Pre-Board Examination (2025-26)
Subject-Biology (044)
Class-XII

Maximum Marks: 70 **Time: 3 hours**

MARKING SCHEME

Q. NO.	Answers	Marks
	SECTION A	
1	A. An RNA virus that synthesises DNA during infection	**1**
2	C. Complete dominance | Incomplete dominance | Codominance	**1**
3	A. 5' – AUGAAUG – 3'	**1**
4	D. Egg , nucellus and endosperm	**1**
5	B. To predict the probability of offspring genotypes	**1**
6	C. males and females, respectively	**1**
7	B. Non-symbiotic nitrogen fixation	**1**
8	B. To degrade organic matter	**1**
9	B.	**1**
10	C. Cyclosporin A produced from *Trichoderma polysporum*	**1**
11	D. used to treat emphysema	**1**
12	C. secondary spermatocyte	**1**
13	A. Both assertion (A) and reason (R) are true, and reason (R) is the correct explanation of assertion (A).	**1**
14	D. Assertion (A) is false, but Reason (R) is true.	**1**
15	A. A and R are true and R is the correct explanation of A.	**1**
16	B. Both A and R are true, but R is not the correct explanation of A.	**1**
	SECTION B	
17	***Attempt either option A or B.*** A. (i) By smoking or oral consumption / inhalation and oral ingestion (1) (ii) Cannabinoids affect the cardiovascular system of the body. (1) **OR** B. (i) Parts of human body that gets affected by pneumonia- alveoli of our lungs and causative agents are *Streptococcus pneumoniae and Haemophilus influenzae.* (1) (ii) Parts of human body that gets affected by common cold infection- nose and respiratory passage and caused by is Rhino virus. (1)	2
18	Cry-proteins are crystal proteins that are poisonous to insects and are expressed by the *cry* gene. (½) In Bt cotton (pest resistant GM crop) a *cry* gene -*cryIAc* and *cryIIAb* has been introduced from bacterium *Bacillus thuringiensis* which causes synthesis of a toxic protein i.e. cry proteins. This protein becomes active in alkaline gut of boll worm feeding on cotton, punching holes in the gut lining causing death of the insect. (1½)	2
19	A. X – Ammensalism Y – Predation (1) B. (i) Nature's way of transferring energy fixed by plants to higher trophic levels/conduits for energy transfer. (ii) Keep prey population under control (iii) Predators help in maintaining species diversity in a community, by reducing the intensity of competition among competing prey species. *(Any two)* (1)	2

20	***Attempt either option A or B.*** A. Spermatogenesis starts at the age of puberty due to significant increase in the secretion of gonadotropin releasing hormone (GnRH) from hypothalamus. Increased levels of GnRH acts at the anterior pituitary gland and stimulates secretion of two gonadotropins – luteinising hormone (LH) and follicle stimulating hormone (FSH). (1) LH acts at the Leydig cells and stimulates synthesis and secretion of androgens. Androgens stimulate the process of spermatogenesis. FSH acts on the Sertoli cells and stimulates secretion of some factors which help in the process of spermiogenesis. (1) **OR** B. In the age group of 15-24 years STIs are reported to be very high. (½) Following are the three practices to avoid them: (i) Avoid sex with unknown partners/multiple partners. (ii) Always try to use condoms during coitus. (iii) In case of doubt, one should go to a qualified doctor for early detection and get complete treatment if diagnosed with infection. (1½)	2
21	***Attempt either option A or B.*** A. (i) Correct answer – (1) (ii) Correct diagram - (1) --- ***For visually impaired students*** A. (i) Same as above (1) (ii) Explanation -Same as above (1) **OR** B. $2pq = 2 \times 0.6 \times 0.4 = 0.48$ (1) If directional selection operates on the population for dominant trait, increase in frequency of R allele (p) and decrease in frequency of r allele (q) will take place and over time, the population would shift towards more red-petaled flowers. This would disrupt the Hardy-Weinberg equilibrium, and the population would evolve. (1)	2
	SECTION C	
22	Preparation of antigenic proteins of pathogens or inactivated/live but weakened pathogens is introduced into the body which generate primary immune response /by producing antibodies along with forming memory B-cells and T-cells. (1) When vaccinated person is attacked by the same pathogens, second time, the existing memory B cells and T cells recognise the antigen and overwhelm the invaders with massive production of lymphocytes and antibodies. (1) Hepatitis B vaccine is produced from yeast. (1)	3
23	A. Seed X- 3 embryos, 1 embryo sac, 1 ovule (1) B. In many Citrus and Mango varieties some of the nucellar cells surrounding the embryo sac start dividing mitotically, protrude into the embryo sac and develop into multiple embryos. Thus, each ovule contains many embryos. Occurrence of more than one embryo in a seed is referred to as polyembryony. (1) C. The plants growing from seed X will have to share the resources/ endosperm, so there is a possibility of some plants being unnourished and only one plant in seed Y will use the entire endosperm for its growth // as the plants of seed X are clones they will not show variation and may succumb to environmental stress, plants from seed Y will have genetic variation and so can show greater adaptability. (1)	3

	--- ***For visually impaired students*** A. Correct use to a farmer - (½) B. Correct use to a plant - (2½)	
24	Significance (½) Correct Parents (½+½) Correct F1 generation (½) Correct Results (½) Correct Interpretations (½)	3
25	A. Protein. (½) B. Chain A – 21, Chain B – 30 (1) C. Human Proinsulin when initially synthesised in human body consists of three peptide chains-A, B and C. The C-peptide is an extra stretch of 31 amino acids joining the A and B-chains. It undergoes processing or splicing to release the functional mature insulin containing only A and B-chains that can carry out its normal functions. (1½) --- ***For visually impaired students*** A. Even if the plant is infected with a virus, the meristem (apical and axillary) is free of virus. Hence, one can remove the meristem and grow it in vitro to obtain virus-free plants. An important application of the method is the recovery of healthy plants from diseased plants. (2) B. Golden rice is a genetically modified Vitamin A enriched rice which can prevent health issues related to vitamin A deficiency. (1)	3
26	Correct functions of Pituitary hormones - (2) Correct functions of Ovarian hormones - (1)	3
27	International Union for Conservation of Nature and Natural Resources (1) Criteria used for determining any region as a hot spot – high level of species richness, high degree of endemism, regions of accelerated habitat loss. *(Any Two)* (1) Western Ghats and Sri Lanka, Indo-Burma and Himalayas. *(Any Two)* (1)	3
28	A. 5' to 3', No more Amino acids will be added (1) B. Codon is GCA, Anti-Codon is CGU (1) C. There are two sites (P-site and A-site) in the large subunit of ribosomes, for subsequent amino acids to bind to and thus, be close enough to each other for the formation of a peptide bond (by peptidyl transferase enzyme). The ribosome also acts as a catalyst (23S rRNA in bacteria is the enzyme- ribozyme) for the formation of peptide bond. (1) --- ***For visually impaired students*** A. The RNA polymerase is only capable of catalysing the process of elongation. It associates transiently with initiation-factor (σ) and termination-factor (ρ) to initiate and terminate the transcription, respectively. Association with these factors alters the specificity of the RNA polymerase to either initiate or terminate. (2) B. Same as C. above. (1)	3

	SECTION –D	
29	A. Logistic growth model**.** The graph for this model is S-shaped or sigmoidal. (1) B. A population growing in a habitat with limited resources show initially a lag phase, followed by phases of acceleration and deceleration and finally an asymptote (stationary phase), when the population density reaches the carrying capacity. A plot of N in relation to time (t) results in a sigmoid curve. This type of population growth is also called Verhulst-Pearl Logistic Growth. (2) ***Attempt either subpart C or D*** C. Since in nature resources for growth for most animal populations are finite and become limiting sooner or later, the logistic growth model is considered a more realistic one. (1) **OR** D. The 'r' is a very important parameter chosen for assessing impacts of any biotic or abiotic factor on population growth. (1)	4
30	A. The rupture of RBCs is associated with release of a toxic substance, haemozoin, which is responsible for the chill and high fever recurring every three to four days/fixed intervals. (1) B. The parasite reproduces asexually in liver cells, bursting the cells and releasing into the blood. Parasite further reproduces asexually in red blood cells. Released parasites infect new red blood cells. Sexual stages (gametocytes) develop in red blood cells. (2) ***Attempt either subpart C or D*** C. The infection is caused by the bite of the infected female *Anopheles* mosquitoes which introduces the sporozoites into the human body. (1) **OR** D. Fertilization and development take place in the mosquito gut. (1) --- ***For visually impaired students*** Same answers as given in parts A – D.	4
	SECTION E	
31	A. 'R' – Structure: After implantation, finger-like projections appear on the trophoblast called chorionic villi which are surrounded by the uterine tissue and maternal blood. The chorionic villi and uterine tissue become interdigitated with each other and jointly form a structural and functional unit between developing embryo (foetus) and maternal body called placenta. (1½) Functions: The placenta facilitate the -supply of oxygen and nutrients to the embryo , removal of carbon dioxide and excretory/waste materials produced by the embryo, acts as an endocrine tissue and produces several hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL), estrogens, progestogens, etc. *(Any two functions)* (1) B. 'Q' – Used in Amniocentesis. (½) C. Correct diagram – Blastocyst. (2) --- ***For visually impaired students*** A. The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex. This triggers release of oxytocin from the maternal pituitary. Oxytocin acts on the uterine muscle and causes stronger uterine contractions, which in turn stimulates further secretion of oxytocin. The stimulatory reflex between the uterine contraction and oxytocin secretion continues resulting in stronger and stronger contractions. This leads to expulsion of the baby out of the uterus through the birth canal – parturition. (2½)	5

	B. Because fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary-isthmic junction. (1) C. The milk that comes out of the mammary glands during initial stages of lactation is called colostrum. It contains several antibodies (IgA) absolutely essential to develop resistance for the new-born babies. (1½) **OR** A. Four male gametophytes are formed by meiosis of single microspore mother cell whereas female gametophytes are formed by meiosis of single megaspore mother cell to produce 4 megaspores, out of which three degenerate and only one survives. The surviving megaspore undergoes mitotic division to form the female gametophyte. (2½) B. Because endosperm provides nutrition to the developing embryo. It is an adaptation to provide assured nutrition to the developing embryo. (½) C. The hard outer layer called the exine is made up of sporopollenin which is one of the most resistant organic materials known. Its most important function is to protect the pollen grain. It can withstand high temperatures and strong acids and alkali. No enzyme that degrades sporopollenin is so far known. (2) --- ***For visually impaired students*** A. and B. same as above. C. Groundnut – Because endosperm is completely consumed during embryo development. Castor – Endosperm persists and is used up during seed germination. (1) D. 480 male gametes (1)	
32	A. They used radioactive phosphorus (^{32}P) and radioactive sulphur (^{35}S). They grew some viruses on a medium that contained radioactive phosphorus and some others on medium that contained radioactive sulphur. Viruses grown in the presence of radioactive phosphorus contained radioactive DNA but not radioactive protein because DNA contains phosphorus. Viruses grown in the presence of radioactive sulphur contained radioactive protein but not radioactive DNA because DNA doesn't contains sulphur. (2) B. Blender: to separate viral protein coats that are still attached to surface of the bacteria. Centrifuge: to separate lighter supernatant (viral protein coat) from denser residue (containing bacteria). (1) C. Observations: Bacteria which were infected with virus having radioactive DNA were found to contain radioactive DNA Bacteria which were infected with virus having radioactive protein coat were not found to contain radioactivity. (1) Conclusion: DNA is the genetic material but not the protein. (1) **OR** A. Correct diagram. (3) B. Morgan saw that when the two genes in a dihybrid cross were situated on same chromosome, the proportion of parental gene combinations were much higher than the non-parental type. Reason: Due to physical association or linkage of the two genes and the term recombination to describe the generation of non-parental gene combinations. Percentage of recombinants depends on distance between genes. More the distance more is the percentage of recombinants and vice versa. He observed that the two genes when linked did not segregate independently of each other and the F2 ratio deviated very significantly from the Mendelian 9:3:3:1 ratio (expected when the two genes are independent). (2)	5

33	A. ori sequence in cloning vector - from where replication starts and any piece of DNA when linked to this sequence can be made to replicate within the host cells. It is also responsible for controlling the copy number of the linked DNA. (1) B. *Agrobacterium* causes tumor in plants, (1) Role of Ti-plasmid and T- DNA , gene of interest introduced in T-DNA (1) C. In bioreactors large volume of culture can be processed biologically /by microbes which results in higher yields of the desired specific products (protein/enzyme) under optimum controlled growth conditions of temperature, pH and raw materials. (1½) The protein produced by genetically altered gene in a host is called recombinant protein. (½) **OR** A. Bacterial cell is made competent by : Divalent cation treatments , incubation on ice , heat shock , incubation on ice again (2) B. Polymerase chain reaction (PCR) i) Annealing ii) Extension (Steps needs to be explained) or correct diagram of the process (3)	5

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Pre-Board Examination (2025-26)
Subject-Biology
Class-XII

MM: 70 **Time: 3 hours**

General Instructions:

(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1mark each; Section–B has 5 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section–D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
(iv) There is no overall choice. Answer all 33 questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION A

Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

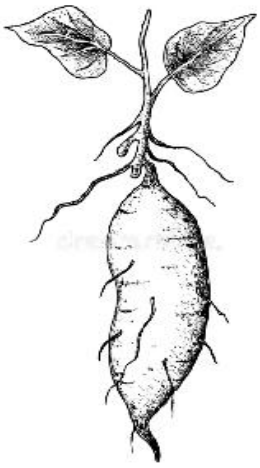
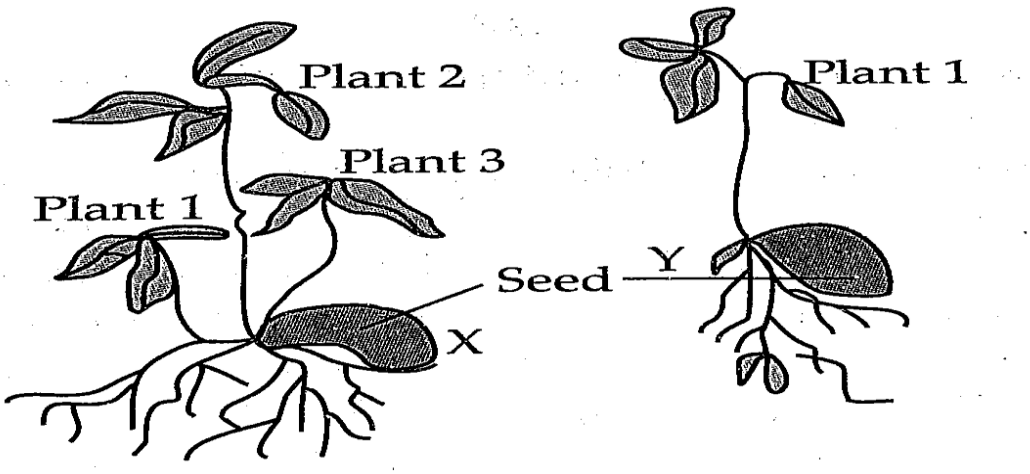
<table>
<tr><th>Q. No.</th><th>Question</th><th>Marks</th></tr>
<tr><td>1</td><td>Choose the correct option regarding retrovirus.
A. An RNA virus that synthesises DNA during infection
B. A DNA virus that synthesises RNA during infection
C. A ssDNA virus
D. A dsRNA virus</td><td>1</td></tr>
<tr><td>2</td><td>In an experiment involving three types of crosses, following results were observed in F_1 progeny:
Cross 1: Only one parental character is expressed
Cross2: Both the parental characters are partially expressed
Cross3: Both the parental characters are expressed
Which of the following conclusions is correct?
<table><tr><th>Conclusion</th><th>Cross 1</th><th>Cross 2</th><th>Cross 3</th></tr><tr><td>A.</td><td>Codominance</td><td>Incomplete dominance</td><td>Complete dominance</td></tr><tr><td>B.</td><td>Codominance</td><td>Complete dominance</td><td>Incomplete dominance</td></tr><tr><td>C.</td><td>Complete dominance</td><td>Incomplete dominance</td><td>Codominance</td></tr><tr><td>D.</td><td>Incomplete dominance</td><td>Codominance</td><td>Complete dominance</td></tr></table></td><td>1</td></tr>
<tr><td>3</td><td>If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is: 5’ – ATGAATG – 3’ - then the sequence of bases in its RNA transcript would be:
A. 5’ – AUGAAUG – 3’
B. 5’ – UACUU AC – 3’
C. 5’ – CAUUCAU – 3’
D. 5 – GUAAGUA – 3’</td><td>1</td></tr>
<tr><td>4</td><td>Commonly in a mature fertilized ovule n,2n,3n conditions are respectively found in:
A. Endosperm , nucellus and egg</td><td>1</td></tr>
</table>

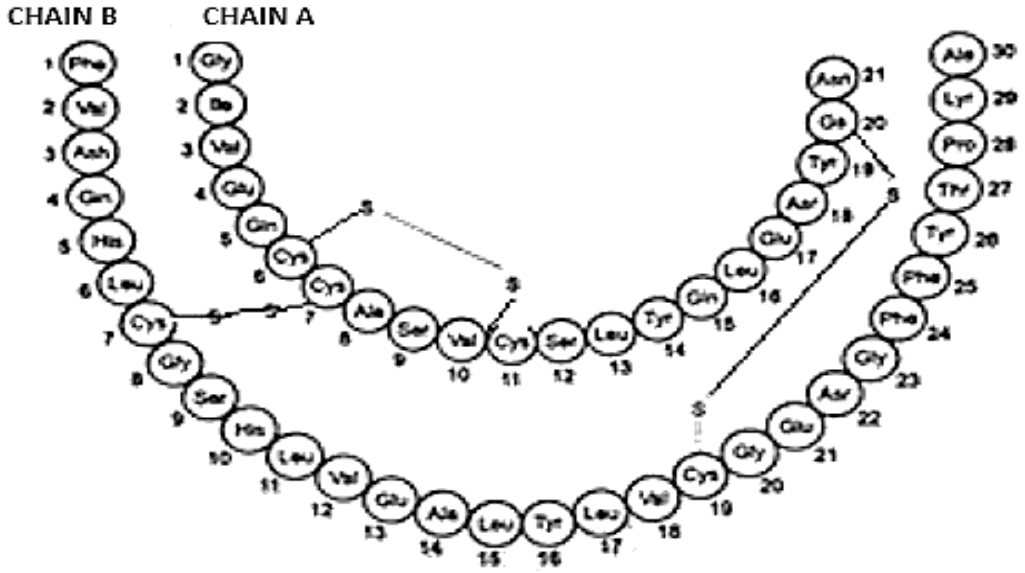
	B. Egg, antipodals and endosperm C. Integuments, synergids and egg D. Egg , nucellus and endosperm	
5	What is the purpose of a Punnett square? A. To determine the genotype of an individual B. To predict the probability of offspring genotypes C. To identify the phenotype of an individual D. To study the evolution of traits	1
6	In a population of cockroaches, some have 20 chromosomes and the others have 21 chromosomes. The 20 and 21 chromosome bearing organisms are: A. females and males, respectively B. all females C. males and females, respectively D. all males	1
7	What is the primary role of *Azotobacter* in soil? A. Symbiotic nitrogen fixation B. Non-symbiotic nitrogen fixation C. Phosphorus solubilization D. Potassium mobilization	1
8	What is the role of microbes in sewage treatment? A. To produce biogas B. To degrade organic matter C. To produce antibiotics D. To purify water	1
9	If a double stranded DNA has 20% of cytosine, what will be the percentage of adenine, guanine, and thymine in it? **S.No.** | **Name of nucleotide** | **Percentage** A | Adenine, Guanine, Thymine | 20%,40%,30%, B | Adenine, Guanine, Thymine | 30%,20%,30% C | Adenine, Guanine, Thymine | 20%,60%,30% D | Adenine, Guanine, Thymine | 40%,30%,20%	1
10	A patient was advised to have a kidney transplant. To suppress the immune reaction, the doctor would administer him: A. Statins produced from *Monascus purpureus* B. Statins produced from *Streptococcus thermophilus* C. Cyclosporin A produced from *Trichoderma polysporum* D. Cyclosporin A produced from *Clostridium butylicum*	1
11	α-1-antitrypsin is - A. nutritionally a more balanced product for human babies B. an enzyme produced by rDNA technology C. used to treat arthritis D. used to treat emphysema	1
12	Which among the following has 23 chromosomes? A. Spermatogonia B. Zygote C. Secondary spermatocyte D. Oogonia	1

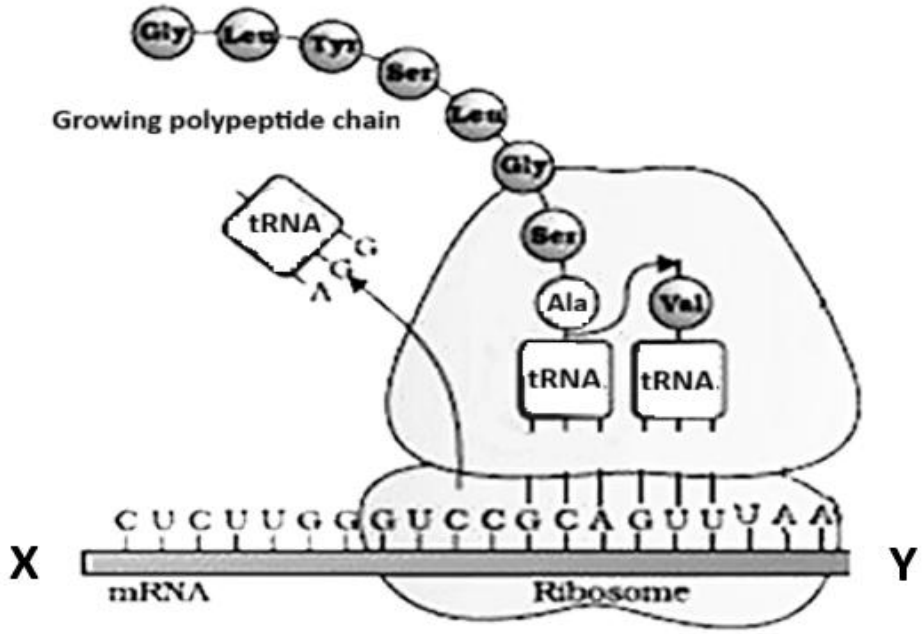
Question No. 13-16 consist of two statements - Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

A. Both A and R are true and R is the correct explanation of A.
B. Both A and R are true and R is not the correct explanation of A.
C. A is true but R is false.
D. A is false and R is true.

13	**Assertion (A):** DNA finger printing is applied in paternity tests in case of disputes. **Reason (R)**: It employs the principle of polymorphism in DNA sequences as polymorphisms are inheritable from parent to children.	1
14	**Assertion (A):** Gross primary productivity is always less than net primary productivity. **Reason (R) :** Rate of synthesis of organic matter by consumers is known as secondary productivity.	1
15	**Assertion (A):** In a monohybrid cross between tall plants and dwarf plants, the F_2 generation showed tall and dwarf plants in the ratio of 3 : 1. **Reason (R) :** There is no blending of traits/characters in the F_2 generation.	1
16	**Assertion (A)**: Pollen viability is the period during which pollen grains retain their ability to germinate. **Reason (R):** Pollen viability is affected by temperature and humidity.	1
	SECTION B	
17	***Attempt either option A or B.*** A. (i) What are the modes of consumption of cannabinoids? (ii) Name the organ which is affected by the consumption of these drugs? **OR** B. (i) Mention the parts of human body that gets affected by pneumonia and common cold infections. (ii) Write the causative agents of the two diseases.	2
18	What are cry-proteins? Explain how these proteins act as biological pesticide with suitable example?	2
19	Given below is a table depicting population interactions between species 'P' and species 'Q'. **Type of interaction** | **Species 'P'** | **Species 'Q'** X | (-) | (0) Y | (+) | (-) A. Name the two types of population interactions – 'X' and Y' depicted in the above table. B. Justify giving a reason, how the type of interaction 'Y' is important in ecological context.	2
20	***Attempt either option A or B.*** A. How does the hypothalamic-pituitary-testicular axis regulate spermatogenesis? **OR** B. Within which age group of human population, the incidences of sexually transmitted infections are reported to be very high. Enlist three practices to avoid them.	2

21	***Attempt either option A or B.***  **Fig. I**  **Fig. II** A. (i) Compare Fig. I and Fig. II given below and explain how they serve as an example of analogy? (ii) Draw the self-explanatory diagrams from plant kingdom to show homologous structures. --- ***For visually impaired students*** A. (i) Compare potato and sweet potato and explain how they serve as an example for analogy? (ii) Explain homology with the help of examples from plant kingdom. **OR** B. In a population of flowers, the frequency of the R allele (red petals) is 0.6 and the frequency of the r allele (white petals) is 0.4. Calculate the expected frequency of the heterozygous genotype (Rr)? What will happen if the environment favours the dominant trait and directional natural selection operates on the above population.	2
	SECTION C	
22	How do vaccines prevent microbial infections? Name the organism from which hepatitis B vaccine is produced.	3
23	The image below shows two germinated seeds 'X' and 'Y' which belongs to the same species. Seed 'X' is produced by apomixis whereas seed 'Y' is product of sexual reproduction. 	3

	A. Write the number of embryo(s), embryo sac(s) and ovules (s) in the ovary of seed 'X'. B. How multiple embryos are formed in citrus fruits? C. What advantage will plants developed from seed Y have over seed 'X'. --- ***<u>For visually impaired students</u>*** A. How does a farmer use the dormancy of seeds to his advantage? B. What advantages a seed provides to a plant?	
24	What is the significance of a test cross? Make a test cross between a round-seeded pea plant (unknown genotype) and a wrinkled-seeded pea plant (rr) and interpret the results.	3
25	The diagram below shows the molecular structure of mature functional insulin.  A. What is the chemical nature of human insulin? B. Eli Lilly an American company used the knowledge of rDNA technology to produce human insulin. Two DNA sequences corresponding to A and B chains of human insulin were prepared. Based on the diagram given above, find the number of codons that would be required to encode for chain A and chain B? C. Human insulin when initially synthesised in human body is a prohormone which contains total 82 building units in its structure. What changes take place in the molecule to form mature functional insulin? --- ***<u>For visually impaired students</u>*** A. What is meristem culture? Pinpoint its significance in the field of agriculture? B. Golden rice has the potential to address nutritional deficiencies in developing countries where rice is a staple food. Justify.	3
26	Describe the role of pituitary and ovarian hormones during the menstrual cycle in a human female.	3
27	Expand IUCN. Mention any two criteria used for determining any region as "biodiversity hotspot". Name any two hotspots in India.	3
28	Study the schematic diagram given below and answer the questions that follow:	3



A. Identify the polarity of mRNA from X to Y in the above diagram and mention how many more amino acids are expected to be added to the polypeptide chain.
B. Mention the codon and anti-codon for alanine.
C. How is peptide bond formation facilitated between alanine and valine in the ribosome in above diagram?

For visually impaired students

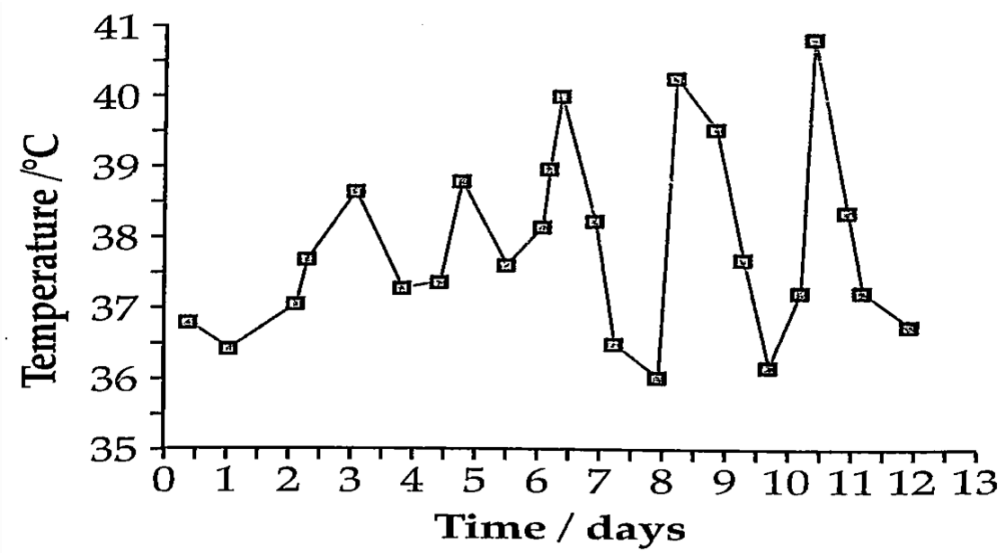
A. How is DNA-dependent RNA polymerase able to catalyse all the three steps which are initiation, elongation and termination during transcription in bacteria?
B. How is peptide bond formation facilitated between alanine and valine in the ribosome during translation?

SECTION –D

29 A population of deer is introduced to a protected nature reserve. Ecologists track the population size over several years, recording the following data: 4

Time (in Year)	Population Size (N)
0	10
2	40
4	100
6	150
8	180
10	195

A. Which population growth model does this data most likely represent? When above data is plotted then what would be the shape of the graph obtained?
B. What are the characteristics of population growth of deer in the habitat with limited resources?

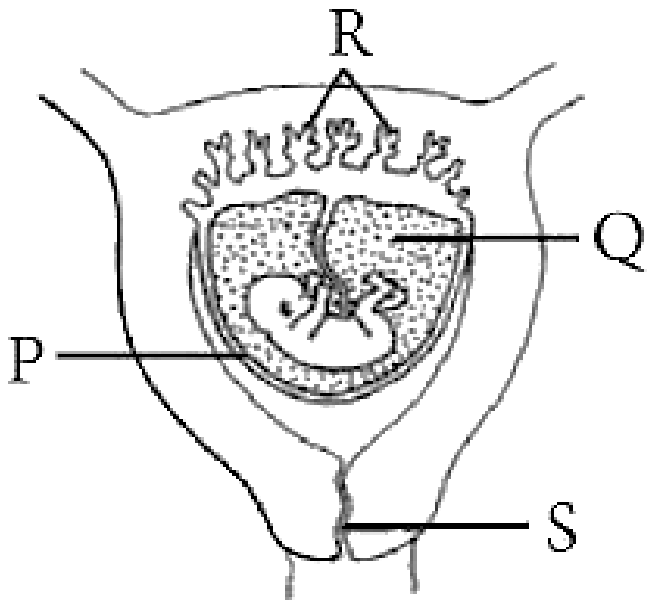
	Attempt either subpart C or D C. Why is this model considered a more realistic one? **OR** D. This type of population growth is called Verhulst-Pearl Logistic Growth and is described by the following equation: $dN/dt = rN\left(\frac{K-N}{K}\right)$ Where, N = Population density at time t, r = Intrinsic rate of natural increase, K = Carrying capacity What is the importance of 'r' in relation to population growth models?	
30	Given below is the pattern of temperature in the person suffering from an unknown non-viral disease transmitted by mosquitoes. Study the graph and answer the following questions:  A. Explain the factor (s) responsible for this pattern of temperature. B. How does the pathogen multiply in the human body? ***Attempt either subpart C or D*** C. How is the infection transmitted to humans? **OR** D. Which stages of the life cycle of this pathogen are completed in the mosquito's gut? --- ***For visually impaired students*** A patient suffering from an unknown non-viral disease, transmitted by mosquitoes, exhibited a peculiar pattern of high fever that recurred at fixed intervals of approximately 48 hours, lasting for 12 days. A. Explain the factor (s) responsible for this pattern of temperature. B. How does the pathogen multiply in the human body? ***Attempt either subpart C or D*** C. How is the infection transmitted to humans? **OR** D. Which stages of the life cycle of this pathogen are completed in the mosquito's gut?	4

SECTION E

31 Study the diagram given below to answer the following questions. 5

A. Describe the process of formation of structure of 'R'. What are the functions of 'R'?

B. 'Q' is used taken to analyse the fetal cells and dissolved substances and to test



for the presence of certain genetic disorders such as, Down's syndrome, haemoplilia, sickle-cell anemia, etc. Name the procedure.

C. Name and draw a labelled sectional view of the embryonic stage that gets implanted.

For visually impaired students

Explain giving reasons for the following:

A. Parturition is induced by a complex neuroendocrine mechanism.

B. All copulations do not lead to fertilisation and pregnancy.

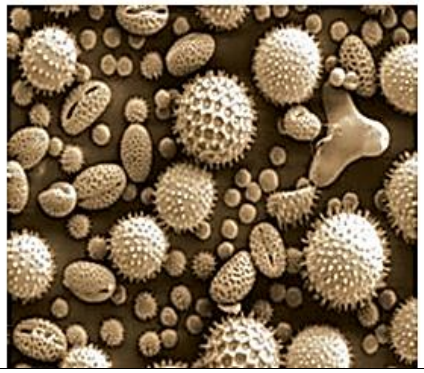
C. Breast feeding is recommended by doctors for bringing up a healthy baby.

OR

A. In a flowering plant a microspore mother cell produces four male gametophytes while a megaspore mother cell forms only one female gametophyte. Explain.

B. Why does endosperm development precede embryo development in angiosperm seeds?

C. Structures shown below have different patterns on their outer layers which are made up of one of the most resistant organic materials known. Mention its most important function and discuss how it ensures to function efficiently.


	--- ***For visually impaired students*** A. In a flowering plant a microspore mother cell produces four male gametophytes while a megaspore mother cell forms only one female gametophyte. Explain. B. Why does endosperm development precede embryo development in angiosperm seeds? C. Groundnut seeds are ex-albuminous and castor seeds are albuminous. Why? D. A flower of tomato plant following the process of sexual reproduction produce 240 viable seeds. How many male gametes were involved in this process?	
32	Hershey - Chase experiment marked a groundbreaking milestone in genetics. A. How were the different radioactive isotopes used in the above experiment? B. Why did they need to agitate and spin their culture? C. Write the observations and conclusions they arrived at. **OR** Morgan carried out several dihybrid crosses in *Drosophila* to study genes that were sex-linked. White eyed, yellow bodied female (*yw/yw*) *Drosophila* were crossed with red eyed, brown bodied male (y^+w^+) *Drosophila* which produced 1.3 per cent recombinants and 98.7 per cent progeny with parental type combinations in F_2 generation. This observation of Morgan disproved the Mendelian dihybrid F_2 phenotypic ratio of 9: 3: 3: 1. A. Draw the F_2 generation of the above dihybrid cross for the genes located on the X chromosome. B. Explain Morgan's observations giving reasons.	5
33	Justify the statements given below with suitable explanations. A. Presence of ori sequence in a vector is crucial to facilitate cloning. B. *Agrobacterium* is disarmed as pathogen and now made a useful cloning vector. C. Bioreactors help in large scale production of recombinant proteins. **OR** A. Explain how a bacterial cell is made competent to take up recombinant DNA from the medium. B. The table given below codes some details about a process which has revolutionized the field of genetic engineering.	5

Codes	Process Details
P	*In vitro* process
Q	Multiple copies of gene of interest synthesized
R	Two sets of primers required
S	Enzyme used is DNA Polymerase
T	Application in DNA Fingerprinting and Molecular Diagnosis

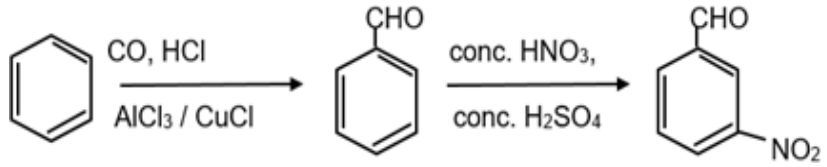
Study the process details to identify the process and explain the steps coded as R and S in detail.

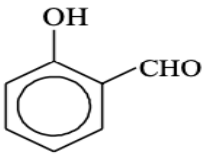
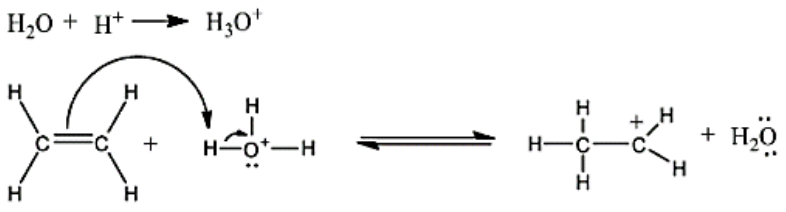
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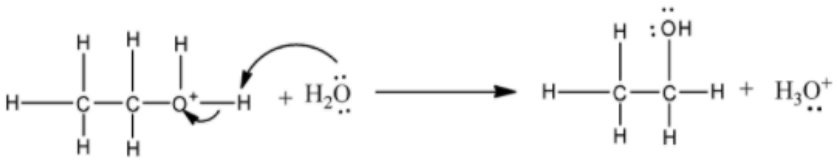
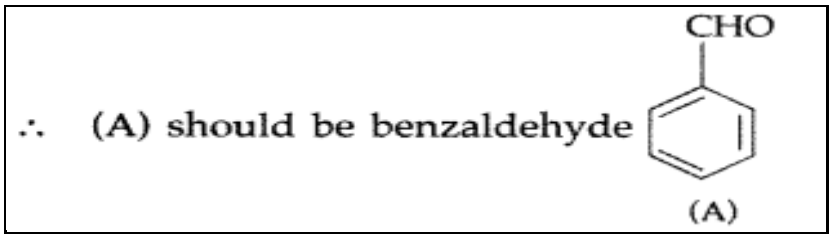
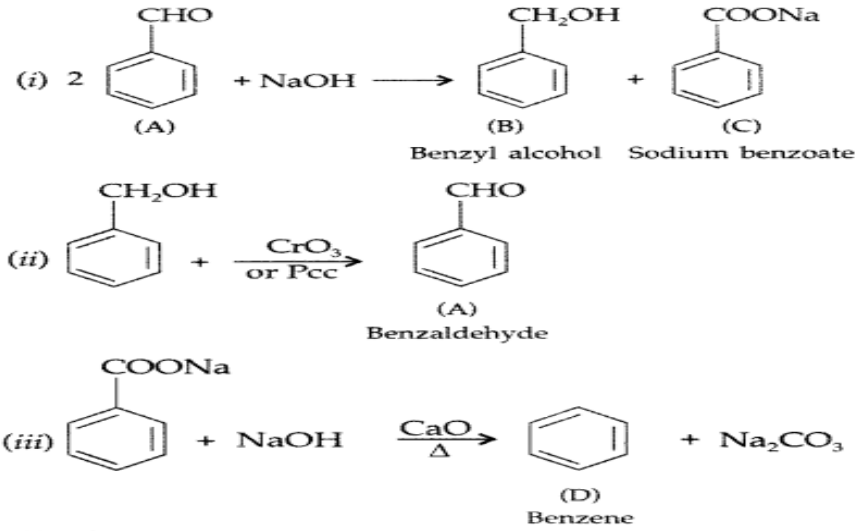
KENDRIYA VIDYALAYA SANGATHAN, DEHRADUN REGION
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MARKING SCHEME (SET-3)

Q.	Solutions/ Answers	Value Points
1.	a	1
2.	a	1
3.	a	1
4.	c	1
5.	c	1
6.	c	1
7.	a	1
8.	b	1
9.	b	1
10.	a	1
11.	c	1
12.	b	1
13.	c	1
14.	d	1
15.	a	1
16.	a	1
17.	The external pressure that must be applied to the solution side to stop the passage of solvent into the solution through a semi-permeable membrane is known as osmotic pressure. The osmotic pressure method has the advantage over other method as: (a) pressure measurement is around the room temperature. (b) molarity of the solution is used instead of molality. (c) As compared to other colligative properties, its magnitude is large even for every dilute solution, and denaturation of protein does not occur.	1 ½ + ½ (for any 2 points)
18.	i) First order ii) time^{-1} or s^{-1} ii) k= 0.693 / $t_{1/2}$ iv) slope = -k (rate constant)	1/2x4=2

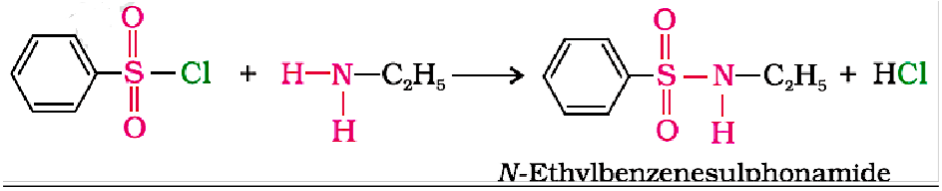
19.	(i) In haloalkanes, the halogen atom is attached to sp^3 -hybridized carbon while in haloarenes, it is attached to sp^2 -hybridized carbon whose size is smaller than sp^3 orbital carbon. Therefore C – Cl bond in chlorobenzene is shorter than alkyl halide. (ii) Grignard reagents are very reactive. In the presence of moisture, they react to give alkanes. Therefore, Grignard reagents should be prepared under anhydrous conditions. $RMgX + H_2O \rightarrow RH + Mg(OH)X$	1 1
20.	(a) $C_6H_5COCH_3 < CH_3COCH_3 < CH_3CHO$ (due to steric & electronic factors). (b) $CH_3—COOH < Cl—CH_2—COOH < F—CH_2—COOH$ (increase in –I effect). **OR** (a)  (b) 	1 1 1 1
21.	(i) Amylose is water soluble component which constitutes about 15-20% of starch. Amylose is a long unbranched chain with 200- 1000 α-D-(+)-glucose units. Amylopectin is insoluble in water and constitutes about 80- 85% of starch. Amylopectin is a branched chain polymer of α-D-glucose units. (ii) A peptide linkage (-CO-NH linkage) is a chemical bond formed between the carboxyl group of one molecule and amino group of the other molecule. The –O- linkage between two monosaccharides in oligosaccharides/ polysaccharides is called glycosidic linkage.	1 1
22.	E°cell = E°right – E°left E°cell = – 0.44 – (– 0.74) = 0.30 V $Ecell = E°cell - \frac{.0591}{n} \log\frac{[P]}{[R]}$ $= 0.30 - \frac{.0591}{6} \log\frac{[0.01]2}{[0.1]3}$ $= 0.30 + 0.01 = 0.31$ V	$1/2$ $1/2$ 1 $1/2$ $1/2$
23.	(i) $[Co(NH_3)Cl(en)_2]^{2+}$ (ii) $[Ni(H_2O)_2(OX)_2]^{2-}$: (iii) Amminechloridobis (ethane-1, 2-diamine)-cobalt(III) ion, Magnetic	1/2 , 1/2

	behaviour : Diamagnetic Diaquadioxalatonickelate (II) ion, Magnetic behaviour : Paramagnetic	1+1
24.	(a) Reimer Tiemann ,  2-Hydroxybenzaldehyde (b) Williamson synthesis, $CH_3CH_2CH(CH_3)CH(CH_3)O\ C_2H_5$ 2- Ethoxy-3 -methylpentane (c) Stephen reaction, CH_3CH_2CHO, Propanal (**Any two)**	½ + ½ + 1/2 ½ + ½ +1/2 ½ + ½+1/2
25.	Using Arrhenius equation, $\log \frac{k_2}{k_1} = \frac{E_a}{2.303R}\left[\frac{T_2 - T_1}{T_1 T_2}\right]$ or, $\log \frac{k_2}{k_1} = \frac{3.05 \times 10^5\ \text{J mol}^{-1}}{2.303 \times 8.314\ \text{JK}^{-1}\ \text{mol}^{-1}} \times \left[\frac{310 - 300}{300 \times 310}\right]$ $\log \frac{k_2}{k_1} = \frac{3.05 \times 10^5\ \text{J mol}^{-1} \times 10\ \text{K}}{1780684.2\ \text{JK}^{\ 1}\text{mol}^{\ 1}}$ $\log \frac{k_2}{k_1} = 1.71 \Rightarrow \frac{k_2}{k_1} = \text{antilog}(1.71)$ $\frac{k_2}{6 \times 10^{-4}} = 51.28$ $k_2 = 3.07 \times 10^{-2}\ \text{s}^{-1}$	½ ½ ½ ½ ½ ½
26.	(a)$(CH3)3C^+$ is 3° carbo-cation which is more stable than CH_3^+ for SN1 reaction. (b) Electrophilic attack on the hydronium ion takes place which protonates the ethene to form a carbocation  2) In the second step, the carbocation is attacked by the water molecule. 	1 ½

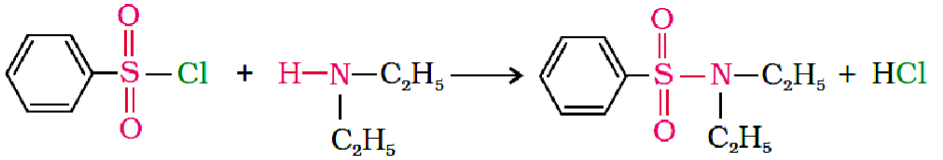
	3) The deprotonation lastly generates the ethanol. 	1 1/2
27.	(A) gives characteristic odour which on treatment with NaOH and forms two compounds B and C.  ∴ (A) should be benzaldehyde (A) **Reactions :**  (i) 2 + NaOH → + (A) (B) Benzyl alcohol (C) Sodium benzoate (ii) + CrO_3 or Pcc → (A) Benzaldehyde (iii) + NaOH $\xrightarrow[\Delta]{CaO}$ + Na_2CO_3 (D) Benzene	1 ½ ½ 1
28.	(a) A= glycosidic, B= α –Glucose, C= β -Fructose (b) Protein present in the hair is fibrous while in egg is globular. Fibrous proteins are long fibre like and usually insoluble in water whereas globular proteins are globular and usually soluble in water	½ + ½ + ½ 1.5
29.	(a) oxidation state = 0 (zero) OR coordination number = 6	1

	(b) Linkage isomerism, $[Co(NH_3)_5(ONO)](Br)_2$	1
	(c) (i) The complex A with ligand ethane-1,2-diamine will be more stable as it is didentate ligand leading to the formation of chelate and hence increasing the stability .	1
	(ii) The higher magnetic moment will be in the case of Complex B , with weak ligand chlorido as no pairing up of electrons will take place.	1
30.	(a) Specific conductance decreases on dilution of electrolyte solution.	1
	(b)In KCl electrolyte solution λ^{m} and λ^{0} are equal.	1
	(c) $\Lambda^\circ m (NH_4OH) = \Lambda^\circ NH_4^+ + \Lambda^\circ OH^-$ $= (\Lambda^\circ NH_4^+ + \Lambda^\circ Cl^-) + 1/2 (\Lambda^\circ Ba^{2+} + 2\Lambda^\circ OH^-)$ $= -1/2 (\Lambda^\circ Ba^{2+} + 2\Lambda^\circ Cl^-)$ $= 129.8 + 1/2 \times 457.6 - 1/2\ 240.6 = 238.3\ Scm^2mol^{-1}$	2
	OR	
	(I)Higher temperature raises the K.E. of **metal** cations, which obstructs the free passage of electrons and reduces metal conductivity, however, increased temperature improves the mobility of ions in electrolytes, which enhances ion conductance.	1
	(II) CORRECT STATEMENT.	
31.	(a) No effect.	1
	(b) B is sea water, due to the presence of salts it freezes at lower temperature (depression in freezing point).	1
	(c) $CaCl_2$ undergoes complete dissociation as: $CaCl_2 \longrightarrow Ca^{2+} + 2Cl^-$ One mole of $CaCl_2$ will give 3 mole particles and therefore, the value of 'i' will be equal to 3.	1
	$\Delta T_f = iK_f \times m$ $= \frac{i \times K_f \times w_B \times 1000}{M_B \times w_A}$ $K_f = 1.86\ K\ kg\ mol^{-1}$,	1/2

	$w_A = 500\,\text{g},\ w_B = ?,$ $\Delta T_f = 2\,\text{K},\ i = 3,\ M_B = 111\,\text{g mol}^{-1}$ $2 = \frac{3 \times 1.86 \times w_B \times 1000}{111 \times 500}$ Hence, $w_B = \frac{2 \times 111 \times 500}{3 \times 1.86 \times 1000}$ $= 19.89\,\text{g}$	1/2 1
	OR	1
	(i) Solution of XY becomes warmer means. Δ H is -ve or it is exothermic therefore. this mixture shows negative deviation**.** **(ii)** Let W gm of solute X is dissolved in 78 g of benzene. Mole fraction of solute $X = \frac{\frac{W}{50}}{\frac{W}{50}+\frac{78}{78}} = \frac{W}{W+50}$ **Relative lowering of vapour pressure** $= \frac{100-90}{100}$ $= \frac{10}{100} = \frac{W}{W+50}$ $\therefore\ W = 5.55\ \text{gm}$ (iii)Hexane and heptane form ideal solution. Those compounds of same family having similar forces of attraction form ideal sol.	1 1/2 1/2 1+1
32.	(a) (i) Aniline is less basic as lone pair is in conjugation with benzene ring. So its K_b is less and pK_b is more. (ii) Aniline is protonated to form anilinium ion, which is meta directing. (b) (i) $NH_3 < C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N$ (ii) $C_2H_5Cl < C_2H_5NH2 < C_2H_5OH$ (iii) $CH_3COOH > C_2H_5OH > CH_3NH_2 > CH_3OCH_3$ **OR** (a) Benzenesulphonyl chloride ($C_6H_5SO_2Cl$), also known as Hinsberg's reagent, is used for the distinction of 1^o, 2^o and 3^o amines and their separation from each other. With 1^o amines, Benzenesulphonyl chloride yields N-ethylbenzenesulphonyl amide With 2^o amines, Benzenesulphonyl chloride gives N, N-diethylbenzenesulphonamide	1 1 1 1 1 1 1 1 1



N-Ethylbenzenesulphonamide



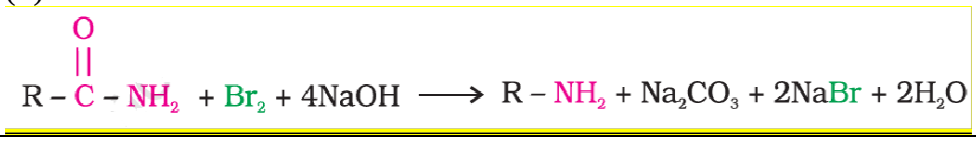
N,N-Diethylbenzenesulphonamide

With 3^{o} amine, benzenesulphonyl chloride do not react.

(b) 1

(i) $R-NH_2 + CHCl_3 + 3KOH \xrightarrow{Heat} R-NC + 3KCl + 3H_2O$ 1

(ii)



33.	(a) Due to presence of unpaired electrons.	
	(b) Transition elements exhibit higher enthalpies of atomization because of large number of unpaired electrons in their atoms; they have stronger interatomic interaction and hence stronger metallic bond.	1 1
	(c)Transition metals have similar atomic radii, therefore, in molten form they can fit to each other's crystalline structure and form homogenous mixture and form the alloys.	
	(d) Mn^{+} has $3d^5 4s^1$ configuration and configuration of Cr^{+} is $3d^5$,therefore, ionisation enthalpy of Mn^{+} is lower than Cr^{+}	1
	(e) Sc and Zn both form colourless compounds and are diamagnetic	1
	OR.	1
	(a) The decrease in the atomic and ionic radii with increase in atomic number of actinoids due to poor shielding effect of 5f electrons.	
	(b) Oxidation state of manganese in manganate ion is +6 and permanganate ion is +7.	1
	(c)Sulphuric acid because hydrochloric acid is oxidised to chlorine.	1
	(d) $NO_2^{-} + 2MnO_4^{-} + 6H^{+}$ □ ------> $2Mn^{2+} + 5NO_3^{-} + 3H_2O$	1
	(e) The increasing order of the magnetic moments of the given ions are: Sc^{+3}, V^{+4}, Ni^{+2}, V^{+2}	1

KENDRIYA VIDYALAYA SANGATHAN, DEHRADUN REGION
PREBOARD-I EXAMINATION (2025-26)

CLASS: XII **MM: 70**
SUBJECT: CHEMISTRY (043) **TIME: 3 Hrs**

GENERAL INSTRUCTION: -

Read the following instructions carefully.

(a) There are 33 questions in this question paper with internal choice.

(b) SECTION A consists of 16 multiple -choice questions carrying 1 mark each.

(c) SECTION B consists of 5 short answer questions carrying 2 marks each.

(d) SECTION C consists of 7 short answer questions carrying 3 marks each.

(e) SECTION D consists of 2 case-based questions carrying 4 marks each.

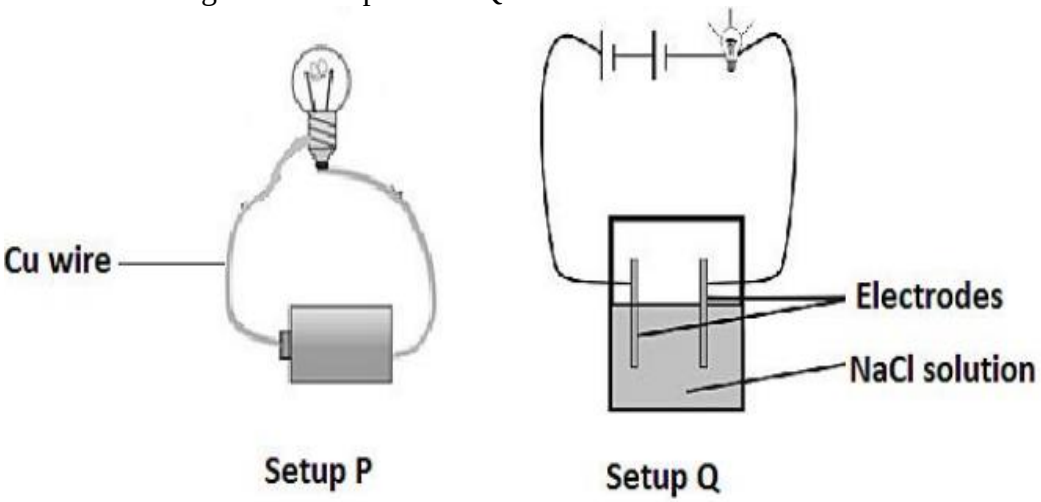
(f) SECTION E consists of 3 long answer questions carrying 5 marks each.

(g) All questions are compulsory.

(h) Use of log tables and calculators is not allowed.

SECTION A

The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

1.	Abhishek arranged two setups P and Q as shown below.  Both experiments are carried out at 25°C. Name the current carriers in setup P and Q. (a) In setup P free electrons and in setup Q be free ions (b) In setup P free ions and in setup Q be free electrons (c) In both setup free ions (d) In both setup free electrons	1

<table>
<tr><td>2.</td><td>The organic compounds A, B and C are amines having equivalent molecular weight. A and B on reaction with benzene sulphonyl chloride give white precipitate, however white precipitate obtained from compound B remains insoluble in NaOH.

The variation in the boiling point of A, B and C can be seen as :

(a) A> B>C (b) B>A>C (c) A=B > C (d) C>B>A</td><td>1</td></tr>
<tr><td>3.</td><td>During a quiz competition team A and team B have to answer a tie question on the characteristics of RNA
Their responses are as follows.
<table>
<tr><th>Name</th><th>Team</th><th>responses</th></tr>
<tr><td>Adrika</td><td>A</td><td>different RNA molecules of a cell are involved in the synthesis of proteins</td></tr>
<tr><td>Seema</td><td>A</td><td>the single stranded helix of RNA holds up to itself to form the secondary structure</td></tr>
<tr><td>Raunak</td><td>B</td><td>the C- 2 atom of the pentose sugar for a ribose nucleotide contains an- OH group.</td></tr>
<tr><td>Ridhima</td><td>B</td><td>the message for the synthesis of a particular protein is present only in the RNA</td></tr>
</table>
What is the expected result of the quiz and why?
(a) team A wins the quiz as both the responses are correct.
(b) team B wins the quiz as both the responses are correct.
(c) team A loses the quiz as Adrika’s response is correct.
(d) team B loses the quiz as Raunak’s response is correct.</td><td>1</td></tr>
<tr><td>4.</td><td>Which of the following will not give aldol condensation?

(a) Phenyl acetaldehyde (b) 2-Methylpentanal (c) Benzaldehyde (d) 1-Phenylpropanone</td><td>1</td></tr>
<tr><td>5.</td><td>Mischmetal contains:

(a) a lanthanoid element and Zinc (b) an actinoid element and Zinc

(c) a lanthanoid element and iron (d) an actinoid element and Mg</td><td>1</td></tr>
<tr><td>6.</td><td>CH_3CH_2OH can be converted into CH_3CHO by:

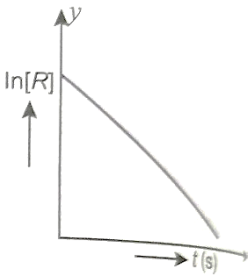
(a)catalytic hydrogenation (b) treatment with $LiAlH_4$

(c) treatment with pyridinium chlorochromate (d) treatment with $KMnO_4$</td><td>1</td></tr>
<tr><td>7.</td><td>The rate law for the reaction A + 2B ---→C is found to be Rate = k [A][B] ^{2}The concentration of reactant ‘B’ is doubled, keeping the concentration of ‘A’ constant, the value of rate constant will be_____.
(a) the same (b) doubled (c) quadrupled (d) halved</td><td>1</td></tr>
<tr><td>8.</td><td>Cu^+ is less stable than Cu^{2+} in aqueous solution. This is because of
(a) More negative Hydration enthalpy of Cu^+ ion</td><td>1</td></tr>
</table>

	(b) More negative Hydration enthalpy of Cu^{2+} ion (c) Less negative Hydration enthalpy of Cu^{2+} ion (d) Less enthalpy of atomization of Cu	
9.	The unit of rate constant for first order reaction is a) mol $L^{-1}S^{-1}$. b) S^{-1} c) L mol^{-1} S^{-1} d) L^2 mol^{-2} S^{-1}	1
10.	Arrange the following compounds in increasing order of boiling point: Propan-1- ol, butan-2-ol, butan-1-ol, pentan-1-ol (a) Propan-1 -ol, butan-2-ol, butan-1 -ol, pentan-1-ol (b) Propan-1 -ol, butan-1 -ol, butan-2-ol, pentan-1 -ol (c) Pentan-1 -ol, butan-2-ol, butan-1 -ol, propan-1 -ol (d) Pentan-1 -ol, butan-1 -ol, butan-2-ol, propan-1 -ol	1
11.	Which one of the following compounds is more reactive towards SN1 reaction? (a) CH_2=$CHCH_2Br$ (b) $C_6H_5CH_2Br$ (c) C_6H_5CH $(C_6H_5)Br$ (d) $C_6H_5CH(CH_3)$ Br	1
12.	Methyl ketones are usually characterised through- (a) Tollen's reagent (b) Iodoform test (c) Schiff's test (d) Benedict test.	1
	In questions (13 to 16), Given below are two statements labelled as Assertion (A) and Reason (R). Select the most appropriate answer in questions 13 to 16, from the options given below: (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true.	1
13.	Assertion (A): D (+) Glucose is dextrorotatory in nature. Reason (R): 'D' represents its dextrorotatory nature.	1
14.	Assertion (A): During electrolysis of aqueous copper sulphate solution using copper electrodes hydrogen gas is released at the cathode. Reason(R): The electrode potential of Cu^{2+}/Cu is greater than H^+/ H_2	1
15.	Assertion (A): Phenol is more reactive than benzene towards electrophilic substitution reaction. Reason (R): In the case of phenol, the intermediate carbocation is more resonance stabilized.	1
16.	Assertion (A): $(CH_3)_3C$-COOH does not undergo HVZ reaction. Reason (R): It does not contain any α- hydrogen.	1

SECTION B

This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.

17.	Define Osmotic Pressure. Why is osmotic pressure used for the determination of molar masses of macromolecules like protein?	1+1=2
18.	For a certain chemical reaction variation in the concentration ln[R] vs time plot is given below:  i) What is the order of the reaction? ii) What are the units of rate constant k? iii) Give the relationship between K and $t_{1/2}$ (half-life period) iv) What is the slope of the curve?	1/2x4=2
19.	Account for the following: - (i) The C – Cl bond length in chlorobenzene is shorter than that in CH_3– Cl (ii) Grignard reagent should be prepared under anhydrous conditions.	1+1=2
20.	Arrange the following compounds in increasing order of their property as indicated: (a) CH_3COCH_3, $C_6H_5COCH_3$, CH_3CHO (reactivity towards nucleophilic addition reaction) (b) Cl—CH_2—COOH, F—CH_2—COOH, CH_3—COOH (acidic character) OR Convert the following: (a) Benzene to m-nitro benzaldehyde (b) Bromobenzene to benzoic acid.	1+1=2 1+1=2
21.	Differentiate between the following: (i) Amylose and amylopectin (ii) Peptide linkage and glycosidic linkage	1+1=2

SECTION C

This section contains 7 questions with internal choice in one question. The following questions are short

answer type and carry 3 marks each.

22.	Calculate e.m.f. of the following cell at 298 K. $2Cr(s) + 3Fe^{2+}(0.1M) \rightarrow 2Cr^{3+}(0.01M) + 3Fe(s)$ Given: $E^\circ (Cr^{3+}/Cr) = -0.74$ V, $E^\circ (Fe^{2+}/Fe) = -0.44$ V	3
23.	Write the formula of each of the following coordination entities: (a) Co^{3+} ion is bound to one Cl^-, one NH_3 molecule and two bidentate ethylene diamine (en) molecules. (b) Ni^{2+} ion is bound to two water molecules and two oxalate ions. (c) Write the name and magnetic behaviour of each of the above coordination entities.	3x1=3
24.	Write the name of the reaction, structure and IUPAC name of the product formed when (any 2): (a) phenol reacts with $CHCl_3$ in the presence of NaOH followed by hydrolysis. (b) $CH_3CH_2CH(CH_3)\ CH(CH_3)ONa$ reacts with C_2H_5Br. (c) CH_3CH_2CN reacts with stannous chloride in the presence of hydrochloric acid followed by hydrolysis.	1.5x2=3
25.	The decomposition of phosphine, $4PH_3(g) \rightarrow P_4(g) + 6H_2(g)$ has the rate law, Rate = $k[PH_3]$. The rate constant is $6.0 \times 10^{-4}\ s^{-1}$ at 300 K and activation energy is $3.05 \times 10^5 J\ mol^{-1}$. Calculate the value of rate constant at 310 K. [Given: R = $8.314 J\ K^{-1} mol^{-1}$]	3
26.	(a)$(CH_3)_3C—O—CH_3$ on reaction with HI gives $(CH_3)_3C—I$ and $CH_3—OH$ as the main products and not $(CH_3)_3C—OH$ and $CH_3—I$. (b) Write the mechanism of the following reaction. $CH_2=CH_2+H_2O \xrightarrow{H^+} CH_3\ CH_2OH$.	1 2
27.	An organic compound 'A' which has characteristic odour, on treatment with NaOH forms two compounds 'B' and 'C'. Compound 'B' has the molecular formula C_7H_8O which on oxidation with CrO_3 gives back compound 'A'. Compound 'C' is the sodium salt of the acid. 'C' when heated with soda lime yields an aromatic hydrocarbon 'D'. Deduce the structures of 'A', 'B', 'C' and 'D'.	3
28.	(a)Complete the following statement: In sucrose, the two monosaccharide units are held together by _____(A) linkage between $\mathbf{C_1}$ of _____(B) and $\mathbf{C_2}$ of _____ (C). Identify A, B & C. (b) Identify and give any one point of difference between the protein present in the hair and	2+1=3

	protein present in egg albumin	

SECTION D

The following questions are case -based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.

29.	Complex compounds play an important role in our daily life. Werner's theory of complex compounds says every metal atom or ion has primary valency (oxidation state) which is satisfied by negatively charged ions, ionisable where secondary valency (coordination number) is non-ionisable, satisfied by ligands (+ve, –ve, neutral) but having lone pair. Primary valency is non-directional, secondary valency is directional. Complex compounds are name according to IUPAC system. Valence bond theory helps in determining shapes of complexes Based on hybridisation, magnetic properties, outer or inner orbital complex. Complex show ionisation, linkage, solvate and coordination isomerism also called structural isomerism. Some of them also show stereoisomerism i.e. geometrical and optical isomerism. Ambidentate ligand are essential to show linkage isomerism. Polydentate ligands form more stable complexes then unidentate ligands. There are called chelating agents. EDTA is used to treat lead poisoning, cis-platin as anticancer agents. Vitamin B12 is complex of cobalt. Haemoglobin, oxygen carrier is complex of Fe^{2+} and chlorophyll essential for photosynthesis is complex of Mg^{2+}. (a) What is the oxidation state of Ni in $[Ni(CO)_4]$? OR Write the coordination number in the given complex: $[Cr(H_2O)_2(C_2O_4)_2]^-$ (b) Indicate the type of isomerism exhibited by the following complex and also write the structure of isomer: $[Co(NH_3)_5(NO_2)](Br)_2$ (c) An element M forms complex 'A' with ligand-ethane-1,2-diamine and complex 'B' with chlorido having coordination number six. (i) Out of the two complexes which one will be more stable and why? (ii) If metal forms d^4 ion, which complex will have higher magnetic moment?	1 1 2
30.	Conductors allow the passage of electric current through them. Metallic and electrolytic are the two types of conductors. Current carriers in metallic and electrolytic conductors are free electrons and free ions respectively. Specific conductance or conductivity of the electrolyte solution is given by the relation: $\kappa = c \times l/A$ where $c = 1/R$ is the conductance and l/A is the cell constant. Molar conductance of strong electrolyte depends on concentration: $\Lambda_m = \Lambda^\circ_m - b\sqrt{c}$, Λ_m= molar conductance at infinite dilution, c= concentration of the solution, b = constant. The degree of dissociation of weak electrolytes is calculated as: $\alpha = \lambda_m/\lambda_m^\infty$ (a) Out of specific conductance and molar conductance, which one of the following decreases on dilution of electrolyte solution? (b)Out of $BaCl_2$ and KCl for which electrolyte solutions Λ_m and Λ_e are equal?	1 1

	(c) Calculate Λ°_m NH_4OH from the following values. Λ°_m for $Ba(OH)_2$, $BaCl_2$, NH_4Cl are 257.6, 240.6, 129.8 S cm^2mol^{-1}respectively. **OR** (i)Metal conductivity decreases as temperature rises, but electrolyte conductivity rises. Why? (ii)State Kohlrausch's law.	2

SECTION E

The following questions are long answer type and carry 5 marks each. All questions have an internal choice.

31. (A)	Attempt either A or B (a) What is the effect of pressure on the solubility of glucose in water? (b) Smith collected a 20 mL each of fresh water and sea water. He observed that one sample labelled "A" froze at 0 ^oC while the other "B" at -1.5^oC. He forgot which of the two, "A" or "B" was sea water. Help him identify which container contains sea water, giving rationalization for your answer. (c) Calculate the amount of $CaCl_2$ (molar mass 111) which must be added to 500 g of water to lower its freezing point by 2 K, assuming $CaCl_2$ is completely dissociated. (K_f for water is 1.86 K kg mol^{-1}) **OR**	1 1 3
(B)	(i) When two liquids 'X' and 'Y' are mixed the solution becomes hot. When pair of liquids, 'Y' and 'Z' are mixed, the solution becomes cold. Which of these SOLUTION will exhibit negative deviations from Raoult's law? (ii) A non-volatile solute 'X' (molar mass = 50 g mol^1) when dissolved in 78g of benzene reduce its vapour pressure to 90%. Calculate the mass of X dissolved in the solution. (iii) Give one example of ideal solution. What type of liquids form ideal solutions?	1 2 2
32. (A)	Attempt either A or B (a) Account for the following: (i) pK_b of aniline is more than that of methylamine. (ii)Although amino group is o, p−directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m- nitroaniline. (b) Arrange the following in: (i) In decreasing order of basic strength in gas phase:	1x5=5

	$C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ and NH_3 (ii) increasing order of solubility in water C_2H_5Cl, $C_2H_5NH_2$, C_2H_5OH (iii) decreasing boiling point CH_3COOH, C_2H_5OH, CH_3NH_2, CH_3OCH_3 **OR**	3+2
(B)	(a) Describe a method for the identification of primary, secondary and tertiary amines. Also write chemical equations of the reactions involved. (b) Write short notes on the following: (i) Carbylamine reaction (ii) Hofmann's bromamide reaction	
33.	Attempt either A or B	5x1
(A)	(a) Transition metals and many of their compounds show paramagnetic behaviour. Why? (b) The enthalpies of atomization of transition metals are high. Why? (b) Transition metals form alloys and interstitial compounds. Why? (d) The second ionization enthalpies of chromium and manganese are 1592 and 1509 kJ/mol respectively. Explain the lower value of Mn. (e) Give two similarities in the properties of Sc and Zn. OR	
(B)	(a) What is lanthanoid contraction? What causes lanthanoid contraction? (b) What is the oxidation state of manganese in manganate and permanganate ion? (c) Out of sulphuric acid and hydrochloric acid, which acid will you prefer for permanganate titrations and why? (d) $5NO2^- + 2MnO4^- + 6H^+$ · ----> (e) Arrange the following ions in the increasing order of their magnetic moments: Sc^{+3}, V^{+2}, V^{+4}, Ni^{+2}.	

PREBOARD EXAMINATION 2025-26

CLASS: XII Subject & Code: COMPUTER SCIENCE (083) Time: 3 hrs MM: 70

General Instructions:

- This question paper contains 37 questions.
- All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
- The paper is divided into 5 Sections- A, B, C, D and E.
- Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
- Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
- Section C consists of 3 questions (29 to 31). Each question carries 3 Marks.
- Section D consists of 4 questions (32 to 35). Each question carries 4 Marks.
- Section E consists of 2 questions (36 to 37). Each question carries 5 Marks.
- All programming questions are to be answered using Python Language only.
- In-case of MCQ, **text of the correct answer** should also be written.

Q No.	Section-A (21 x 1 = 21 Marks)	Marks

1	**State if the following statement is True or False:**
	Using the **math** module, the value of **k** will be -123:
	`import math`
	`k = math.ceil(-123.567)`
	`print(k)`
		1

2	**What will be the output of the following code?**
	`M = ["Python", "Cobol", "Java"]`
	`print(M[1][0:4] + M[2][2:])`
	a) Cobova b) Pythva c) Coboava d) Coboav
		1

3	**Given a=10 & b=19, What will be the correct output of the given expression?** `print(a < b-7 and 2+b > a+11)` a) True b) False c) Null d) No output	1

4	Which type of Join(s) is used in following SQL command?
	`SELECT Item.ItID, Sales.OrdNo, Name, Price`
	`FROM Item, Sales`
	`WHERE Item.ItId = Sales.ItId;`
	a) Equi-join b) Natural join, c) Outer join d) None of these
		1

5	**What will be the output of the following Python code?**
	`Exam="CBSE YEAR 2025-26"`
	`print(Exam[-17::3])`
	a) CEA 22 b) CEE 56 c) CEE 22 d) CYE 22
		1

6	**Consider the following Python code, and predict the output :**
	`for t in [11, 22, 33, 44]:`
	`print (t % 10)`
		1

7	**Evaluate following Python Expression:** `500 -2**3**2 + 164//10`	1
8	Consider the given SQL Query: **SELECT name FROM emp WHERE name LIKE "__Sharma";** Which one of the following is to be added into the blank space to select the names ending with **Sharma**. a) $ b) __ c) || d) %	1

9	**What will be the output of the following Python code?** P,Q =12, 17 try: x = 10 / (5 + P - Q) except ZeroDivisionError: print("Division by zero error!") except Exception: print("Some other error!") a) Division by zero error! b) Some other error! c) ZeroDivisionError d) Nothing is printed	1

10	**Consider following Python code and choose the correct output from the given options**
	dict = {"bnm": "Python", "Price": 875, "Publ": "MGH"}
	if dict["Price"]>800:
	print("Price is too high")
	else:
	print("Price is OK")
	a) It will produce an error b) Price is OK
	c) Price is too high d) Nothing is printed
		1

11	Predict the maximum & minimum values of variable **M** on execution of following code ? import random List = [100,130,150,170] M = random.randint(1, len(List)) print(M) a) 1, 3 b) 1, 4 c) 1, 5 d) 1,1	1
12	**Find the output of the following Python code?** def FUN(): G = 17 G = G - 2 print(G, end='**') G = 10 print(G, end='&&') FUN() print(G) a) 10&&15**15 b) 10&&10**15 c) 10&&15**10 d) 10**15&&10	1
13	Manisha has deleted 2 records from an existing relation? It will change ……. Of relation. a) Cardinality b) Degree c) Both a) & b) d) None of these	1
14	What is the output of the given Python code? st='PYTHON' print("*".join(st)) a) P*Y*T*H*O*N b) P*Y*T*H*O*N* c) P*YT*HO*N d) None	1
15	A relation **EMP** has 6 columns and 4 rows. If 2 columns are added and 2 rows are deleted from the existing relation, what will be the updated degree of a relation? a) Degree: 7 b) Degree: 8 c) Degree: 9 d) Degree: 6	1
16	Which SQL command is used to remove a database in MySQL? a) UPDATE b) ALTER c) DROP d) DELETE	1

17	_____ is a standard communication protocol used for the transfer of computer files from a server to a client on a computer network a) SMTP b) FTP c) POP3 d) PPP	1
18	Which of the following allows you to connect and login to a remote computer? a) SMTP b) HTTP c) FTP d) Telnet	1
19	Which of the following is an example of Bluetooth? a) wide area network b) personal area network c) local area network d) virtual private network	1
	Q20 and Q21 are **Assertion**(A) and **Reason**(R) based questions. Mark the correct choice as: a) Both A and R are True and R is the correct explanation for A. b) Both A and R are True and R is not the correct explanation for A. c) A is True but R is False. d) A is False but R is True.	
20	**Assertion (A):** Dictionaries are mutable, hence its keys can be easily changed. **Reason (R):** Mutability means a value can be changed in place without having to create new storage for the changed value.	1
21	**Assertion (A):** A primary key is used to uniquely identify each row in the table. **Reasoning (R):** The primary key is an attribute that has a unique value for each tuple/row	1
Q No.	**Section-B (7 x 2=14 Marks)**	**Marks**
22	A. Differentiate between mutable & immutable data types in Python. Give one example of each. **OR** B. What do you mean by Keyword in python? Give any two example of keywords.	2

23	Aniket Bisla, a student of XII, has written following function to check whether a number is Prime or Not. However, there are some syntax and logical errors in the code. Rewrite it after removing all the errors. Also, underline all the corrections made.
	DEF ChkPrime(Num):
	Flag = 1
	for i in range(2,len(Num)//2)
	if Num % i = 0:
	Flag=0
	Break
	if Flag == 1:
	print("PRIME NO")
	else:
	print("Not Prime")
		2

24	A. Given a List L= [11, 23, 34, 56, 67] and String ST = “Milan is a good singer”, Write a statement for following using Python built-in methods/functions only. I. To find frequency of letter "i" in a ST. II. To insert a new element 99 between 23 and 34. **OR** B. What will be the output of following code in python: K ="Key Features of Python" print(K.split()) print(K.find("e"))	2

25	A. Write a function **count_EvenOdd(L)** in Python that accepts a list **L** and prints frequency of Even elements and Odd elements in the List L. **OR** B. Write a Python function **CountNow(CITY)** that accepts a dictionary, **CITY** as an argument and displays the names (in uppercase) of the **cities** are longer than 6 characters. For example : consider the following dictionary- CITY = {11:"Dehradun", 12:"Delhi", 13:"Pune", 14:"Kolkata",15:"Patna"} The output should be: DEHRADUN KOLKATA\	2

26	Predict the output of the Python code given below :
	tup = (11,25,33,45,58,75)
	L1 = [ ]
	L2 = [ ]
	for k in tup:
	if k % 10 == 5:
	L1.append(k)
	else:
	L2.append(k)
	print(L1)
	print(L2)
		2

27	A. Rohan is learning to work upon RDBMS application. Help him to perform the following tasks in MySQL: I. To open a Database named STUD. II. To display names of all tables stored in the opened database. **OR** B. Differentiate between **CHAR** and **VARCHAR** data types in SQL.	2
28	A. What do you mean by following terms in Networking: I. Repeater II. Gateway **OR** B. I. Expand : **TCP** , **VoIP** II. Define : **Video Conferencing**.	2
Q No.	**Section-C (3 x 3 = 9 Marks)**	**Marks**
29	A. Write a Python function **Words5()** that displays the all the words containing more than 5 characters in the file named "**Story.txt**". **OR** B. Write and call a Python function **Lines_Vowel()** to read lines from a text file **ARTICLE.TXT** and display all the lines that start with a vowel (A, E, I, O, U) irrespective of their case.	3
30	Amit, a students of class XII, has prepared a list of of Books as **L = [("Python", 1900), ("Java", 500), ("Pascal", 1750), ("RDBMS", 950)]** Write the following user-defined functions to perform operations on a stack named **Book** to: I. Push_Book() – To push a book containing the book name and price of book costing more than 900 into the stack **Book.** II. Pop_Book() – To pop the books from the stack and display them. Also, display "**Stack Empty**" when there are no elements in the stack.	3

Output: **("RDBMS", 950)**
("Pascal", 1750)
("Python", 1900
Stack Empty

31 A. **Consider following Python code & predict the output :** 3

```
Exam = "CbSe@2025"
NewStr = ""
for j in range(len(Exam)):
    if Exam[j].isupper():
        NewStr = NewStr + Exam[j].lower()
    elif Exam[j].islower():
        NewStr = NewStr + Exam[j].upper()
    elif Exam[j].isdigit():
        k = int(Exam[j])
        k = k + 1
        NewStr = NewStr + str(k)
    else:
        NewStr = NewStr + "&&"
print("OUTPUT: ", NewStr)
```

OR

B. **Predict the output of the following Python code:**

```
Item =[["I001","DVD",200], ["I002","PenDrv",600], ["I003","RAM",1700]]
for i in range (len(Item)):
    if Item[i][2]> 500:
        Item[i][2] -= 100
    else:
        Item[i][2] += 200
for k in Item:
    print(k)
```

Q No.	**Section-D (4 x 4 = 16 Marks)**	**Marks**

32. Jastin Tailor has created a relation **Teacher** as given below:

Tr_ID	Name	SEX	Age	Dept	Salary	Dt_of_join
101	Harish	M	29	Comp	50000	2020-01-22
102	Vineeta	F	32	Phy	55000	2022-08-12
103	Rakesh	M	36	Chem	60000	2025-06-17
104	Vimal	M	38	Comp	62000	2021-02-28
105	Sunayana	F	24	Chem	49000	2019-07-19
106	Lalit	M	40	Eng	45000	2009-12-25
107	Priya	F	34	Phy	43000	2018-04-09

A. ***Write SQL commands for following:***

i) To list name & Salary of male teachers who are in Computer or Physics department.

ii) To display distinct Department from **Teacher** table.

iii) To display records of teachers whose names starts with the letter '**V**'.

iv) To display all the records from table Teachers sorted by their Salary in descending order.

OR

B Predict the output of the following:

i. SELECT * FROM Teacher WHERE SEX = "M" and Dept = "Comp";

ii. SELECT Tr_ID, Name, Salary FROM Teacher WHERE age between 30 and 35;

iii. SELECT COUNT(Name) FROM Teacher WHERE Dept in ("Eng", "Chem");

iv. SELECT Sum(Salary), Max(Salary) from Teacher WHERE SEX="F";

33 (4 / (2+2))

Shukanya is a teacher in a school. To keep track of Periodic Test, she has created a CSV file named **TEST.csv**, which stores the details (RNo, Name, and marks in Phy, Chem & MAths) of each student.

The columns of the CSV file are: RNo, StudName, Phy, Chem, Maths.

Help her to efficiently maintain the data by creating the following user-defined functions:

I. **AddRec()** – to accept a record from the user and add it to the file TEST.csv.

II. **Disp75()** – to read details of student from the csv file and display the details of students whose percentage marks are more than 75%, along with total marks and percentage.

34

Jay Munjal is managing an Airlines Database and needs to access certain information from the **Passenger** and **Flight** tables for an upcoming tourism survey. Help him extract the required information by writing the appropriate SQL queries as per the tasks mentioned below:

Table: **Passenger**

P_No	Name	SEX	F_No
1001	Prayas	M	F101
1002	Sonam	F	F102
1003	Ravindra	M	F103
1004	Kamni	F	F104

Table: **Flight**

F_No	Start	End	F_Date	Fare
F101	Mumbai	Chennai	2021-12-25	4500
F102	Mumbai	Patna	2021-11-20	4000
F103	Delhi	Chennai	2021-12-10	5500
F104	Kolkata	Mumbai	2021-12-20	4500
F105	Delhi	Patna	2021-01-15	5000

i. To display a list of Name & Fare who have a flight to start from Delhi.

ii. To display the total number of Male & Female passengers.

iii. To delete all flights which end at Mumbai.

	iv. a) To change the fare to 6000 of the flight having flight Number as F104. **OR** b) To display the passenger's name along with their F_Date.	
35.	MySQL database named **LibraryDB** has a **Book_inventory** table in MySQL which contains the following attributes: **ISBN:** Book code (Integer) **Book_Name:** Name of Book (String) **Quantity:** No of Copies of Book (Integer) **Cost:** Price of Book (Integer) *Consider the following details to establish Python-MySQL connectivity*: Username: admin Password: Libr@2025 Host: localhost Write a Python program to change the Price of the Book to 900, whose ISBN is 1005 in the Book_inventory table.	4
Q No.	**Section-E (2 X 5 = 10 Marks)**	**Marks**
36	Mohit Acharya, a Technician at a Manufacturing Unit, needs to maintain records of Products. Each record should include: Prod_ID, Prod_Name, Batch_No and Price. **Write the Python functions to:** i. **AddProd() :** to input Product details and append it to a binary file PRODUCT.bin. ii. **Disp_Prod():** Read the data from binary file and display details of Product having Price more than 500.	2+3
37	You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (v), keeping in mind the distances between the buildings and other given parameters.	5

Building to Building Distance

from	to	Distance
ADMIN	ACCOUNTS	55 M
ADMIN	EXAMINATION	90 M
ADMIN	RESULT	50 M
ACCOUNTS	ACCOUNTS	55 M
ACCOUNTS	RESULT	50 M
EXAMINATION	RESULT	45 M
DELHI Head Office	MUMBAI campus	2150 Km

No of Computers in each building

ADMIN	110
ACCOUNTS	75
EXAMINATION	40
RESULT	12
DELHI Head Office	20

(i) Suggest the most appropriate location of the server inside the MUMBAI campus (out of the four buildings) to get the best connectivity for maximum number of computers. Justify your answer.
(ii) Suggest and draw cable layout to efficiently connect various buildings within the MUMBAI campus for a wired connectivity.
(iii) Which networking device will you suggest to be procured by the company to interconnect all the computers of various buildings of MUMBAI campus?
(iv) Company is planning to get its website designed which will allow students to see their results after registering themselves on its server. Out of the static or dynamic,

	which type of website will you suggest? **(v) A.** Which of the following will you suggest to establish the online face to face communication between the people in the ADMIN office of Mumbai campus and Delhi head office? a) Cable TV b) Email c) Video conferencing d) Text chat **OR** B**.** Which type of network (PAN, LAN, MAN, or WAN) will be formed while connecting the MUMBAI campus to Delhi Head Office?	

PREBOARD EXAMINATION 2025-26		
CLASS: XII Subject & Code: COMPUTER SCIENCE (083) Time: 3 hrs MM: 70		
MARKING SCHEME		
Q No.	**Section-A (21 x 1 = 21 Marks)**	**Marks**
1	-123 (TRUE)	1
2	**a)** Cobova	1
3	b) False	1
4	a) Equi-join	1
5	c) CEE 22	1
6	**1** **2** **3** **4**	1
7	500 -2**3**2 + 164//10 = 500 – 2**9 + 16 = 500 – 512 + 16 = 516 -512 = 4	1
8	d) %	1
9	a) Division by zero error!	1
10	c) Price is too high	1
11	b) 1, 4	1
12	c) 10&&15**10	1
13	a) Cardinality	1
14	a) P*Y*T*H*O*N	1
15	b) Degree: 8	1
16	c) DROP	1
17	b) FTP	1
18	d) Telnet	1
19	b) Personal Area Network	1
20	d) A is False but R is True.	1
21	a) Both A and R are True and R is the correct explanation for A.	1
	Section-B (7 x 2=14 Marks)	
22	a) In simple terms, mutable objects can be changed after they are created, while immutable objects cannot be altered. Example of mutable data types –LIST, immutable data type – String (**Award 1 mark for correct difference & 01 mark for correct example**.) OR keywords are reserved words that have specific, predefined meanings and functionalities within the Python language and can't be used as an identifier in a Python program. Example : break, while (**Award 1 mark for correct definition & ½ marks for each correct example**.)	1+1

23	**def** ChkPrime (Num):
	Flag = 1
	for i in range(2,len(Num)//2) **:**
	if Num % i **= =** 0:
	Flag=0
	break
	if Flag == 1:
	print("PRIME NO")
	else:
	print("Not Prime")
	(Award ½ marks for each correction)
		2

24	A. i) ST.count(' i ') **[01 mark]** ii) L.insert(2, 99) **[01 mark]** **OR** B. ['Key', 'Features', 'of', 'Python'] 1 **(01 mark for each correct output)**	2

25	A. def count_EvenOdd(L):
	C_Even = 0
	C_Odd = 0
	for N in L:
	if N % 2 == 0:
	C_Even += 1
	else:
	C_Odd += 1
	print("Frequency of Even elements: ",C_Even)
	print("Frequency of Odd elements: ",C_Odd)
	OR
	B. def countNow(CITY):
	for k in CITY:
	if len(CITY[k])>6:
	print(CITY[k].upper())
	(½ marks for correct function header, 1 m for logic and ½ marks for print statement)
		2

26	Correct output: [25, 45, 75] **[01 mark]** [11, 33, 58] **[01 mark]**	2
27	A. i) USE STUD; **[01 mark]** ii) SHOW tables; **[01 mark]** **OR** B. **CHAR** is a fixed-length data type. When you define a column as CHAR(n), it reserves n bytes of storage, padding shorter strings with spaces to meet the defined length. **[01 mark]** **VARCHAR** is a variable-length data type. Defining a column as VARCHAR(n) allows storage of strings up to n characters, using only as much space as needed for each entry. **[01 mark]**	2
28	A. A **gateway** in the OSI model is a device or program that connects two different networks by translating between different communication protocols. **[01 mark]** **Repeaters** are networking devices that amplify weak signals, ensuring they travel longer distances without losing quality. **[01 mark]** **OR**	2

	B. I) TCP : **Transmission Control Protocol**, **[½ mark]** VoIP : **Voice over Internet Protocol** **[½ mark]** II) Video conferencing is a **live, visual connection between two or more remote parties over the internet** that simulates a face-to-face meeting. **[1 mark]**	
	Section-C (3 x 3 = 9 Marks)	

29	A.
	``
	def Words5():
	    f =open("Story.txt","r")
	    st = f.read()
	    L = st.split()
	    print("List of words having more than 5 characters:")
	    for word in L:
	        if len(word)>5:
	            print(word)
	  f.close()
	``
	OR
	``
	def Lines_Vowel()
	    f =open("Story.txt","r")
	    Lines = f.readlines()
	    print("Lines beggining with a vowel: ")
	    for L in Lines:
	        if L[0] in "AEIOUaeiou":
	            print(L)
	    f.close()
	Lines_Vowel() # function call
	``
	(½ marks each for function header & opening of file in correct mode, ½ each for using read & split functions, 1 mark for correct logic)
		3

30	```
	L = [("Python", 1900), ("Java", 500), ("Pascal", 1750), ("RDBMS", 950)]
	Book=[] # stack
	def Push_Book():
	    for b in L:
	        if b[1]>900:
	            Book.append(b)
	def Pop_Book():
	    print("OutPut: ")
	    while True:
	        if Book:
	            b = Book.pop()
	            print(b)
	        else:
	            print("Stack is Empty")
	            break
	Push_Book() # function Call
	Pop_Book() # Fucntion call
	``
	(01 mark for creating list L & initializing stack Book, 01 mark for Push() & 01 mark for Pop() function)
		3

31	A. Output: cBsE&&3136 **(Award full 3 marks for correct output)** **OR** B. ['I001', 'DVD', 400] ['I002', 'PenDrv', 500] ['I003', 'RAM', 1600] **(award 1 mark for each correct line of output)**	3

Section-D (4 x 4 = 16 Marks)

32 A. 4

i. SELECT Name, Salary FROM Teacher WHERE SEX="M" and Dept IN ("Comp", "Phy");
ii. SELECT Distinct Dept FROM Teacher ;
iii. SELECT * FROM Teacher WHERE Name LIKE 'Y%';
iv. SELECT * FROM Teacher ORDER BY Salary Desc;

(Award 1 mark for each correct Query)

OR

B. i.

Tr_ID	Name	SEX	Age	Dept	Salary	Dt_of_join
101	Harish	M	29	Comp	50000	2020-01-22
104	Vimal	M	38	Comp	62000	2021-02-28

ii.

Tr_ID	Name	Salary
102	Vineeta	55000
107	Priya	43000

iii.

COUNT(Name)
2

iv.

SUM(Salary)	Max(Sal)
147000	55000

(1 mark for each correct output)

33 i.)

```
import csv
def AddRec():
    f = open("TEST.csv", "a", newline="")
    wriObj = csv.writer(f)
    print("Enter students details")
    rno = int(input("RNo ? "))
    nm = input("Name? ")
    P = int(input("Physics? "))
    C = int(input("Chemistry? "))
    M = int(input("Maths? "))
    L= [ rno, nm, P, C, M]
    wriObj.writerow(L)
  f.close()
```

(½ mark for correctly taking user input ,(½ mark for opening the file in append mode, (½ mark for correctly creating the writer object, ½ mark for correctly using writerow() of writer object)

ii.)

```
def Disp75():
  f=open("TEST.csv", "r", newline="")
  robj = csv.reader(f)
  c=0
  for Rec in robj:
    tm = int(Rec[2])+ int(Rec[3]) + int(Rec[4])
    Per = tm/300*100
    if Per > 75:
      print(Rec[0],Rec[1],Rec[2],tm,Per)
  f.close()
```

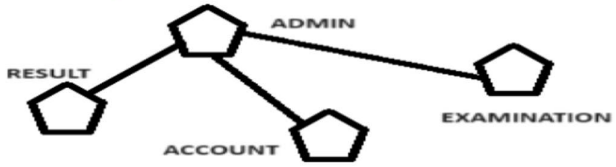
	(1⁄2 mark for opening in the file in right mode, 1⁄2 mark for correctly creating the reader object, 1⁄2 mark for correctly checking the condition, 1⁄2 mark for correctly displaying the details**)**	

34	i. SELECT Name, Fare FROM Passenger P, Flight F WHERE Start = "Delhi" and P.F_No=F.F_No;
	ii. SELECT SEX, count(SEX) FROM Passenger GROUP BY SEX;
	iii. DELETE FROM Flight WHERE END="Mumbai";
	iv. a) UPDATE Flight SET Fare = 6000 WHERE F_No = "F104";
	OR
	b) SELECT Name, F_Date FROM Passenger P, Flight F WHERE P.F_No=F.F_No;
	(4 x 1 mark for each correct query)
		4

35	import mysql.connector as MSC
	MyCon = MSC.connect(host='localhost',user='admin',password='Libr@2025',
	database = 'LibraryDB')
	if MyCon.isconnected():
	print("Connection OK")
	else:
	print("Connection failed")
	cur = MyCon.cursor()
	Modi_query = "UPDATE Book_inventory SET Price = 900 WHERE ISBN = 1005"
	cur.execute(Modi_query)
	MyCon.commit()
	print("Price Modified successfully.")
	cur.close()
	MyCon.close()
	
	(1⁄2 mark for correctly importing the connector object, 1⁄2 mark for correctly creating the connection object, (1⁄2 mark for correctly creating the cursor object, 1 mark for correct creation of update query, (1 mark for correctly executing the query with commit, 1⁄2 mark for correctly closing the connection**)**
		4

	Section-E (2 X 5 = 10 Marks)	
36	i. import pickle **def AddProd():** f = open("Product.bin", "wb") pn = int(input("Enter Prod No? ")) pnm = input("Enter Prod Name ? ") bno = int(input("Enter Batch No ? ")) pr = int(input("Enter Price ? ")) Data = [pn, pnm, bno, pr] pickle.dump(Data,f) f.close() **(**1/2 mark for correctly defining the function header, 1/2 mark for correctly opening the file in append mode, 1/2 mark for correctly taking user input, 1/2 mark for using dump() method of the pickle module**)**	02 03

	ii. def Disp_Prod():
	f = open("Product.bin", "rb")
	print("List of Products having price more than 500: ")
	try:
	while True:
	Rec = pickle.load(f)
	if Rec[3]>=500:
	print(Rec[0],'\t',Rec[1],'\t',Rec[2],'\t',Rec[3])
	except:
	f.close()
	(1/2 mark for correctly defining the function header, (1/2 mark for correctly opening the file, 1 mark for using load() with while loop and try-except block, 1 mark for checking the condition and updating the value**)**	

37	i) ADMIN Building, as it has maximum no of computers. ii) Following Layout is suggested:  iii) HUB/SWITCH iv) DYNAMIC Website v) A) Video conferencing B) WAB (01 mark for each correct answer (4*1))	

	MARKING SCHEME Pre-Board Exam (2025-26) **Class- XII** **Subject: English Core(301)** **TIME 3 HOURS** **M MARKS-80**	
	INSTRUCTIONS: 1. The question paper contains THREE sections- READING, WRITING and LITTERATURE. 2. Attempt question based on specific instructions for each part.	
	SECTION A : READING SKILLS (22 marks)	
Q1	Read the following passage and answer the questions that follow.	12 marks
	I. The rain and the deserted station create a mood of loneliness and introspection. The downpour mirrors Arvind's inner turmoil, while the empty platform symbolises isolation and the emotional distance between him and his father. ii. The old woman's words highlight the dual nature of journeys—physical and emotional. They suggest that travel can either reunite people or mark a permanent separation, depending on the circumstances. In Arvind's case, they foreshadow his emotional reconciliation. iii. At the beginning, Arvind feels anxious, burdened by the thought of meeting his estranged father. By the end, after listening to the old woman's story, he finds courage and acceptance, ready to face whatever awaits him at home—whether reunion or regret. iv. Correct Option: (a) Both A and R are true, and R is the correct explanation of A. Her story reminds Arvind of the pain of waiting and missed chances, prompting him to reconcile before it is too late. v. The rain symbolises renewal and emotional cleansing. It reflects Arvind's shift from fear and hesitation to clarity and resolve. vi. Correct Option: A Nostalgic and reflective The tone is thoughtful and meditative, encouraging the reader to reflect on relationships, distance, and time. vii. Correct Option: B The old woman's words gave him a sense of closure and courage. They helped him accept that facing his father was necessary, regardless of the outcome.	2 1 2 1 1 1 1

	viii. Correct Option: C Reconciliation and acceptance The passage centers on Arvind's emotional reconciliation with his father and his acceptance of the need to go home. ix.Correct Option: B Simile The phrase compares the shawl's movement to a memory, using "like." x. B Poor audibility.	1 1
Q2	Read the following passage and answer the questions that follow. I Natural Language Processing (NLP) II B. Facial expression analysis III through video consultations or mobile apps IV Sentence1: 'potential Sentence2: 'precision' V Talkspace 1 VI (i).Woebot (ii) Wysa VII AI systems can detect micro-expressions and subtle changes in facial features that may indicate underlying psychological conditions. VIII D. BetterHelp	10 marks 1 1 2 1 1 ½+½ 2 1
	SECTION B : CREATIVE WRITING SKILLS (18 marks)	
3.	NOTICE WRITING.	4 marks
	Format -1, Content -2, Language Accuracy and Expression 1	
4.	INVITATIONS AND REPLIES TO INVITATION	4 marks
	Format -1, Content -2, Language Accuracy and Expression 1	
5.	JOB APPLICATION /LETTER TO EDITOR	5 marks
	Format -1, Content -2, Language Accuracy and Expression- 2	
6.	ARTICLE/REPORT WRITING	5 marks
	Format -1, Content -2, Language Accuracy and Expression-2	
	SECTION C : LITERATURE(40 marks)	
7.	Read the given extracts and answer the questions for any one of the two given.	1x6=6 marks

A.	Those who prepare green wars, wars with gas, wars with fire, victory with no survivors, would put on clean clothes and walk about with their brothers in the shade, doing nothing.	
i.	Gaining victory with no survivors	1

ii.	C. A moment of unity and peaceful reflection	1
iii.	…a potential for change and renewal / a moment of pause and reflection / an act of cleansing of their actions /embracing a peaceful existence/ the possibility of transformation	1
iv.	condemns	1
v.	B. Both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.	1
vi.	Global leaders and communities can work toward more sustainable and peaceful solutions –Can be used to advocate for non-violent resolutions / peace negotiations in contemporary conflicts / Can be used to promote dialogue and understanding over aggression and warfare	1
	OR	
B.	When Aunt is dead, her terrified hands will lie Still ringed with ordeals she was mastered by. The tigers in the panel that she made Will go on prancing, proud and unafraid.	
i.	The phrase suggest that Aunt's life has been filled with struggles shaped by frear,anxiety and oppression/ The phrase signify her emotional and psychological state, shaped by years of fear and oppression.	1

ii.	…the enduring power of Aunt Jennifer's creative spirit even after her death.	1

iii.	The tiger in the panel are bold , fearless and free symbolizing strength , courage and confidence. In contrast , Aunt's life is marked by fear , struggle and oppression, which prevents her from living with the same power and freedom that her tigers represent.	1
iv.	Wedding band on her finger.	1
v.	C. A child playing freely in a park, unburdened by the responsibilities.	1
vi.	B) Art is a timeless expression that outlives its creator , continuing to embody their spirit and desire.	1
8.	Read the given extracts and answer the questions for any one of the two given.	6 marks
A.	Some might make quite extravagant claims for it as being, in its highest form, a source of truth, and, in its practice, an art. Others, usually celebrities who see themselves as its victims, might despise the interview as an unwarranted intrusion into their lives, or feel that it somehow diminishes them, just as in some primitive cultures it is believed that if one takes a photographic portrait of somebody then one is stealing that person's soul.	

i.	C. Creativity and imagination	1
ii.	Celebrities feel that an interview <u>makes them appear</u> <u>ordinary</u>. [accept - negatively impacts OR weakens them/ their aura]	1
iii.	D. (2) is the reason for (1).	1
iv.	It is an extravagant claim as an interview cannot be a source of truth due to the following- Interview may be scripted OR People may make false statements OR Certain questions may be left unanswered.	1
v.	Victims	1
vi.	A. Facts	1
	OR	

B.	He walked and walked without coming to the end of the wood, and finally he realised that he had only been walking around in the same part of the forest. All at once he recalled his thoughts about the world and the rattrap. Now his own turn had come. He had let himself be fooled by a bait and had been caught. The whole forest, with its trunks and branches, its thickets and fallen logs, closed in upon him like an impenetrable prison from which he could never escape.	
i.	(b) analogy	1
ii.	(d) the peddler was stuck up in the dense forest the peddler was stuck up in the dense forest	1
iii.	(c) The girl waited for her turn to enter the class.	1
iv.	Trunks , branches, thickets which prevent free movement.	1
v.	(d) Options 3, 4, 6 (pass through, enter, access)	1

vi.	simile	1
9.	Read the given extracts and answer the questions for any one of the two given.	4 marks
A.	MR LAMB: Lord, boy, you've got two arms, two legs and eyes and ears, you've got a tongue and a brain. You'll get on the way you want, like all the rest. And if you chose, and set your mind to it, you could get on better than all the rest. DERRY: How? MR LAMB: Same way as I do. DERRY: Do you have any friends? MR LAMB: Hundreds. DERRY: But you live by yourself in that house. It's a big house, too. MR LAMB: Friends everywhere. People come in.... everybody knows me. The gate's always open. They come and sit here. And in front of the fire in winter. Kids come for the apples and pears. And for toffee. I make toffee with honey. Anybody comes. So have you. DERRY: But I'm not a friend.	
i.	C. It symbolizes the potential for human capability.	1
ii.	A. The house reflects Mr. Lamb's open and welcoming nature.	1

iii.	D. It signifies the accessibility of Mr. Lamb's friendship.	1

1

iv.	B. It highlights Derry's insecurity about friendship.	1
	OR	
B.	"Human civilisations have been around for a paltry 12,000 years - barely a few seconds on the geological clock. In that short amount of time, we've managed to create quite a ruckus, etching our dominance over Nature with our villages, towns, cities, megacities. The rapid increase of human populations has left us battling with other species for limited resources, and the unmitigated burning of fossil fuels has now created a blanket of carbon dioxide around the world, which is slowly but surely increasing the average global temperature."	
i.	The author calls 12,000 years as paltry because 12,000 years is only a few seconds on the geological clock which means there is a vast difference in time scales between human history and the origin of the earth.	1
ii.	Answer: False	1
iii.	B) burning of fossil fuels	1

iv.	C. competing for the limited resources with other species	1
10.	Each question carries 2 marks Content-1 Expression -2. Marks to be given for 5 questions only. Give marks for any valid answer.	5x2=10 marks

I II III IV V	The villagers' presence reveals that people often value things only when they are about to lose them. Their sudden respect for the French language, which they had earlier neglected, shows regret and a deep realisation of its importance for their identity and culture. Subbu's creativity, versatility, and loyalty made him indispensable at Gemini Studios. He could write scripts, solve production problems, and inspire others with his cheerful nature. His ability to turn challenges into opportunities significantly contributed to the smooth functioning and success of the studio. The thought of her mother's mortality fills the poet with fear and sadness, intensifying the contrast between life and death. This moment of realisation makes her feelings more poignant and universal, reminding readers of the inevitability of death and the pain of separation. Selfishness, lack of noble thoughts, gloom, ill-health, lack of beauty, despondency, and evil natures of human beings cause suffering and pain. These negative influences drain joy from life, making people feel burdened and disconnected from happiness and peace. Anees Jung observes that the children in slums are forced to work at a very young age to support their families. Their childhood is consumed by the struggle for food, money, and survival, making them share the responsibility of sustaining the family along with adults.	
11.	Each question carries 2 marks Content-1 Expression -2. Marks to be given for 2 questions only. Give marks for any valid answer.	2 x 2 = 4 marks

I II III	The transformative power of awareness and education? Answer: The story shows how awareness of discrimination can lead to a desire for change. Through her brother's advice and her own determination, Bama demonstrates that education can be a tool for liberation. Charley's preference for Galesburg, 1894 Charley's longing for Galesburg, 1894, reveals his yearning for a simpler, peaceful life. It shows his discomfort with the insecurity, war, and restlessness of the modern world. His preference symbolises nostalgia and his desire to escape from the anxieties of the present to an idealised past. Journey to Antarctica The journey to Antarctica highlights humanity's fragile yet profound connection with nature. Its pristine, untouched landscape reminds us of our planet's vulnerability and urges us to respect ecological balance. It suggests that human survival is dependent on protecting nature and maintaining harmony with Earth's systems.	
12.	Each question carries 5 marks (Content-3 marks, Expression- 2 marks.). Marks to be given for 1 question only. Give marks for any valid answer Respected Maharaja, I write to you as a humble subject of your kingdom, deeply concerned about the current state of affairs. While your courage and hunting skills are admirable, the excessive focus on tiger hunting has led to neglect of urgent issues like poor irrigation, inadequate roads, and poverty among the villagers. Your Majesty's glory lies not just in slaying tigers but in safeguarding the lives of your people. I humbly suggest diverting resources towards building hospitals, schools, and better roads, as well as ensuring fair taxes and justice for all. True greatness will come when the subjects live in prosperity and remember Your Highness as a benevolent and just ruler. With deepest respect, A Loyal Citizen Or	1x5=5 marks
	In both The Enemy and the autobiographical works of Bama or Zitkala-Sa, the protagonists experience and respond to societal prejudices, yet their approaches highlight the complexities of human conscience and moral courage. Dr. Sadao in The Enemy is torn between his patriotism and his duty as a doctor. He decides to help an American soldier, despite the societal pressure to regard the soldier as the enemy. His decision represents the triumph of human decency over nationalism and prejudice, and his actions reflect his resistance to the dehumanizing forces of war. Similarly, Bama experiences caste-based discrimination in her society. Despite the oppressive	

	environment, Bama responds to the injustice with resilience. Rather than accept her marginalization, she chooses to educate herself and stand up against the oppressive caste system. Zitkala-Sa, too, confronts the discrimination imposed by the American government and society toward Native Americans. Her narrative emphasizes the conflict between her native culture and the forced assimilation into the white man's world..	
13.	Answer any one of the two following questions in about 120 to 150 words.	1x5=5 marks
	Each question carries 5 marks (Content-3 marks, Expression- 2 marks.). Marks to be given for 1 question only. Give marks for any valid answer 15th July, 19XX Dear Diary, Today is a day I will never forget. I finally swam across the pool without fear! For years, water meant terror -— a reminder of that dreadful incident at the YMCA pool. But every stroke I took today was a blow to my fear. As I reached the other side, I felt reborn — light, free, and full of courage. I learnt that fear lives only until we confront it. By challenging my fear, I discovered an inner strength I never knew existed. Today, I not only conquered water but also gained confidence to face any challenge life throws at me. William Douglas Or In the story Lost Spring we see the poor oppressed bangle makers who live in utter poverty and accept it as their fate but are so fear-sticken that they do not form a co-operative due to the fear of the politicians and money lenders. Thus, they remain trapped and will never come out of it Shukla is a poor peasant of Champaran and like the others of his lot, he too is crushed under the oppressive landowners. However, still he gathers the courage and determination to speak up against the injustice. It is his determination which leads Gandhiji to get involved in the Champaran movement and thus, mark the onset of his involvement in India's freedom struggle. The poor peasants of Champaran get rid of their fear when they realize they are strong in number and have the support of outsiders like Gandhiji as well as the local lawyers. This empowers them and they are able to speak up for their 68 rights. Thus the two stories present a contrast in the way the oppressed behaved. It is this contrast in behaviour which determined their future. We can conclude that our actions determine our fate and destiny, we have to act and must not leave everything to God as the maxim goes – 'God helps those who help themselves.' until and unless they overcome the fear and determine to take a step towards a better future.	

	Pre-Board Exam (**2025_26**) **Class- XII** **Subject**: **English Core (301)** **TIME**: **3 HOURS** **MMARKS-80**	
	General Instructions Read the following instructions very carefully and follow them: i. This question paper has 13 questions. All questions are compulsory. ii. This Question paper contains three sections: Section A : Reading Skills Section B : Creative Writing Skills Section C : Literature. iii. Atempt all questions based on specific instructions for each part. Write the correct question number and part thereof in your answer sheet. iv. Separate instructions are given with each question/part, wherever necessary. v. Adhere to thhi prescribed word limit while answering the questions.	
	SECTION A: READING SKILLS (22 marks)	
1.	Read the following passage and answer the questions that follow.	12 marks
	The rain had begun just after dusk, a slow, reluctant drizzle that stitched the road with silver threads. By the time Arvind reached the small railway station, it had swelled into a downpour, washing the platform with a mirror-like sheen. The single yellow bulb above the ticket counter hummed faintly, its light dissolving into the mist. The station was nearly deserted—just a tea vendor, a stray dog, and a lone figure on the far bench, hunched in a shawl. Arvind clutched his satchel and exhaled, his breath visible in the chill. His train was delayed, as expected. The noticeboard, written in a hand that seemed as weary as the station itself, declared a delay of "one hour, possibly more." He sat down, the wood of the bench damp beneath him. There was a peculiar quiet in the air, broken only by the occasional hiss of the tea vendor's kettle. As he waited, his mind wandered to the letter in his satchel—creased, reread, and nearly memorised. It was from his father, whom he had not seen in five years. The man had always been distant, his affections hidden behind a stern exterior and curt words. But the letter was different—almost tender. His father had written simply: *"Come home, Arvind. I am not well." A sudden gust of wind swept through the station, sending a shiver through him. The figure at the far end stirred and slowly rose. As she approached, Arvind saw that she was an old woman, her face lined like parched earth. She stopped a few feet away and regarded him with sharp, searching eyes.	

	"You're travelling east?" she asked, her voice raspy but steady. "Yes," he replied cautiously. "Good," she said, sitting beside him. "Trains to the east bring people home. Or away from home, depending on how you see it." Her words struck him strangely. She spoke as though she knew him, or at least his thoughts. The two sat in silence for a while, listening to the rhythmic patter of rain. Then she began to speak—softly, as though telling a story to the night itself. She spoke of her son, who had left many years ago to seek fortune in the city and never returned. She had waited through monsoons, through scorching summers, through winters that froze her very breath, but the platform had remained empty. When her train finally arrived, she rose without another word, her shawl trailing like a memory. Arvind watched her climb aboard and disappear into the dimly lit compartment. As the train's whistle echoed across the wet fields, he felt an unfamiliar weight lift from his chest. He no longer dreaded the journey ahead. Whatever waited at the end—reunion or regret—he knew he must face it. The rain eased into a whisper as though agreeing with him, and when the next eastbound train arrived, Arvind stepped aboard.	
i.	Analyse how the imagery of rain and the deserted station contribute to the mood of the passage.	2
ii.	What do you think is the significance of the old woman's words: "Trains to the east bring people home Or away from home, depending on how you see it."?	1
iii.	Comment on Arvind's emotional journey in the passage. How does his state of mind evolve from the beginning to the end?	2
iv.	Assertion (A): The old woman's story acts as a catalyst for Arvind's decision to face his father. Reason (R) : Listening to her story helps Arvind realise the value of reconciling before it is too late. (a) Both A and R are true, and R is the correct explanation of A. (b) Both A and R are true, but R is not the correct explanation of A. (c) A is true, but R is false. (d) A is false, but R is true	1
v.	What does the rain symbolise in the narrative?	1

vi.	Which of the following best describes the tone of the passage? A. Nostalgic and reflective B. Cynical and detached C. Humorous and light-hearted D. Cold and indifferent	1
vii.	What is the most likely reason Arvind "no longer dreaded the journey ahead"? A. He had received good news about his father's health. B. The old woman's words gave him a sense of closure and courage. • C. The rain had finally stopped, making the journey easier. • D. He had forgotten about the letter entirely.	1
viii..	7. Which theme is most central to this passage? • A. Materialism and ambition • B. Alienation and loss • C. Reconciliation and acceptance • D. Futility of human effort	1
ix.	Which literary device is most evident in the phrase *"shawl trailing like a memory"*? • A. Metaphor • B. Simile • C. Personification • D. Symbolism	1
x.	Complete the analogy – Dimly lit : Poor visibility :: Deafening noise :_____ A. Silence B. Poor audibility C. Echo D. Rock music	1
2.	Read the following passage and answer the question that follow.	10 marks
	1. AI-driven tools have made significant strides in analysing speech, text, and facial expressions to identify early signs of mental health disorders. Natural Language Processing (NLP) techniques enable extracting valuable insights from written or spoken words. For example, sentiment analysis can identify nuanced changes in an individual's emotional condition by examining social media posts, chat logs, or written diaries. 2. Moreover, voice analysis can detect alterations in speech patterns, encompassing variations in pitch, tone, and rhythm, which might potentially serve as indicators of anxiety, depression, or other mental health conditions.	

	Facial expression analysis, often coupled with computer vision, can provide insights into an individual's emotional state. AI systems can detect micro-expressions and subtle changes in facial features that may indicate underlying psychological conditions. 3. This technology benefits remote mental health monitoring through video consultations or mobile apps. The current trend in this domain involves advancing AI algorithms capable of discerning and comprehending these subtle indicators with notable precision. As AI systems continue to improve, they hold the potential to provide early warning signs of mental health disorders, allowing for timely intervention and support. Table below highlights specific AI tools used in current mental healthcare. **AI tools used in current mental healthcare** *AI tools Chatbot-based therapy* 1.**Woebot** - chatbot that provides CBT-based therapy for depression and anxiety. It has been shown to be effective in reducing symptoms of depression and anxiety in clinical trials. 2.**Wysa** - chatbot that provides therapy support for a variety of mental health conditions, including depression, anxiety, stress, and loneliness. It uses a combination of CBT, mindfulness, and positive psychology to help users improve their mental health. 3.**Talkspace** - online therapy platform connecting patients with licensed therapists through video, text, and audio messaging. It uses AI to match patients with therapists best suited to their needs. 4.**BetterHelp** - online therapy platform that connects patients with licensed therapists. It uses AI to match patients with therapists but offers a broader range of therapeutic approaches, including cognitive-behavioral therapy (CBT) and psychodynamic therapy. (Created for Academic Usage / 330 words Courtesy: Journal of Medicine, Surgery, and Public Health, August 2024.)	
I	**Answer the following questions, based on the passage above:** Complete the following suitably. _____techniques enable extracting valuable insights from written or spoken words.	1
ii	Suppose you are offered undesirable food by a host and you were dumbfounded. How would AI driven tools read your feelings? A. voice analysis B. facial expression analysis C. written or spoken words D. social media posts, chat logs	1
iii.	How does technology benefit remote mental health monitoring? Give two modes.	2

iv.	Paragraph 3 contains words- 'precision' and 'potential' Classify the following sentences as: - 'precision' and 'potential.' Sentence1: AI systems can warn the signs of depression Sentence 2: AI algorithms are capable of telling the effect of sleeping hours on the person correctly.	1
v.	Name an online therapy that is best suited to the patients' needs from the AI tool chart.	1
vi.	List two cognitive behavioural therapies found effective in reducing depression and anxiety from the AI tool chart given.	1
vii.	How do AI systems read facial expressions to link with the person's mind?	2
viii.	Which of the AI tools in the chart uses CBT as well as psychodynamic therapy. A. Woebot B.Wysa C. Talkspace D. BetterHelp	1
	SECTION B: CREATIVE WRITING SKILLS (18 marks)	
3.	Attempt any one of two , (A) or (B) in about 50 words.	4 marks
A.	You are Arun Verma, the Cultural Secretary of your school. The Principal has asked you to plan a "Zero-Waste School Fair" to promote sustainability and responsible consumption. Write a notice in not more than 50 words informing students about the event, encouraging them to set up stalls using eco-friendly materials, and participate actively.	
	OR	
B.	Your school library has introduced a 'Bring Your Own Book Week' where students can donate, exchange, or display books that inspire them. As Karan/ Karuna the Library Captain, draft a notice to motivate students to contribute actively and explain how this event will help create a vibrant reading culture.	
4.	Attempt any one of two, (A) or (B) in about 50 words.	4 marks
A.	You are Sindhu Sharma, the Head Boy/Head Girl of your school. Your school is organizing a Career Counselling Session for students of classes XI and XII. Draft a formal invitation in about 50 words to invite Dr. Meera Sharma, a renowned career counsellor, to deliver a talk on "Emerging Careers in the 21st Century"	
	OR	
B.	You are Professor Rohan/Roshni, a renowned author. You have been invited to be the judge for the Annual Debate Competition at ABC Public School on 12th September 2025. Draft a formal reply in about 50 words accepting the invitation..	
5.	Attempt any one of two, (A) or (B) in about 120 to 150 words.	5 marks

A.	WANTED Tech Sphere Solutions, a leading IT firm, is looking for a Data Analyst to join its Business Intelligence team. Eligibility: Bachelor's degree in Computer Science/Statistics/Mathematics Strong knowledge of MS Excel, SQL, and Data Visualization Tools. Good analytical and problem-solving skills. 2 years' experience **Apply within 10 days** with a detailed CV to: The HR Manager, Tech Sphere Solutions, Cyber Park, Gurgaon – 122002 Write a formal job application letter (120–150 words) applying for the above post along with a well-structured CV/Biodata	
	OR	
B.	You are Arjun/Ananya, a resident of 45, Lake View Apartments, Lucknow. You are concerned about the increasing incidents of cyberbullying among teenagers in your city. Write a letter to the Editor of The Hindustan Times highlighting the psychological impact of cyberbullying, suggesting preventive measures, and urging schools and parents to take action.	
6.	Attempt any one of the two, (A) or (B) in about 120 to 150 words.	5 marks
A.	You are **Ishita/Ishan**, a student of Class XII. You feel that social media influencers are shaping the mindset and lifestyle choices of today's youth. Write an article for your school magazine on the topic **"Social Media Influencers – Role Models or Mere Entertainers?"** in 120-150 words (Positive impact: awareness campaigns, skill sharing, motivation Negative impact: unrealistic lifestyles, consumerism, misinformation, Need for digital literacy and critical thinking,)	
	OR	
B.	You are Kavya/Karan, Cultural Secretary of your school. Your school recently organized a "Clean India – Green India" Drive as part of the Swachhata Pakhwada initiative. Write a report in 120–150 words for your school magazine describing the event. Use the hints given below. (Date, time and venue of the event, Classes/participants involved. Activities conducted: rally, slogan writing, tree plantation, cleanliness drive in and around school, Chief Guest's message, Feedback)	
	SECTION C : Literature (40 marks)	

7.	Read the given extracts and answer the questions for any one of the two given.	1 x 6 = 6 marks
A.	Those who prepare green wars, wars with gas, wars with fire, victory with no survivors, would put on clean clothes and walk about with their brothers in the shade, doing nothing.	
i.	What is a common outcome of all the wars described? (poem - Keeping Quiet)	
ii.	What does the imagery of 'walking about with their brothers in the shade' primarily represent? A. The readiness for further conflicts B. A return to normal activities post-conflict. C. A moment of unity and peaceful reflection D. The physical environment of a typical war zone	
iii.	Complete the following suitably. The putting on of 'clean clothes' by the warmongers, symbolises_____.	
iv.	Select the correct option from those given in brackets, to fill in the blank. The excerpt tells us that the speaker _____ (condemns / glorifies) the destructive nature of modern warfare.	
v.	Read the assertion and the reason below, with reference to the given extract. Assertion: The poet advocates for 'doing nothing' as a way to prevent the devastation of war. Reason: 'Doing nothing' refers to a time for stopping any action for a few moments. Choose the correct option regarding their relationship. A. Both the assertion and the reason are true, and the reason is the correct explanation of the assertion. B. Both the assertion and the reason are true, but the reason is not the correct explanation of the assertion. C. The assertion is true, but the reason is false. D. The assertion is false, but the reason is true.	
vi.	How can the message in the excerpt, about the outcome of wars be applied to promote peace?	
	OR	
B.	When Aunt is dead, her terrified hands will lie Still ringed with ordeals she was mastered by. The tigers in the panel that she made Will go on prancing, proud and unafraid.	
i.	What does the phrase 'terrified hands' suggest about Aunt's life?	1

ii.	Complete the following suitably. The tigers' proud and playful movements reflect ___.	1
iii.	Examine briefly how the tigers in the panel contrast with Aunt's life experiences.	2
iv.	Fill in the blank with the correct option from those given in the brackets. The phrase 'still ringed' refers to both the literal ___(shape of the embroidery panel / wedding band on her finger) and the figurative 'ring' of constraints and ordeals imposed by her marriage.	
v.	If a student were to interpret the word 'prancing' in a real-world context, which of the following would it best represent? a) An employee working under the pressure of deadlines. b) A soldier standing firm and ready for battle at the frontier. c) A child playing freely in a park, unburdened by responsibilities. d) A bird trapped in a cage, longing to be free and fly high.	
vi.	What does the poet imply about the art in the line 'The tigers in the panel that she made will go on prancing'? a) Art is a timeless expression that outlives its creator, continuing to embody their spirit and desires. b) The tigers symbolise Aunt Jennifer's fleeting empowerment, which will fade over time. c) The panel is a temporary escape for Aunt Jennifer, offering solace only during her lifetime. d) The permanence of the tigers in the panel contrasts with the transient nature of Aunt Jennifer's struggles.	
8. A	Read the given extracts and answer the questions for any one of the two given. Some might make quite extravagant claims for it as being, in its highest form, a sourceof truth, and, in its practice, an art. Others, usually celebrities who see themselves as its victims, might despise the interview as an unwarranted intrusion into their lives, orfeel that it somehow diminishes them, just as in some primitive cultures it is believed that if one takes a photographic portrait of somebody then one is stealing that person's soul.	1 x 6 = 6 marks
i.	What is the most likely reason some people consider the practice of interview to be anart? This could be because it requires- A. fluency of words. B. sensitive and careful handling.	1

	C. creativity and imagination. D. probing and focusing on details.	
ii.	Rewrite the sentence by replacing the underlined phrase with its inference. Celebrities feel that an interview <u>diminishes them</u>.	1
iii.	On the basis of the extract, choose the correct option with reference to the two statements given below. (1) Celebrities don't consent to be interviewed. (2) Interviews intrude the privacy of celebrities. A. (1) Can be inferred from the extract but (2) cannot. B. (1) cannot be inferred from the extract but (2) can. C. (1) is true but (2) is false. D. (2) is the reason for (1).	1
iv.	Rationalise, to support the given opinion: To say that an interview, in its highest form, is a source of truth, is an extravagant claim.	1
v.	Replace the underlined word with its antonym from the extract. Some celebrities hate the idea of having to give an interview because it makes them feel like <u>supporters</u>.	1
vi.	The author's views on interview, in the extract, can best be described as statements based on. A. facts B. hypothesis C. beliefs D. superstitions	1
	OR	
B.	He walked and walked without coming to the end of the wood, and finally he realised that he had only been walking around in the same part of the forest. All at once he recalled his thoughts about the world and the rattrap. Now his own turn had come. He had let himself be fooled by a bait and had been caught. The whole forest, with its trunks and branches, its thickets and fallen logs, closed in upon him like an impenetrable prison from which he could never escape.	
i.	I) The peddler's thoughts about the 'world' and the rattrap' and luxuries as bait is a/an _____ A. simile B. paradox C. analogy D. hyperbole	1
ii.	The forest was like an 'impenetrable prison' because A. the police was waiting to catch him outside the forest B. there was no shelter or food in the forest C. there were wild animals in the forest	1

	D. the peddler was stuck up in the dense forest	
iii.	Which of the following sentences uses the word 'turn' in the same way as used in this extract? (a) Mijbil could turn the tap in the bathroom. (b) He must not turn his back to the teacher. (c) The girl waited for her turn to enter the class. (d) I might turn down their offer to play football.	1
iv.	What makes the forest similar to the prison ?	1
v.	Something which is impenetrable" is impossible to 1. break 2. defeat 3. pass through 4. enter 5. hide 6. Access (a) Options 1,2,4 (b) Options 2,5,6 (c) Options 2,3,4 (d) Options 3, 4, 6	1
vi.	6. The literary device used in the expression, "like an impenetrable prison" is a……..	1
9.	Read the given extracts and answer the questions for any one of the two given.	4 marks
A.	MR LAMB: Lord, boy, you've got two arms, two legs and eyes and ears, you've got a tongue and a brain. You'll get on the way you want, like all the rest. And if you chose, and set your mind to it, you could get on better than all the rest. DERRY: How? MR LAMB: Same way as I do. DERRY: Do you have any friends? MR LAMB: Hundreds. DERRY: But you live by yourself in that house. It's a big house, too. MR LAMB: Friends everywhere. People come in.... everybody knows me. The gate's always open. They come and sit here. And in front of the fire in winter. Kids come for the apples and pears. And for toffee. I make toffee with honey. Anybody comes. So have you. DERRY: But I'm not a friend.	
i.	What is the significance of Mr.. Lamb's statement, "You've got two arms, two legs and eyes and ears, you've got a tongue and a brain"? A. He was healthy B. The boy was intelligent. C. It symbolizes the potential for human capability. D. Mr Lamb was suffering from sense of alienation.	1

ii.	Analyze the role of the house in the story. How does Mr.. Lamb's home reflect his character and the themes of the narrative? A. The house reflects Mr. Lamb's open and welcoming nature B. His house was bright and beautiful. C. He was proud of his house D. His house was his pride.	1
iii.	Examine the significance of the gate always being open at Mr.. Lamb's house. What does this symbolize in terms of the story's themes? A. The open gate represents Mr.. Lamb's vulnerability. B. The gate symbolizes Derry's reluctance to enter. C. The open gate has no symbolic meaning. D. It signifies the accessibility of Mr.. Lamb's friendship.	1
iv.	Evaluate the impact of Mr.. Lamb's statement, "So have you." when Derry says, "But I'm not a friend." What does this reveal about their relationship and the story's themes? a) It shows Mr.. Lamb's disregard for Derry's feelings. b) It highlights Derry's insecurity about friendship. c) It suggests that Mr.. Lamb sees potential in Derry. d) The statement is unrelated to the story's themes.	1
	OR	
B.	"Human civilisations have been around for a paltry 12,000 years - barely a few seconds on the geological clock. In that short amount of time, we've managed to create quite a ruckus, etching our dominance over Nature with our villages, towns, cities, megacities. The rapid increase of human populations has left us battling with other species for limited resources, and the unmitigated burning of fossil fuels has now created a blanket of carbon dioxide around the world, which is slowly but surely increasing the average global temperature."	
i.	Why does the author call 12,000 years as paltry?	1
ii.	Say whether the following statement is true or false according to the passage. Human beings have protected the earth by developing villages, towns, cities and megacities.	1
iii.	The author says that there is a blanket of carbon dioxide around the world because of _____ A) global temperature B) burning of fossil fuels C) limited resources D) increase of population	1

iv.	iv) 'battling with other species for limited resources' means____ A) destroying the other species B) consuming the available resources C) competing for the limited resources with other species D) increasing the resources for other species	1
10.	Answer any five of the following six questions in about 40 to 50 words.	5 x 2= 10 marks
I	What does the villagers' presence at the last lesson reveal about human nature?	
II.	Subbu is described as "tailor-made for films." How does his personality contribute to Gemini Studios' success?	
III.	How does the poet's fleeting thought of her mother's death deepen the emotional impact of the poem?	
IV	List the things that cause suffering and pain.	
V	Why does Anees Jung say that "the children have become partners in survival"?	
VI.	How does the poem expose the false promises made to rural people?	
11.	Answer any two of the following three questions in about 40 to 50 words.	2 x 2 = 4 marks
I	In what ways does "We Too Are Human Beings" emphasize the transformative power of awareness and education?	
II.	What does Charley's preference for Galesburg, 1894, reveal about his character?	
III.	What does the journey to Antarctica suggest about humanity's relationship with nature?	
12.	Answer ANY ONE of the following two questions in about 120 to 150 words.	5 marks
A.	The king in "The Tiger King" was obsessed with hunting tigers and securing his own glory, ignoring the welfare of his kingdom. As a responsible citizen of his kingdom, write a note expressing your concerns to the king. Include suggestions on how he could act responsibly and care for his people instead of being selfish.	
	OR	
B.	In both "The Enemy" and the autobiographical extracts of Bama and Zitkala-Sa, the protagonists confront deeply ingrained societal prejudices — whether rooted in race, nationality, or caste. Compare how Dr. Sadao and either Bama or Zitkala-Sa respond to the injustice they witness or experience. What does their response reveal about resistance, conscience, and the power of individual action against discrimination?	
13.	Answer ANY ONE of the following two questions in about 120 to 150 words.	5 marks

A.	Imagine you are William Douglas , who overcame his fear of water. Write a diary entry describing your emotions, thoughts, and reflections on courage and self-confidence	
	OR	
B.	Rajkumar Shukla in ‘Indigo’ decided to take up the cause of the peasants and raise his voice against injustice. The bangle makers were in a stark contrast and accepted their plight of oppression because of tradition and caste. Write a comparative analysis of the two different attitudes towards unjust domination. [120-150 Words]	

	KENDRIYA VIDYALAYA SANGATHAN, DEHRADUN REGION **FIRST PRE BOARD EXAMINATION** **(2025-2026)** **CLASS XII** **Time allowed: 3 Hrs GEOGRAPHY (029) Max. marks: 70** **MARKING SCHEME** **Section A** **Questions no. 1 to 17 are Multiple Choice Type Questions.**	
1	B. Geneva	1
2 2.1	Viticulture under Plantation Agriculture D Multiple Cropping	1
3	A. Retailer Both the statements are true, statement II correctly explains statement I.	1
4	C. Maharashtra-Korba	1
5	C. 2 1 3 4	1
6.	D. Food grains	1
7.	A. Both A and R are true and R is the correct explanation of A.	1
8	C. A is true but R is false.	1
9	C. A is true but R is false.	1
10	C. A is true but R is false.	1
11	A. Sikkim	1
12	C. Regional planning	1
13	B. Only 1 & 2	1
14	B. Both statement 1 and 2 are correct and statement 1 is NOT correct explanation of statement 2.	1
15	A. U.S.A 15.1. A	1
16	B. China 16.1. D	1

17	A. Brazil 17.1. D	1
	Section B **Questions number 18 and 19 are Source-based Questions.**	
18. I	Economic growth, Improve the quality of life of people, Provide good environment	1
18.II	Bhubaneswar (any relevant city)	1
18. III	Provide core infrastructure	1
19. I	The Suez Canal (19.1.I. A.)	1
19. II	@ It gives Europe a new gateway to the Indian Ocean and reduces direct sea-route distance between Liverpool and Colombo compared to the Cape of Good Hope route. @ It is a sea-level canal without locks which is about 160 km and 11 to 15 m deep. (19.2.II. B.)	1
19. III	Port Said in the north and Port Suez in the south linking the Mediterranean Sea and the Red Sea. (19.3.III.B.)	1
	Section C **Questions number 20 to 23 are Short Answer Type Questions**	
20 20.I 20.II 20.III	I. Himachal Pradesh II Bharmaur tribal region has harsh climate conditions, low resource base and fragile environment. It is one of the most (economically and socially) backward areas of Himachal Pradesh. III. The most significant contribution of tribal sub-plan in Bharmaur region is the development of infrastructure in terms of schools, healthcare facilities, potable water, roads, communications and electricity. B. Agriculture and Animal husbandry C. Educational facilities A. Gaddi	3

21.	Types of Rural Settlements and their Features (any three) 3 1. Clustered/Nucleated Settlements 2. Semi-Clustered (Hamleted) Settlements 3. Dispersed Settlements 4. Linear Settlements Rural settlements in India display a variety of patterns—clustered, semi-clustered, dispersed, and linear—shaped by the interaction of physical environment, socio-cultural traditions, and economic activities.	
22.	Outsourcing benefits both sets of countries—cost efficiency for developed nations. 24*7 Operations, employment plus growth, skill development, foreign exchange earnings and infrastructure growth etc. for developing ones. However, it also creates challenges like job insecurity, social tensions, cultural influence and over-dependence. Balanced policies and skill development are essential to maximize the benefits while reducing the drawbacks.	
23. A	1. The understanding of concepts of friction and heat helped us discover fire. 2. Understanding of the secrets of DNA and genetics enabled us to conquer many diseases. 3. We use the laws of aerodynamics to develop faster planes. **OR**	
23.B	1. With social and cultural development, humans develop better and more efficient technology. **3** 2. The imprints of human activities are created everywhere; health resorts on highlands, huge urban sprawls, fields, orchards and pastures in plains and rolling hills, ports on the coasts, oceanic routes on the oceanic surface and satellites in the space. 3. Nature provides opportunities and human being make use of these and slowly nature gets humanised and starts bearing the imprints	

24. A	of human endeavour. Mediterranean agriculture goes beyond subsistence and is oriented toward **highly specialized, export-oriented, and commercially valuable crops**, making it one of the most specialized agricultural systems in the world. **5** 1. **Cultivation of Commercial Crops:** o Mediterranean regions mainly grow high-value crops like olives, grapes, citrus fruits, figs, and dates. 2. **Export Orientation:** o A large share of production (especially wine, olive oil, and citrus fruits) is exported to other parts of the world. o Agriculture here is strongly linked to global markets. 3. **Specialized Viticulture (Wine Production):** o Viticulture (grape cultivation) and wine making are highly specialized and technologically advanced, making the region globally famous. 4. **Favorable Climate and Crop Suitability:** o The mild, wet winters and hot, dry summers uniquely suit these specialized crops, making the region's farming system distinct from subsistence agriculture. 5. **Integration with Industry and Tourism:** o Olive oil, wine, and citrus processing industries are well developed. o Agricultural products also support Mediterranean cuisine and attract agro-tourism, reinforcing its commercial and specialized character.	
	OR	
24.B	1. Dairy is the most advanced and efficient type of rearing of milch animals. 2. It is highly capital intensive. Animal sheds, storage facilities for fodder, feeding and milching machines add to the cost of dairy	

	farming. 3. Special emphasis is laid on cattle breeding, health care and veterinary services. 4. It is highly labour intensive as it involves rigorous care in feeding and milching. 5. It is practised mainly near urban and industrial centres which provide neighbourhood market for fresh milk and dairy products. 6. The development of transportation, refrigeration, pasteurisation and other preservation processes have increased the duration of storage of various dairy products.	
25. A.	**Water Pollution: Natural vs. Human Sources** **5** **1. Natural Sources of Water Pollution** • Natural phenomena like volcanic eruptions, landslides, floods, and decomposition of organic matter can release sediments, minerals, and biological wastes into water. • Example: Floods increase turbidity, volcanic eruptions release ash and toxic minerals. However, these are **occasional, localized, and self-purifying over time** due to natural ecological balance. **2. Human Sources – The Real Cause of Concern** • **Industrial Discharge:** Factories release toxic chemicals, heavy metals, and dyes into rivers and lakes, causing long-term contamination. • **Agricultural Runoff:** Fertilizers, pesticides, and insecticides seep into groundwater and surface water, leading to eutrophication. • **Domestic Sewage:** Large volumes of untreated sewage are dumped in rivers, adding pathogens and organic matter. • **Plastic and Solid Waste:** Non-biodegradable waste pollutes water bodies and disrupts aquatic ecosystems. • **Thermal & Nuclear Pollution:** Hot water from power plants and radioactive waste affect aquatic life.	

	Unlike natural pollutants, **human-induced pollution is continuous, widespread, large in volume, and often contains toxic, non-biodegradable substances** that accumulate in the environment. **3. Conclusion:** Although natural processes contribute to water pollution, **human activities are the real cause of concern** because they: • Introduce new, synthetic, and harmful substances into water. • Overwhelm nature's self-purification capacity. • Create long-lasting impacts on health, agriculture, and ecosystems. Human-induced pollution is **persistent, large-scale, and hazardous**, making it the primary challenge in water resource management. **OR**	
25.B	**Problems Faced by Slum Dwellers in Urban Areas (Any three)** **3** **(3+2=5)** **1. Poor Housing Conditions** o Slums are characterized by overcrowded, poorly constructed houses with little ventilation and unsafe structures. o Lack of proper ownership rights makes dwellers vulnerable to eviction. **2. Inadequate Basic Amenities** o Limited or no access to clean drinking water, sanitation, drainage, and electricity. o Garbage disposal is inefficient, leading to unhygienic surroundings. **3. Health Issues** o High population density, poor sanitation, and polluted surroundings cause the spread of diseases like cholera, typhoid, tuberculosis, and respiratory infections.	

	○ Malnutrition and poor healthcare access worsen the situation. 4. **Employment and Poverty** ○ Most slum dwellers work in the informal sector as daily wage laborers, rickshaw pullers, or domestic workers. ○ Jobs are insecure and wages are low, perpetuating poverty. 5. **Social Problems** ○ Lack of proper schools and recreational facilities results in low literacy and limited opportunities for children. ○ Social evils like crime, drug abuse, and child labor are more common due to poverty and neglect. **Impact on Quality of Life (any two)** **2** • **Low Standard of Living**: Overcrowding, poor housing, and lack of amenities create constant hardship. • **Health Vulnerability:** Frequent disease outbreaks reduce life expectancy and productivity. • **Cycle of Poverty:** Limited education and insecure jobs prevent upward social mobility. • **Social Exclusion:** Slum dwellers often face discrimination and marginalization in urban society.	
26. A.	**Definition of Population Density:** Population density refers to the number of people living per unit area of land (usually per square kilometre). **(2+3)** **Example:** According to Census 2011, Bihar has a population density of **1106 persons per sq. km**, one of the highest in India, whereas Arunachal Pradesh has only **17 persons per sq. km**. Reasons for Higher Population Concentration in North Indian Plains, Deltas and Coastal Plains (Any three) 1. Fertile Soil and Agricultural Productivity	

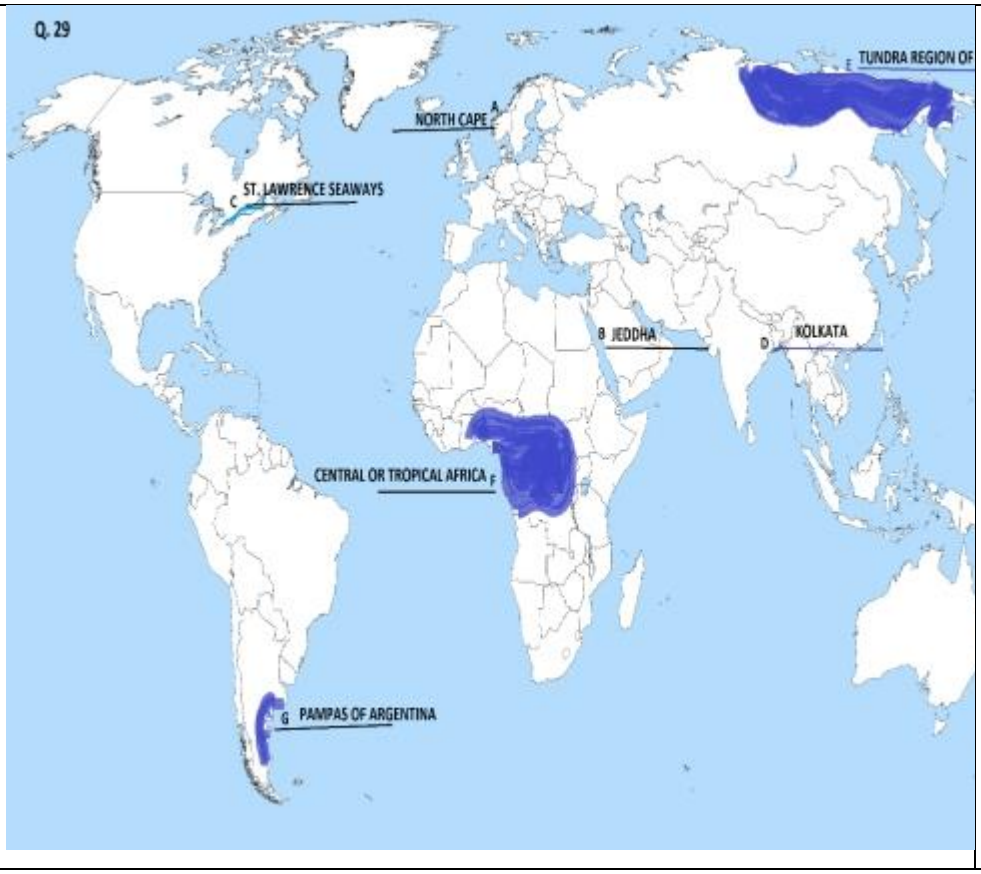
26. B	2. Water Availability 3. Favourable Climate 4. Industrial and Trade Opportunities *(extra point if needed)* **Contrast with Southern & Central Interior States:** Regions like **Madhya Pradesh, Chhattisgarh, Rajasthan interiors, Karnataka plateau** have rugged terrain, poor soils, and scarce water supply. • Agriculture is less productive, industrialization is limited, and climate is less hospitable (dry/arid). • As a result, these areas are **sparsely populated** compared to northern plains and coastal regions. I. **Adolescents** are individuals in the age group of 10–19 years, representing the transition phase from childhood to adulthood. They form about one-fifth (20%) of India's total population, making them a significant demographic group. **(1+2+2)** II. Why are Adolescents Important in the Population? 1. **Demographic Dividend:** They represent the future workforce and can accelerate economic growth if properly educated and skilled. 2. **Social Change Agents:** Being energetic and adaptable, adolescents can bring social reforms and adopt progressive ideas quickly. 3. **Future Human Resource:** Investment in their health, nutrition, and education ensures a productive adult population. 4. **Bridge Generation:** They are key to shaping cultural, social, and political transformation in society. III. Adolescents are a **critical segment of the population**, as they determine the quality of the future workforce and society. However, without proper education, healthcare, and opportunities, they may become a burden instead of an asset. Hence, **investment in adolescent health, education, and skill development is essential for sustainable**	

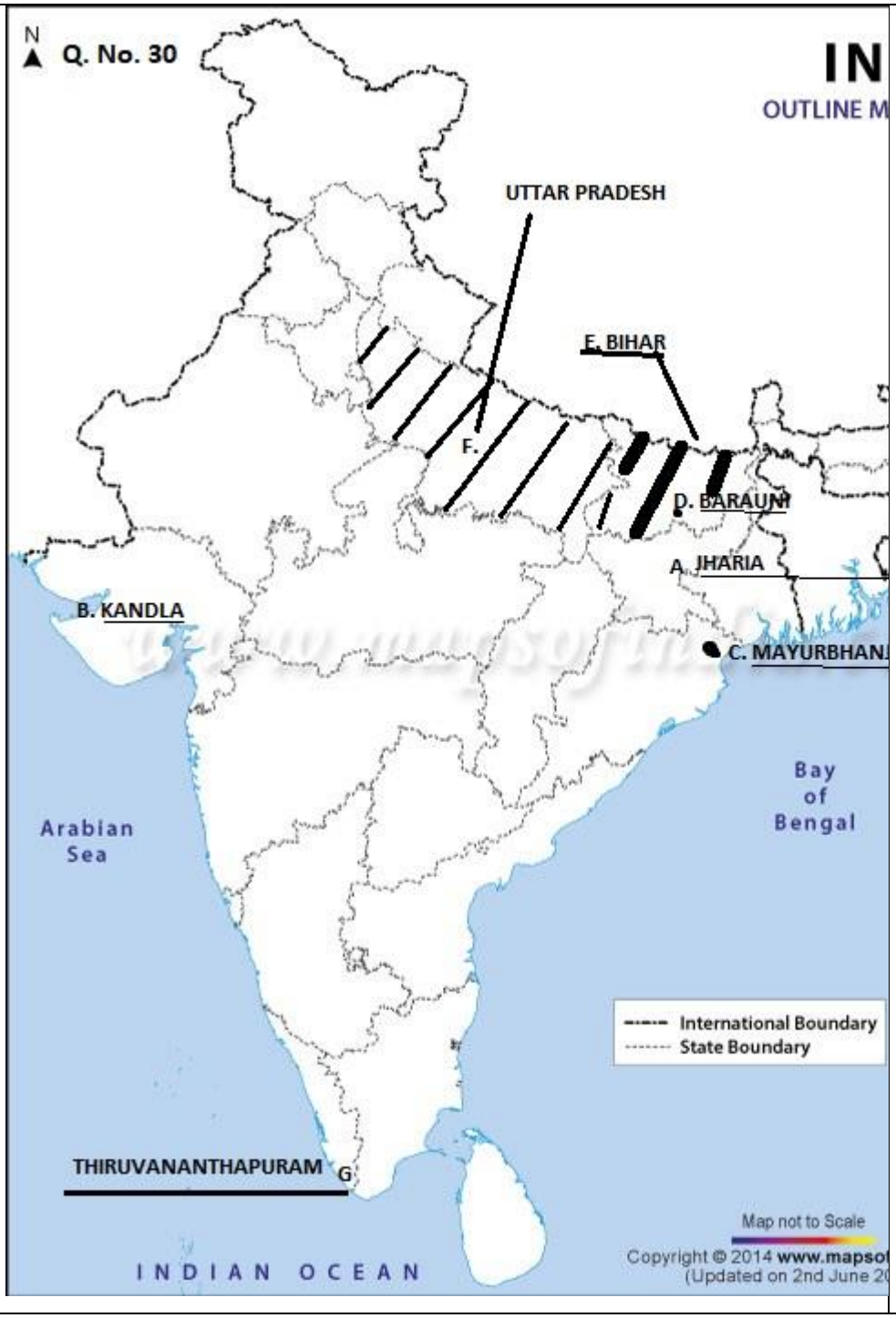
27.	**development**. **Importance & Contribution of Sea Routes in Handling India's Foreign Trade: (5 Points)** 1. Major Share in Foreign Trade 2. Cost-Effectiveness 3. Global Connectivity 4. Export and Import of Key Commodities 5. Strategic and Economic Significance **Conclusion:** Sea routes are the lifeline of India's foreign trade, handling the maximum share of imports and exports. Their cost-effectiveness, connectivity, and ability to handle bulk goods make them indispensable for India's economic growth and integration with the global market.	
28.A	**I. Definition of Demographic Cycle (1+2+2)** The **demographic cycle** (or transition) refers to the changes in **birth rate, death rate, and population growth** over time as a society develops economically and socially. • It is explained through the **Demographic Transition Theory**, which has **three main stages** (traditional form) or **five stages** (modern form). **II. Stage II of Demographic Transition Theory – Main Features** Stage II is known as the **Early Expanding Stage**. 1. **High Birth Rate, Falling Death Rate** o Due to improvements in medical facilities, sanitation, and food supply, the death rate declines significantly. o But the birth rate remains high due to traditional social norms, lack of awareness, and agricultural economy.	

28. B	2. **Rapid Population Growth** o The gap between birth rate and death rate widens. o This results in **high natural increase** in population, often described as a **population explosion**. III. **Demographic Condition of India in Context of Demographic Transition Theory.** • **India's Position:** India is currently passing through **Stage III (Late Expanding Stage)**. • **Features in India:** o Birth rate is **declining** gradually due to family planning, urbanization, and rising literacy. o Death rate has already declined significantly because of improved medical facilities and better living standards. o Population is still growing, but the **rate of growth has slowed** compared to Stage II. • **Future Trend:** India is expected to move towards **Stage IV (Low Stationary Stage)** in the coming decades, where both birth and death rates will be low and population growth will stabilize. **Conclusion:** The demographic cycle highlights how societies shift from high birth and death rates to low birth and death rates over time. India, having passed the explosive growth of Stage II, is now in Stage III, moving steadily towards stabilization. **OR** **Female Migration** as a Component of Population Change: (1+2+2) **Definition:** Female migration refers to the movement of women from one place to another, either within a country (internal migration) or across countries (international migration), for reasons such as marriage, employment, education, or family reunification. It has become a **significant component of global population change**, as	

	women now constitute nearly **half of international migrants worldwide**.
	
	Reasons for Increase in Female Migration Globally
	
	1. **Economic Opportunities:**
	  o Growth of the service sector (healthcare, domestic work, education, hospitality) has created demand for female labor in developed countries.
	  o Women migrate independently for jobs rather than only as dependents.
	2. **Social and Educational Factors:**
	  o Rising literacy, higher education, and empowerment have encouraged women to migrate for studies, careers, and better life prospects.
	  o Family reunification programs also increase female migration.
	
	Impacts of Female Migration on Destination Regions
	
	1. **Socio-Cultural Impact:**
	  o Enhances **cultural diversity** and brings new perspectives to host societies.
	  o Women often take up caregiving roles, supporting aging populations in developed countries.
	  o However, it may also create cultural adjustment challenges and gender-based discrimination.
	2. **Economic Impact:**
	  o Contributes significantly to the labor market in sectors like nursing, childcare, hospitality, and domestic services.
	  o Remittances sent back home improve livelihoods in origin countries while boosting global economic linkages.
	  o In some cases, dependency on migrant female labor may discourage local participation in low-paid jobs.
	
	Conclusion: Female migration has shifted from being **marriage or**	

	family-linked to being a major **economic and social phenomenon**. It not only contributes to the labor force of the destination countries but also reshapes their socio-cultural and economic structures.	
29	**MAP (attached with answers)**	5
29.A	Saint Lawrence Seaway or Great Lakes Waterway	
29. B	Sydney Port	
29.C	Suez Canal	
29.D	Vancouver (British Columbia)	
29.E	Tokyo Port or Yokohama Port	
29.F	Mumbai Port (other major ports: Chennai, Kolkata, Kandla, Visakhapatnam)	
29. G	Amazon Rainforest regions (by indigenous tribes) or Orinoco Basin regions.	5
30	**The World Map (attached with answers)**	5
30.A	West Bengal	
30. B	Karnataka	
30.C	Jamnagar refinery	
30.D	Singbhum Copper mines	
30.E	Mumbai Port	
30.F	Lokpriya Gopinath Bordoloi International Airport (Guwahati)	
30.G	Malajkhand Copper Mine	

29	 Q. 29 TUNDRA REGION OF E NORTH CAPE A ST. LAWRENCE SEAWAYS C B JEDDHA D KOLKATA CENTRAL OR TROPICAL AFRICA F G PAMPAS OF ARGENTINA	5

30	 N Q. No. 30 IN OUTLINE M UTTAR PRADESH E. BIHAR F. D. BARAUNI A. JHARIA B. KANDLA C. MAYURBHAN Bay of Bengal Arabian Sea International Boundary State Boundary THIRUVANANTHAPURAM G Map not to Scale Copyright © 2014 www.mapso (Updated on 2nd June 2 INDIAN OCEAN	5

THE END

KENDRIYA VIDYALAYA SANGATHAN DEHRADUN REGION

PRE BOARD EXAM-1 2025-26

Class – **XII** Subject- **Geography**

Time allowed – 3:00 Hours Maximum Marks -70

General Instructions:

1. This question paper contains **30** questions. **All** questions are c**ompulsory**.
2. This question paper is divided into **five** sections. **Sections-A, B, C, D and E.**
3. ***Section A*** - Question number **1 to 17** are Multiple Choice type questions carrying 1 mark each.
4. ***Section B***- Question number **18 and 19** are Source based questions carrying 3 marks each.
5. ***Section C***- Question number **20 to 23** are Short Answer type questions carrying 3 marks each. Answer to these questions shall be written in 80 to 100 words.
6. ***Section D*** Question number **24 to 28** are Long Answer type questions carrying 5 marks each. Answer to these questions shall be written in 120 to 150 words.
7. ***Section E*** Question number **29 and 30** are Map based questions carrying 5 marks each.
8. In addition to this, **NOTE** that a separate question has been provided for Visually Impaired candidates in lieu of questions having visual inputs, map etc. Such questions are to be attempted by Visually Impaired candidates only.
9. There is no overall choice given in the question paper. However, an internal choice has been provided in a few questions in all sections other than Section A**.**

सामान्य निर्देश:

1. इस प्रश्न पत्र में 30 प्रश्न हैं। सभी प्रश्न अनिवार्य हैं।
2. यह प्रश्न पत्र पाँच खंडों में विभाजित है। खंड- A, B, C, D और E.
3. खंड अ - प्रश्न संख्या 1 से 17 तक बहुविकल्पीय प्रश्न हैं, प्रत्येक 1 अंक का है।
4. खंड ब - प्रश्न संख्या 18 और 19 स्रोत आधारित प्रश्न हैं, प्रत्येक 3 अंक का है।
5. खंड स - प्रश्न संख्या 20 से 23 तक लघु उत्तरीय प्रश्न हैं, प्रत्येक 3 अंक का है। इन प्रश्नों के उत्तर 80 से 100 शब्दों में लिखने हैं।
6. खंड डी - प्रश्न संख्या 24 से 28 तक दीर्घ उत्तरीय प्रश्न हैं, प्रत्येक 5 अंक का है। इन प्रश्नों के उत्तर 120 से 150 शब्दों में लिखने हैं।
7. खंड ई - प्रश्न संख्या 29 और 30, मानचित्र आधारित प्रश्न हैं, प्रत्येक 5 अंक का है।
8. इसके अतिरिक्त, कृपया ध्यान दें कि दृश्य इनपुट, मानचित्र आदि वाले प्रश्नों के स्थान पर दृष्टिबाधित अभ्यर्थियों के लिए एक अलग प्रश्न दिया गया है। ऐसे प्रश्न केवल दृष्टिबाधित अभ्यर्थियों को ही हल करने हैं।
9. प्रश्नपत्र में कोई समग्र विकल्प नहीं दिया गया है। हालाँकि, खंड 'क' को छोड़कर सभी खंडों में कुछ प्रश्नों में आंतरिक विकल्प दिया गया है।

SECTION A
खंड अ

There are 17 MCQ in this section (Q.No. 1-17) all are compulsory questions.

इस खंड में 17 बहुविकल्पीय प्रश्न (प्रश्न संख्या 1-17) हैं, सभी अनिवार्य प्रश्न हैं।

S.NO		Marks
Q 1	Which one of the following is the headquarter of the 'World Trade Organization'? A. New York B. Geneva C. Delhi D. London	1

निम्नलिखित में से कौन सा 'विश्व व्यापार संगठन' का मुख्यालय है?

A. न्यूयॉर्क B. जिनेवा C. दिल्ली D. लंदन

Q 2 Identify the type of agricultural farming in the given picture and give a suitable title to it. 1



A) Viticulture under plantation agriculture
B) Subsistence agriculture
C) Mixed farming
D) Dairy farming

दिए गए चित्र में कृषि के प्रकार को पहचानें और उसे उपयुक्त शीर्षक दें।

A) बागानी कृषि के अंतर्गत अंगूर की खेती
B) निर्वाह कृषि
C) मिश्रित खेती
D) डेयरी खेती

The following question is for **Visually Impaired Candidates only** in lieu of Question No.2. Which of the following is **NOT** a characteristic of commercial grain farming?

A. Large scale mechanized operations
B. Capital Intensive
C. Labour Intensive
D. Multiple cropping

प्रश्न संख्या 2 के स्थान पर निम्नलिखित **प्रश्न केवल दृष्टिबाधित अभ्यर्थियों** के लिए है। निम्नलिखित में से कौन-सी व्यावसायिक अनाज खेती की विशेषता नहीं है?

A. बड़े पैमाने पर मशीनीकृत कार्य
B. पूँजी प्रधान
C. श्रम प्रधान
D. बहुफसली खेती

Q 3 _____ are business firms engaged in offering goods and services directly to consumers. 1

A. Retailer

B. Trader
C. Buyer
D. Teacher

_____ व्यावसायिक फर्में हैं जो सीधे उपभोक्ताओं को वस्तुएँ और सेवाएँ प्रदान करती हैं।
A.खुदरा विक्रेता
B. व्यापारी
C. क्रेता
d. शिक्षक

Q 4 Which of the following pair is not correctly matched: 1

State	Coal mine
(a). West Bengal	I. Raniganj
(b). Tamilnadu	II. Neyveli
(c). Maharashtra	III. Korba
(d). Odisha	IV. Talcher

निम्नलिखित में से कौनसा जोड़ा सही ढंग से मेल नहीं खाता है|

राज्य	कोयलाखदान
a. पश्चिम बंगाल	I. रानीगंज
b. तमिलनाडु	II. नेवेली
c. महाराष्ट्र	III. कोरबा
d. ओडिशा	IV. तालचेर

Q 5 Match the column I with column II and choose the correct answer with the help of given codes. 1

COLUMN I (TYPES OF AGRICULTURE) स्तंभ I (कृषि के प्रकार)	COLUMN II (FEATURES) स्तंभ II (विशेषताएँ)
I. Protective irrigation farming / संरक्षण सिंचाई कृषि	1. Practice various measures of soil moisture conservation and rain water harvesting. मृदा नमी संरक्षण एवं वर्षा जल संचयन के विभिन्न उपाय अपनाना।
II. Productive irrigation farming / उत्पादक सिंचाई कृषि	2. Stress on growing various water intensive crops. अधिक जल-खपत वाली फसलों की खेतीपर बल।
III. Wet land farming / आर्द्र भूमि कृषि	3. To protect the crops from adverse effects of soil moisture deficiency. फसलों को मृदा नमी की कमी के प्रतिकूल प्रभाव से बचाना।
IV. Dry land farming/ शुष्क भूमि कृषि	4. To provide sufficient soil moisture in the cropping season to achieve high productivity. फसल अवधि में पर्याप्त

मृदा नमी प्रदान करना ताकि अधिक उत्पादन प्राप्त हो सके।

Code: I II III IV
A. 1 2 3 4
B. 2 3 4 1
C. 2 1 3 4
D. 3 2 1 4

Q 6 India does not import which of the following commodities? 1
A. Pearls and semi-precious stones
B. Electronic goods
C. Scrap metals and non-ferrous metals
D. Food grains

भारत निम्नलिखित में से किस वस्तु का आयात नहीं करता है?
A. मोती और अर्ध-कीमती पत्थर
B. इलेक्ट्रॉनिक सामान
C. स्क्रैप धातुएँ और अलौह धातुएँ
D. खाद्यान्न

Answer the question from 7-10 1x3=3

Directions: In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:
A. Both A and R are true and R is the correct explanation of A.
B. Both A and R are true but R is NOT the correct explanation of A.
C. A is true but R is false.
D. A is false and R is true.

प्रश्न संख्या 7-10 के उत्तर दीजिए।

निर्देश: निम्नलिखित प्रश्नों में, अभिकथन (A) के बाद तर्क (R) का कथन दिया गया है। सही विकल्प पर निशान लगाइए:
A. A और R दोनों सत्य हैं और R, A की सही व्याख्या है।
B. A और R दोनों सत्य हैं लेकिन R, A की सही व्याख्या नहीं है।
C. A सत्य है लेकिन R असत्य है।
D. A असत्य है और R सत्य है।

Q 7 **Assertion (A):** Bio-energy is a sustainable and versatile source of energy that can be converted into electrical energy, heat energy, or gas for cooking. 1
Reason (R): Bio-energy not only processes waste and garbage to produce energy but also reduces environmental pollution, enhances self-reliance, and improves the economic life of rural areas in developing countries.

अभिकथन (A): जैव-ऊर्जा ऊर्जा का एक स्थायी और बहुमुखी स्रोत है जिसे विद्युत ऊर्जा, ऊष्मा ऊर्जा या खाना पकाने के लिए गैस में परिवर्तित किया जा सकता है।
कारण (R): जैव-ऊर्जा न केवल अपशिष्ट और कूड़े को संसाधित करके ऊर्जा उत्पन्न करती है, बल्कि पर्यावरण प्रदूषण को भी कम करती है, आत्मनिर्भरता बढ़ाती है और विकासशील देशों के ग्रामीण क्षेत्रों के आर्थिक जीवन में सुधार करती है।

Q 8 **Assertion (A):** High-tech industries require intensive research and development efforts. 1
Reason (R): High-tech industries primarily rely on unskilled labor for production.

अभिकथन (A): उच्च तकनीक उद्योगों को गहन अनुसंधान और विकास प्रयासों की आवश्यकता होती है।

कारण (R): उच्च तकनीक उद्योग मुख्य रूप से उत्पादन के लिए अकुशल श्रम पर निर्भर करते हैं।

Q 9 **Assertion (A):** In Punjab, Haryana and Western Uttar Pradesh more than 85 per cent of their net sown area is under irrigation. 1

Reason (R): Of the total net irrigated area 26.1 per cent in Punjab and 11.3 per cent in Haryana are irrigated through wells and tube wells.

अभिकथन (A): पंजाब, हरियाणा और पश्चिमी उत्तर प्रदेश में उनके शुद्ध बोए गए क्षेत्र का 85 प्रतिशत से अधिक सिंचित है।

कारण (R): कुल शुद्ध सिंचित क्षेत्र का 26.1 प्रतिशत पंजाब में और 11.3 प्रतिशत हरियाणा में कुओं और नलकूपों के माध्यम से सिंचित है।

Q 10 **Assertion (A):** Power from non- conventional and renewable sources is must in order to reduce carbon dioxide emissions of the coal-based power plants. 1

Reason (R): It is exhaustible in nature and environment-friendly.

अभिकथन (A): कोयला आधारित बिजली संयंत्रों से कार्बन डाइऑक्साइड उत्सर्जन को कम करने के लिए गैर-पारंपरिक और नवीकरणीय स्रोतों से बिजली आवश्यक है।

कारण (R): यह प्रकृति में समाप्त होने योग्य और पर्यावरण के अनुकूल है।

Q 11 Which state in India is the first fully organic state? 1

A.Sikkim B.Kerala C.Punjab D. Himachal Pradesh

भारत का पहला पूर्ण रूप से जैविक राज्य कौन सा है?

A सिक्किम B केरल C पंजाब Dहिमाचल प्रदेश

Q 12 The uneven pattern of development over space necessitates that the planners have a spatial perspective and draw the plans to reduce regional imbalance in development. This type of planning is known as : 1

A. Sectoral planning B. Linear planning

C. Regional planning D. None of the above

स्थानिक विकास के असमान स्वरूप के कारण योजनाकारों के लिए एक स्थानिक दृष्टिकोण रखना आवश्यक है और क्षेत्रीय असंतुलन को कम करने के लिए योजनाएँ तैयार करनी चाहिए

इस प्रकार की योजना को निम्न नामों से जाना जाता है:

A. खंडिय योजना B. रेखीय योजना

C. प्रादेशिक योजना D. उपरोक्त में से कोई नहीं

Q 13 Consider the following statements: 1

1. Nagpur plan is related to the road development plan
2. NHAI is an autonomous body under the ministry of surface transport.
3. National Highway constitutes about 02 % of road length but carry 80 % of road traffic.

OPTIONS

A. Only 1

B. Only 1 & 2

C. Only 2 & 3

D. Only 3

निम्नलिखित कथनों पर विचार कीजिए:

1. नागपुर योजना सड़क विकास योजना से संबंधित है।

2. NHAI भूतल परिवहन मंत्रालय के अधीन एक स्वायत्त निकाय है।

3. राष्ट्रीय राजमार्ग सड़क की लंबाई का लगभग 0.2% है, लेकिन सड़क यातायात का 80% वहन करता है।

विकल्प

A. केवल 1

B. केवल 1 और 2

C. केवल 2 और 3

D. केवल 3

Q 14 Consider these two statements and draw an appropriate conclusion. 1

1. Water resources are gradually declining.
2. Water pollution is caused by concentration of fluoride and nitrite.

Options

A. Both statement 1 and 2 are correct and statement 1 is the correct explanation of statement 2.

B. Both statement 1 and 2 are correct and statement 1 is not correct explanation of statement 2.

C. Statement 1 is correct and statement 2 is incorrect.

D. Statement 2 is correct and statement 1 is incorrect.

इन दोनों कथनों पर विचार कीजिए और एक उपयुक्त निष्कर्ष निकालिए।

1. जल संसाधन धीरे-धीरे कम हो रहे हैं।

2. जल प्रदूषण फ्लोराइड और नाइट्राइट की सांद्रता के कारण होता है।

विकल्प

A. कथन 1 और 2 दोनों सही हैं और कथन 1, कथन 2 की सही व्याख्या है।

B. कथन 1 और 2 दोनों सही हैं और कथन 1, कथन 2 की सही व्याख्या नहीं है।

C. कथन 1 सही है और कथन 2 गलत है।

D. कथन 2 सही है और कथन 1 गलत है।

Q **Read the following graph and answer question no 15 to 17.** 1x3=3

निम्नलिखित ग्राफ को पढ़ें और प्रश्न संख्या 15 से 17 के उत्तर दें।

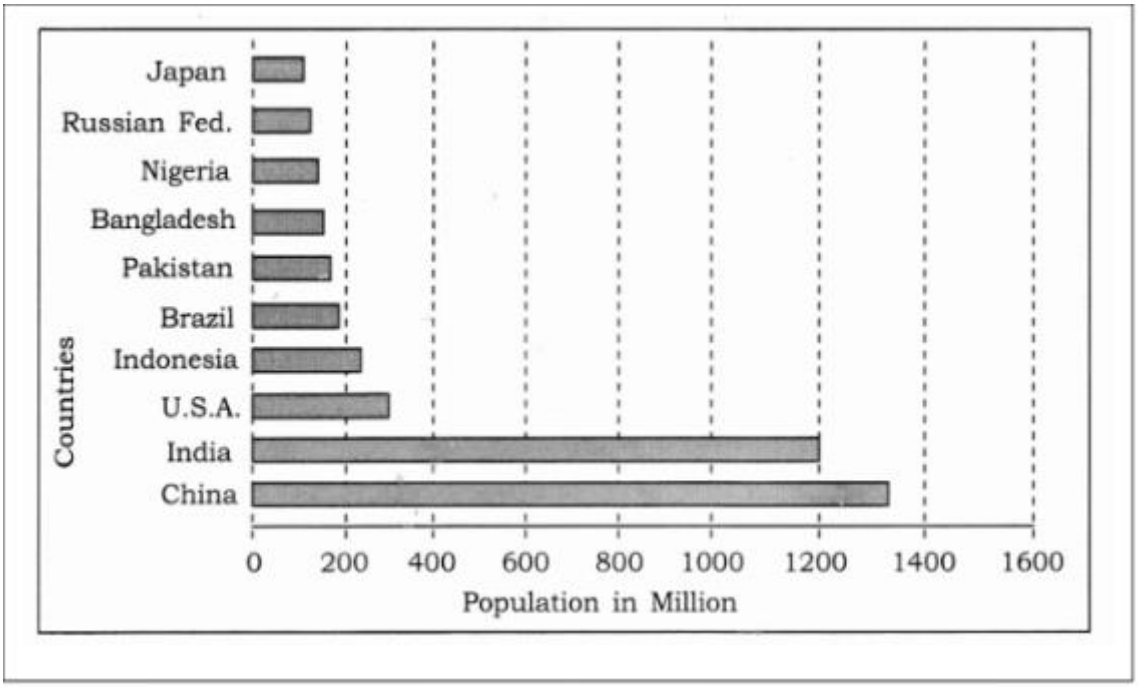


Fig.2.1: Most Populous Countries

Q 15 Which of the following country of North America recorded highest population? 1

A. U.S.A B. Mexico C. Russia D. Nigeria

उत्तरी अमेरिका में निम्नलिखित में से किस देश की जनसंख्या सबसे अधिक दर्ज की गई है?

A. संयुक्त राज्य अमेरिका B. मेक्सिको C. रूस D. नाइजीरिया

The following question is for **Visually Impaired Candidates** only in lieu of Q.15.

What does the term population distribution refer to?

A. The total number of people living in specific area.

B. The arrangement or spread of people across a given area.

C. The rate at which population increases over time.

D. The number of births per 1,000 people in the population.

निम्नलिखित प्रश्न **केवल दृष्टिबाधित अभ्यर्थियों** के लिए प्रश्न 15 के स्थान पर है।

जनसंख्या वितरण शब्द का क्या अर्थ है?

A. किसी विशिष्ट क्षेत्र में रहने वाले कुल लोगों की संख्या।

B. किसी दिए गए क्षेत्र में लोगों की व्यवस्था या फैलाव।

C. समय के साथ जनसंख्या में वृद्धि की दर।

D. जनसंख्या में प्रति 1,000 व्यक्तियों पर जन्मों की संख्या।

Q 16 Identify the Asian country that has very high population. 1

A. Indonesia B. China C. Pakistan D. Bangladeh

उस एशियाई देश की पहचान करें जिसकी जनसंख्या बहुत अधिक है।

A. इंडोनेशिया B. चीन C. पाकिस्तान D. बांग्लादेश

The following question is for **Visually Impaired Candidates only** in lieu of Q.16.

Identify the highest populous country?

A. Russia B. Bangladesh C. Canada D. China

निम्नलिखित प्रश्न **केवल दृष्टिबाधित अभ्यर्थियों** के लिए प्रश्न 16 के स्थान पर है।

सबसे अधिक जनसंख्या वाला देश कौन सा है?

A. रूस B. बांग्लादेश C. कनाडा D. चीन

Q 17 Which of the following country of South America recorded highest population? 1
A. Brazil B. Mexico C. Russia D. Nigeria

The following question is for **Visually Impaired Candidates** only in lieu of Q. 17.
Which continent has the largest concentration of the world most populated countries? A. North America B. South America C. Africa D. Asia
निम्नलिखित प्रश्न केवल दृष्टिबाधित अभ्यर्थियों के लिए प्रश्न 17 के स्थान पर है।
दुनिया के सबसे अधिक आबादी वाले देशों का सबसे बड़ा संकेन्द्रण किस महाद्वीप में है?
A. उत्तरी अमेरिका B. दक्षिण अमेरिका C. अफ्रीका D. एशिया

SECTION B **2x3=6**

Question numbers 18 to 19 are Source-Based Questions.

खंड ब

प्रश्न संख्या 18 और 19 स्रोत-आधारित प्रश्न हैं।

Q 18 **Read the case study given below and answer the questions that follow:** 1x3=3

The objective of the Smart Cities Mission is to promote cities that provide core infrastructure, a clean and sustainable environment and give a decent quality of life to its citizens. One of the features of Smart Cities is to apply smart solutions to infrastructure and services in order to make them better. For example, making areas less vulnerable to disasters, using fewer resources and providing cheaper services. The focus is on sustainable and inclusive development and the idea is to look at will act like a lighthouse to other aspiring cities.

नीचे दिए गए केस स्टडी को पढ़ें और उसके बाद दिए गए प्रश्नों के उत्तर दें:

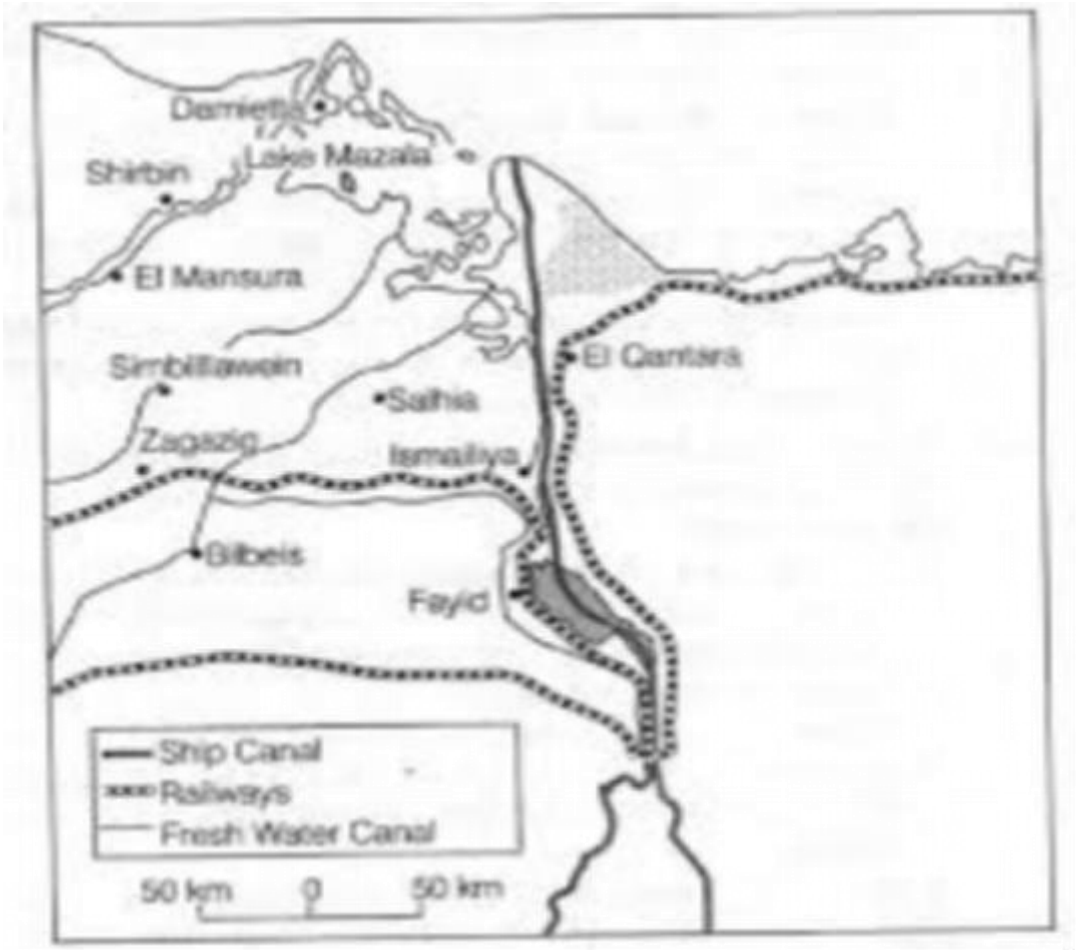
स्मार्ट सिटी मिशन का उद्देश्य ऐसे शहरों को बढ़ावा देना है जो बुनियादी ढाँचा, स्वच्छ और टिकाऊ पर्यावरण प्रदान करें और अपने नागरिकों को एक सभ्य जीवन स्तर प्रदान करें। स्मार्ट सिटी की एक विशेषता बुनियादी ढाँचे और सेवाओं को बेहतर बनाने के लिए उनमें स्मार्ट समाधान लागू करना है। उदाहरण के लिए, आपदाओं के प्रति कम संवेदनशील क्षेत्रों को बनाना, कम संसाधनों का उपयोग करना और सस्ती सेवाएँ प्रदान करना। इसका उद्देश्य सतत और समावेशी विकास पर केंद्रित है और यह अन्य महत्वाकांक्षी शहरों के लिए एक प्रकाश स्तंभ की तरह काम करेगा।

18.1 What is the purpose of the Smart Cities Mission?
स्मार्ट सिटी मिशन का उद्देश्य क्या है?

18.2 Name one Smart City in India?
भारत के किसी एक स्मार्ट शहर का नाम बताइए?

18.3 What are the main features of the Smart Cities Mission?
स्मार्ट सिटी मिशन की मुख्य विशेषताएं क्या हैं?

Q 19 Study the following map and answer the questions that follow: 1x3=3
निम्नलिखित मानचित्र का अध्ययन करें और उसके बाद दिए गए प्रश्नों के उत्तर दें:



19.1 Identify and name the canal shown in the map.
मानचित्र में दर्शाई गई नहर को पहचानें और उसका नाम बताएँ।

19.2 Explain any two features of the canal.
नहर की कोई दो विशेषताएँ बताइए।

19.3 Explain any two features of the canal.
नहर की कोई दो विशेषताएँ बताइए।

SECTION C

Question numbers 20 to 23 are Short Answer Type Questions

खंड स

प्रश्न संख्या 20 से 23 लघु उत्तरीय प्रश्न हैं। **4x3=12**

Q20 Study the map of following map and answer the following questions: 1x3=3
नीचे दिए गए मानचित्र का अध्ययन करें और निम्नलिखित प्रश्नों के उत्तर दें:

20.1. Identify the map belongs to which state of India?

20.2. What were the basic problems of these tribal areas?

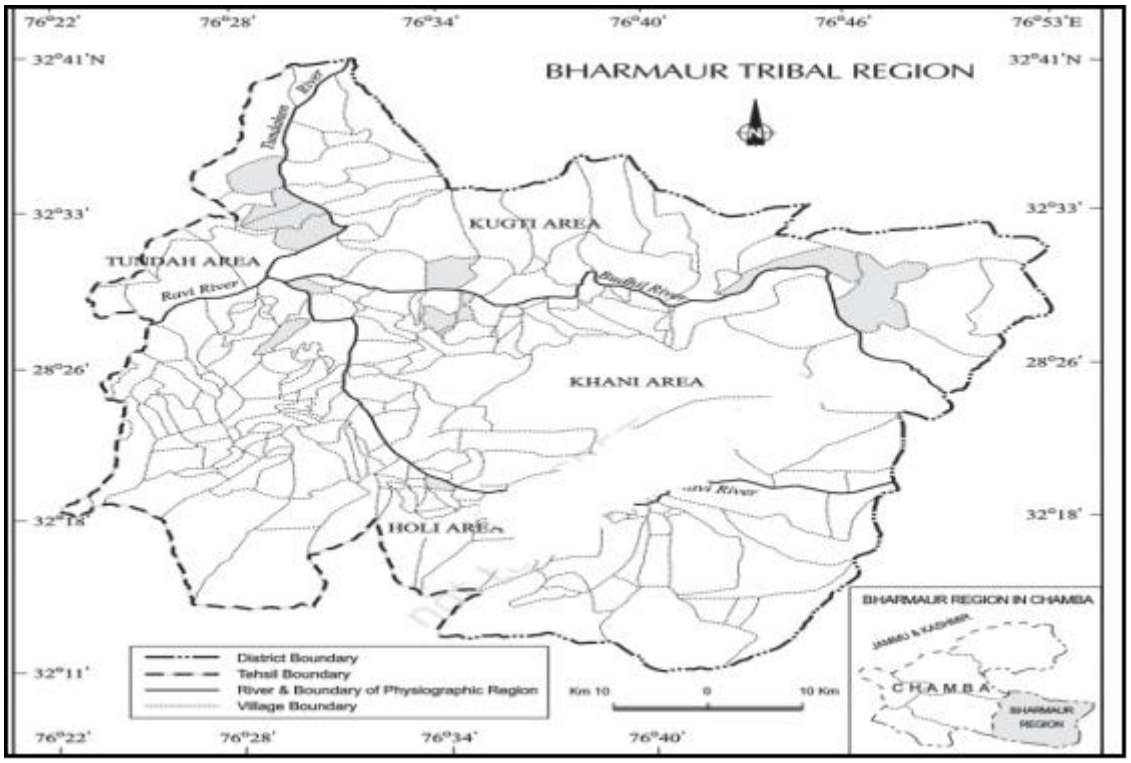
20.3. What were the initiatives taken by the Indian government to develop these areas?

20.1. पहचानें कि यह मानचित्र भारत के किस राज्य का है?

20.2. इन आदिवासी क्षेत्रों की मूल समस्याएँ क्या थीं?

20.3. इन क्षेत्रों के विकास के लिए भारत सरकार द्वारा क्या पहल की गई?

1x3=3



The following questions are **for Visually Impaired Candidates only** in lieu of Q.20.
निम्नलिखित प्रश्न दृष्टिबाधित विद्यार्थियों के लिए केवल प्रश्न 20 के स्थान पर है।

20.1 Which of the following is a major occupation of the people in Bharmaur tribal region?
भरमौर जनजातीय क्षेत्र के लोगों का प्रमुख व्यवसाय कौन-सा है?

A. Mining / खनन

B. Agriculture and Animal Husbandry / कृषि एवं पशुपालन

C. Fishing / मछली पालन

D. Industrial work / औद्योगिक कार्य

20.2 What is the main reason for seasonal migration in Bharmaur tribal region?
भरमौर जनजातीय क्षेत्र में मौसमी प्रवासन का मुख्य कारण क्या है?

A. Lack of water / जल की कमी

B. Search for better pasture lands / बेहतर चरागाहों की खोज

C. Industrial employment / औद्योगिक रोजगार

D. Educational facilities / शैक्षिक सुविधाएँ

20.3 Which community mainly inhabits the Bharmaur tribal region?
भरमौर जनजातीय क्षेत्र में मुख्य रूप से कौन-सा समुदाय निवास करता है?

A. Gaddis / गद्दी

B. Bhils / भील

C. Santhals / संथाल

D. Todas / तोडा

Q 21 Discuss the features of different types of Rural settlement in India. What are the factors responsible for the settlement patterns in different physical environment. 3

भारत में विभिन्न प्रकार क ग्रामीण बस्तियों कि विशेषताओं पर चर्चा करें I विभिन्न भौतिक वातावरणों में इस प्रकार कि संरचनाओं के लिये ज़िम्मेदार कारकों की व्याख्या करें I

Q 22 Explain how outsourcing has impacted both the countries that outsource work and the countries receiving outsourced jobs. 3

समझाइए कि आउटसोर्सिंग ने उन देशों को कैसे प्रभावित किया है जो काम को आउटसोर्स करते हैं और उन देशों को भी जहाँ आउटसोर्स किया गया काम मिलता है।

Q 23 "The knowledge about nature is extremely important to develop technology". 3
Support this statement by giving three examples.

OR

"Nature provides opportunities and humans make use of these and slowly nature gets humanised and starts bearing the imprints of human endeavour". Justify the statement.

"प्रौद्योगिकी के विकास के लिए प्रकृति का ज्ञान अत्यंत आवश्यक है।" तीन उदाहरण देकर इस कथन की पुष्टि कीजिए।

या

"प्रकृति अवसर प्रदान करती है और मनुष्य इनका उपयोग करता है और धीरे-धीरे प्रकृति मानवीय हो जाती है और मानव प्रयासों की छाप धारण करने लगती है।" इस कथन का औचित्य सिद्ध कीजिए।

SECTION D

खंड डी

Question numbers 24 to 28 are Long Answer Type Questions

प्रश्न संख्या 24 से 28 दीर्घ उत्तरीय प्रश्न हैं **5x5=25**

Q 24 A. "Mediterranean agriculture is highly specialized commercial agriculture in the world". justify the statement. 5

OR

B. "Dairy farming is the most advanced and efficient type of rearing of milk animals in the world". Analyse the statement with examples.

A. "भूमध्यसागरीय कृषि विश्व में अत्यधिक विशिष्ट वाणिज्यिक कृषि है।" इस कथन का औचित्य सिद्ध कीजिए।

या

B. "डेयरी फार्मिंग दुनिया में दुधारू पशुओं के पालन का सबसे उन्नत और कुशल प्रकार है।" उदाहरणों सहित इस कथन का विश्लेषण कीजिए।

Q 25 A. Though water pollutants are also created from natural sources but the pollutants from human sources are the real cause of concern. Explain. 5

OR

B. Explain the problems faced by slum dwellers in urban areas. How do these problems impact their quality of life?

A. हालाँकि जलप्रदूषक के कारण प्राकृतिक स्रोत भी हैं, लेकिन मानवीय स्रोतों से होने वाले प्रदूषक चिंता का वास्तविक कारण हैं। व्याख्या करें। 3+2=5

या

B. शहरी क्षेत्रों में झुग्गी-झोपड़ियों में रहने वालों के सामने आने वाली समस्याओं की व्याख्या कीजिए। ये समस्याएँ उनके जीवन की गुणवत्ता को कैसे प्रभावित करती हैं?

Q 26 A. Define population density with an example. North Indian plains, deltas and coastal plains have higher concentration of population than the interior districts of Southern and Central Indian state. Why? Support your answer with at least 3 suitable reasons. 2+3=5

OR

B. Who are adolescents? Why are they considered important in the population? What are the challenges faced by society in dealing with adolescents?

A. जनसंख्या घनत्व को एक उदाहरण सहित परिभाषित कीजिए। उत्तर भारतीय मैदानों, डेल्टाओं और तटीय मैदानों में दक्षिणी और मध्य भारतीय राज्यों के आंतरिक जिलों की तुलना में जनसंख्या का संकेन्द्रण अधिक है। क्यों? अपने उत्तर के समर्थन में कम से कम तीन उपयुक्त कारण दीजिए।

या 1+2+2=5

B. किशोर कौन हैं? उन्हें जनसंख्या में महत्वपूर्ण क्यों माना जाता है? किशोरों के साथ व्यवहार करते समय समाज को किन चुनौतियों का सामना करना पड़ता है?

Q 27 Describe the importance & contribution of Sea routes in handling India's Foreign Trade. 5

भारत के विदेशी व्यापर सञ्चालन में समुद्री मार्गों के योगदान व महत्व की समीक्षा करेंI

Q 28 A. Define demographic cycle. Explain any two main features of Stage II of the demographic transition theory. Analyse the demographic condition of India in the context of the demographic transition theory. 1+2+2=5

OR

B. Female migration has emerged as a significant component of population change in the world. Define female migration as a components of population change. State two reasons for the increase in female migration at the global level. Analyse two impacts of female migration on the socio-economic structure of the destination regions. 1+2+2=5

1+2+2=5

A. जनसांख्यिकीय चक्र को परिभाषित करें। जनसांख्यिकीय संक्रमण सिद्धांत के द्वितीय चरण की दो प्रमुख विशेषताओं को स्पष्ट कीजिए। **जनसांख्यिकीय संक्रमण सिद्धांत के परिप्रेक्ष्य में भारत की जनसंख्या स्थिति का विश्लेषण कीजिए।**

या

B. महिला प्रवास विश्व में जनसंख्या परिवर्तन के एक महत्वपूर्ण घटक के रूप में उभरा है। जनसंख्या परिवर्तन के एक घटक के रूप में महिला प्रवास को परिभाषित कीजिए। वैश्विक स्तर पर महिला प्रवास में वृद्धि के दो कारण बताइए। गंतव्य क्षेत्रों की सामाजिक-आर्थिक संरचना पर महिला प्रवास के दो प्रभावों का विश्लेषण कीजिए।

SECTION E

Question numbers 29 & 30 are Map based questions having 5 Sub – Parts each

खंड ई

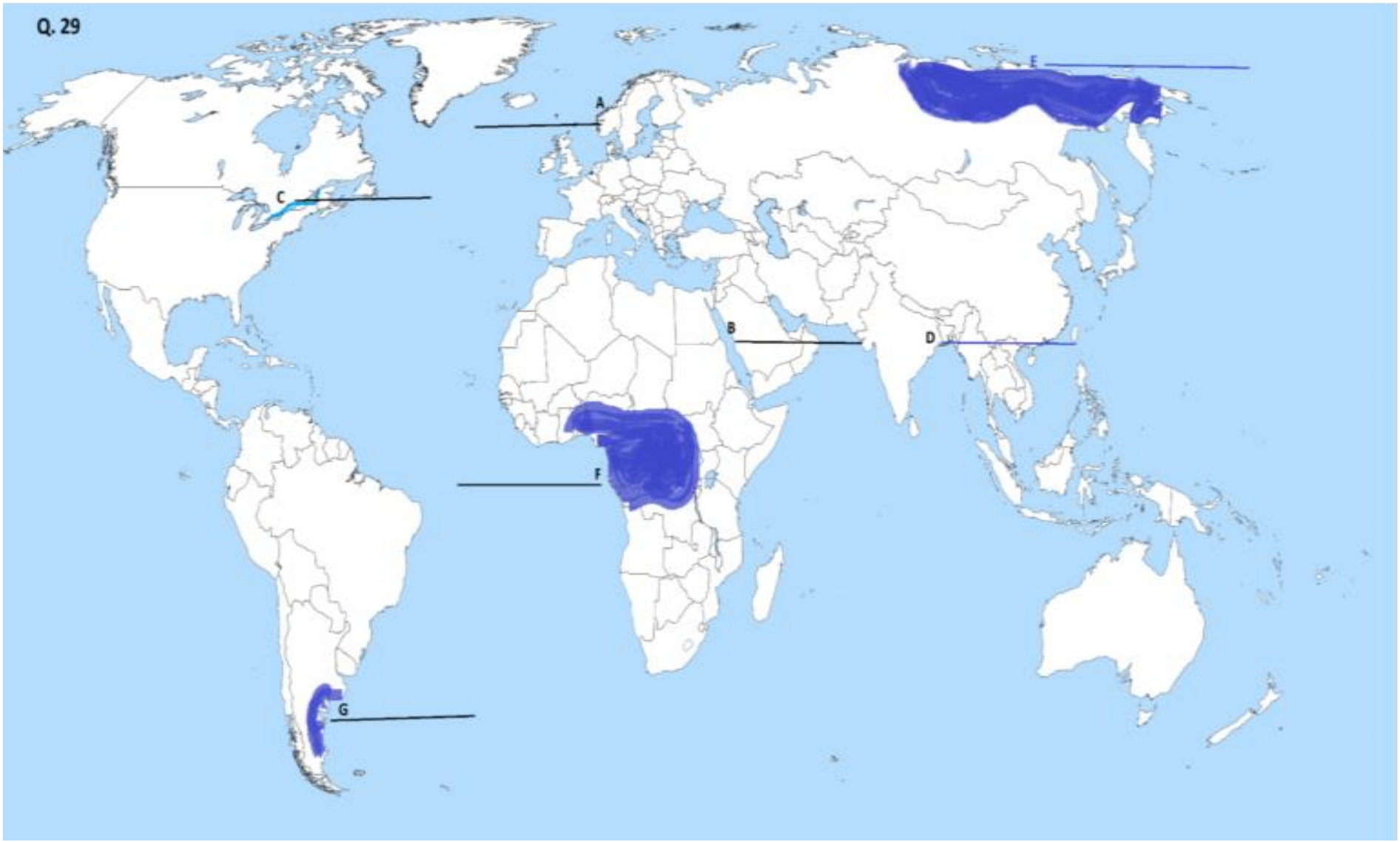
प्रश्न संख्या 29 और 30 मानचित्र आधारित प्रश्न हैं जिनमें प्रत्येक में 5 उप-भाग हैं

Q 29 On the given political map of the World, seven geographical features have been marked as A, B, C, D, E, F and G. Identify **any five** with the help of the following information and write their correct names on the lines drawn near each feature. 1x5=5

A. A major seaport.
B. An international airport.
C. An important Seaway.
D. An important seaport of Asia.
E. An area of Nomadic Herding
F. An area of subsistence gathering in South America.
G. Region of extensive commercial grain agriculture.

विश्व के दिए गए राजनीतिक मानचित्र पर, सात भौगोलिक विशेषताओं को A, B, C, D, E, F और G के रूप में चिह्नित किया गया है। निम्नलिखित जानकारी की सहायता से **किन्हीं पाँच** को पहचानें और प्रत्येक विशेषता के पास खींची गई रेखाओं पर उनके सही नाम लिखें।

A. एक प्रमुख बंदरगाह।
B. एक अंतरराष्ट्रीय हवाई अड्डा।
C. एक महत्वपूर्ण समुद्री मार्ग।
D. एशिया का एक महत्वपूर्ण बंदरगाह।
E. खानाबदोश पशुपालन का क्षेत्र।
F. दक्षिण अमेरिका में निर्वाह संग्रहण का क्षेत्र।
G. व्यापक वाणिज्यिक अनाज कृषि का क्षेत्र।


Q. 29
A
B
C
D
E
F
G

The following questions are for Visually Impaired Candidates only in lieu of Question No.29.

Answer any five questions out of the following:

29.A. Write the name inland seaways located in North America

29.B. Name the major seaport of Australia

29.C. A shipping canal which is located in Egypt

29.D. Name the western most point of Trans Canadian Railway

29.E. Name the Major Sea port Located in Japan

29.F. Name the major sea port of India 29.G. Name the areas of Subsistence gathering of South America

निम्नलिखित प्रश्न केवल दृष्टिबाधित अभ्यर्थियों के लिए प्रश्न संख्या 29 के स्थान पर हैं।

निम्नलिखित में से **किन्हीं पाँच** प्रश्नों के उत्तर दीजिए:

29.A. उत्तरी अमेरिका में स्थित अंतर्देशीय समुद्री मार्गों के नाम लिखिए।

29.B. ऑस्ट्रेलिया के प्रमुख बंदरगाह का नाम बताइए।

29.C. मिस्र में स्थित एक शिपिंग नहर का नाम बताइए।

29.D. ट्रांस-कैनेडियन रेलवे के सबसे पश्चिमी बिंदु का नाम बताइए।

29.E. जापान में स्थित प्रमुख समुद्री बंदरगाह का नाम बताइए।

29.F. भारत के प्रमुख समुद्री बंदरगाह का नाम बताइए।

29.G. दक्षिण अमेरिका के निर्वाह संग्रहण क्षेत्रों के नाम बताइए।

Q 30 Locate and label **any five** of the following geographical features on the Political Outline map of India with appropriate symbols: 1x5=5

A. An important coal mine in Jharkhand.

B. An important seaport in Gujarat.

C. Mayurbhanj – Iron mines.

D. An oil refinery in Bihar.

E. The state with highest population density.

F. The state leading in the production of Wheat.

G. An international airport in Kerala.

भारत के राजनीतिक रूपरेखा मानचित्र पर निम्नलिखित भौगोलिक विशेषताओं में से **किन्हीं पाँच** को उपयुक्त प्रतीकों द्वारा चिह्नित करें:

A. झारखंड में एक महत्वपूर्ण कोयला खदान।

B. गुजरात में एक महत्वपूर्ण बंदरगाह।

C. मयूरभंज - लौह खदानें।

D. बिहार में एक तेल शोधक कारखाना।

E. सबसे अधिक जनसंख्या घनत्व वाला राज्य।

F. गेहूँ उत्पादन में अग्रणी राज्य।

G. केरल में एक अंतर्राष्ट्रीय हवाई अड्डा।


INDIA
OUTLINE MAP WITH STATES
& UNION TERRITORIES
Map not to Scale
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The following questions are for visually impaired students in lieu of Question No.30. Attempt any five.

30.A Name the State Having Largest Rice Production

30.B Name the State having Highest Coffee Production

30. C Name the oil Refinery of Gujarat

30.D. Name the copper Mines of Jharkhand

30.E. Name the Sea port of Maharashtra

30.F Name the International Airport of Assam

30.G.Name the Copper mines of Madya Pradesh

निम्नलिखित प्रश्न **दृष्टिबाधित विद्यार्थियों** के लिए प्रश्न संख्या 30 के स्थान पर हैं। **किन्हीं पाँच** प्रश्नों के उत्तर दीजिए।

30.A सबसे अधिक चावल उत्पादन वाले राज्य का नाम बताइए।

30.B सबसे अधिक कॉफी उत्पादन वाले राज्य का नाम बताइए।

30.C गुजरात की तेल रिफाइनरी का नाम बताइए।

30.D झारखंड की तांबे की खदानों के नाम बताइए।

30.E महाराष्ट्र के समुद्री बंदरगाह का नाम बताइए।

30.F असम के अंतर्राष्ट्रीय हवाई अड्डे का नाम बताइए।

30.G मध्य प्रदेश की तांबे की खदानों के नाम बताइए

SOLUTIONS

SECTION _A (1Mark)

Q.N.	Answer	Q.N.	Answer	Q.N.	Answer	Q.N.	Answer
1	b	6	a	11	b	16	c
2	d	7	c	12	a	17	d
3	a	8	b	13	a	18	c
4	b	9	b	14	d	19	d
5	b	10	d	15	c	20	a

SECTION B (2 Marks)

21. **Ans**. Number of relations = 3

R_1 = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)}

R_2 = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3), (2, 1)}

R_3 = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3), (3, 2)}

OR

Let $\tan^{-1}(\frac{1}{4}) =$; $\tan\theta = \frac{1}{4}$; $\sin\theta = \frac{1}{\sqrt{17}}$; $\cos\theta = \frac{4}{\sqrt{17}}$

Sin 2 θ = 2 sin θ cos θ = $\frac{8}{17}$

22. **Ans.** $x = \frac{\sin y}{\sin(a+y)}$

Differentiating w.r.to x; $1 = \frac{\sin(a+y)\cos y - \cos(a+y)\sin y}{sin^2(a+y)} \frac{dy}{dx}$

$$\frac{dy}{dx} = \frac{sin^2(a+y)}{\sin(a+y-y)} = \frac{sin^2(a+y)}{\sin a}$$

OR

$$cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right) = tan^{-1}a \Rightarrow cos^{-1}\left(\frac{1-(\frac{y}{x})^2}{1+(\frac{y}{x})^2}\right) = tan^{-1}a \text{ -----(1)}$$

Let $\frac{y}{x} = tan\theta$

(1) => $cos^{-1}(cos2\theta) = tan^{-1}a \Rightarrow 2\theta = tan^{-1}a \Rightarrow 2tan^{-1}\frac{y}{x} = tan^{-1}a$

$\frac{y}{x} = \tan(\frac{1}{2}tan^{-1}a)$

Differentiating w.r.to x, we get $\frac{x\frac{dy}{dx} - y}{x^2} = 0$ $\quad x\frac{dy}{dx} - y = 0$

$$\frac{dy}{dx} = \frac{y}{x}$$

23. **Ans**. $\frac{3\pi}{8} < x < \frac{7\pi}{8}$ implies $\pi < 2x + \frac{\pi}{4} < 2\pi$

$f(x) = \cos(2x + \frac{\pi}{4})$; $f'(x) = -2\sin(2x + \frac{\pi}{4})$

$f'(x) > 0\ for\ all\ 2x + \frac{\pi}{4} \in (\pi, 2\pi)$

$f\ is\ increasing\ in\ (\frac{3\pi}{8}, \frac{7\pi}{8})$

24. Ans Area of one triangle = $\frac{1}{2}\left|\left(\hat{\imath}-\hat{\jmath}+\hat{k}\right)\times(4\hat{\imath}+5\hat{\jmath})\right|$

$= \frac{1}{2}\left|-5\hat{\imath}+4\hat{\jmath}+9\hat{k}\right| = \frac{1}{2}\sqrt{122}$

Area of parallelogram = $\sqrt{122}$ sq. units

25. Ans Given $|\vec{a}|=|\vec{b}|=1$ *and* $\left(\vec{a}+3\vec{b}\right).\left(7\vec{a}-5\vec{b}\right)=0$

$7 + 16\,\vec{a}.\vec{b} - 15 = 0$

$16\,\vec{a}.\vec{b} = 8$

$|\vec{a}||\vec{b}|\cos\theta = \frac{1}{2}$

$\cos\theta = \frac{1}{2}$ $\Rightarrow\ \theta = \frac{\pi}{3}$

SECTION C (3 Marks)

26. Ans.

Integration by parts; $\int x\,sin^{-1}x\;dx = sin^{-1}x \times \frac{x^2}{2} - \int \frac{1}{\sqrt{1-x^2}}\,\frac{x^2}{2}\,dx$

$= \frac{x^2}{2}\,sin^{-1}x + \frac{1}{2}\int \sqrt{1-x^2} - \frac{1}{\sqrt{1-x^2}}\,dx$

$= \frac{x^2}{2}sin^{-1}x + \frac{1}{2}\left[\frac{x}{2}\sqrt{1-x^2} + \frac{1}{2}sin^{-1}x\right] - \frac{1}{2}\,sin^{-1}x + C$

$= \frac{x^2}{2}sin^{-1}x - \frac{1}{4}sin^{-1}x + \frac{x}{4}\sqrt{1-x^2} + C$

27. Ans. $\int_1^3 |x^2-2x|dx = \int_1^2 (2x-x^2)dx + \int_2^3 (x^2-2x)\,dx$

[in (1,2) ,$((x^2-2x)<0$ & in (2,3) , $(x^2-2x)>0$}

$= \left[2\frac{x^2}{2} - \frac{x^3}{3}\right]_1^2 + \left[\frac{x^3}{3} - 2\frac{x^2}{2}\right]_2^3$

= 2

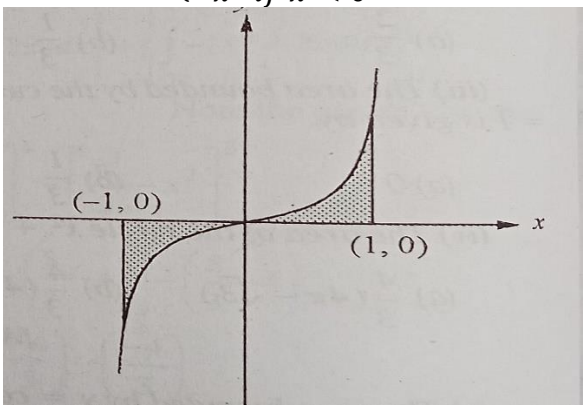
OR

$\int \frac{1}{(1+e^x)(1-e^{-x})}\,dx = \int \frac{e^x}{(e^x+1)(e^x-1)}\,dx$

Let $e^x = t$; $\quad e^x dx = dt$

$\int \frac{dt}{(t+1)(t-1)} = \int \frac{dt}{t^2-1} = \frac{1}{2}\log\left|\frac{t-1}{t+1}\right| + C = \frac{1}{2}\log\left|\frac{e^x-1}{e^x+1}\right| + C$

28. Ans. $y = x\,|\,x\,| = \begin{cases} x^2 \;if\; x \geq 0 \\ -x^2 \;if\; x < 0 \end{cases}$



Area = $2\int_0^1 x^2\,dx$

$= \frac{2}{3}$ sq. units

29. Ans. $\frac{dx}{dy} + \frac{1}{y}x = y^2$, linear in x

P = $\frac{1}{y}$ Q = y^2

I.F = $e^{\int \frac{1}{y} dy} = e^{\log y} = y$

Solution is $x \times y = \int y^2 \times y\,dy$

$xy = \frac{y^4}{4} + C$ ——> (1)

Given x = 0, when y = 2

C = -4(from 1)

(1) —> $xy = \frac{y^4}{4} - 4$ or $x = \frac{y^3}{4} - \frac{4}{y}$

30. Ans.

A - Event that the ball drawn is Red

E_1 – Event that select bag I

E_2 – Event that select bag II

Given $P(E_2/A) = \frac{1}{3}$, To find n

$P(E_1) = P(E_2) = \frac{1}{2}$ $P(A/E_1) = \frac{1}{3}$ $P(A/E_2) = \frac{n}{n+25}$

$$P(E_2/A) = \frac{P(E_2)P(A/E_2)}{P(E_1)P(A/E_1)+P(E_2)P(A/E_2)}$$

$$\frac{1}{3} = \frac{\frac{1}{2}\times\frac{n}{n+25}}{\frac{1}{2}\times\frac{1}{3}+\frac{1}{2}\times\frac{n}{n+25}}$$

n = 5

OR

A - Event that the letters visible are TA

E_1– Event that the letter came from TATANAGAR

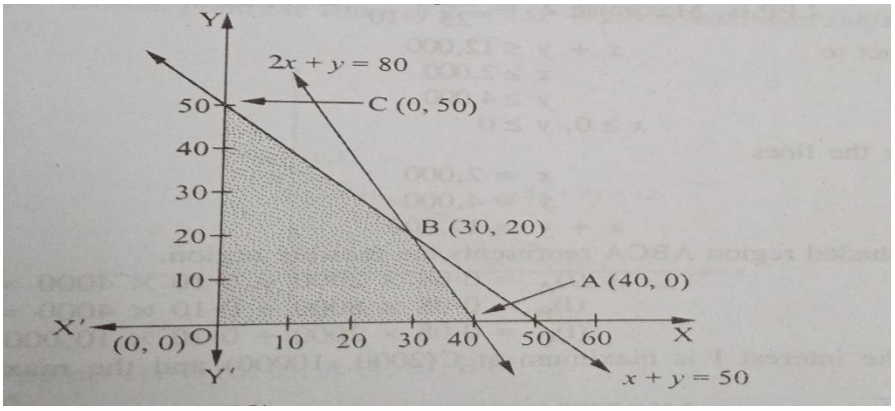
E_2– Event that the letter came from CALCUTTA

$P(E_1) = P(E_2) = \frac{1}{2}$ $P(A/E_1) = \frac{2}{8}$ $P(A/E_2) = \frac{1}{7}$

$$P(E_1/A) = \frac{P(E_1)P(A/E_1)}{P(E_1)P(A/E_1)+P(E_2)P(A/E_2)}$$

$$= \frac{\frac{1}{2}\times\frac{2}{8}}{\frac{1}{2}\times\frac{2}{8}+\frac{1}{2}\times\frac{1}{7}} = \frac{7}{11}$$

31. Ans.



Feasible region is bounded

At (0, 0), Z = 0, (40, 0), Z = 420000, (30, 20) Z = 495000, (0, 50), Z = 450000

Maximum value is 495000 at x = 30, y = 20

SECTION D (5 marks each)

32. Ans. 1) Given a + d = b + c => (a, b) R (c, d)

Then a + b = b + a => (a, b) R (a, b) $\forall\ (a, b) \in A \times A$. so R is reflexive

2) If (a, b) R (c, d) => a + d = b + c

=> b + c = a + d

=> c + b = d + a => (c, d) R (a, b) so R is symmetric

3) If (a, b) R (c, d) and (c, d) R (e, f)

=> a + d = b + c and c + f = d + e

By adding (a + d) + (c + f) = (b +c) + (d +e)

a + f = b + e => (a, b) R (e, f)

[(1, 2)] = {(1, 2), (2, 3), (3, 4), (4, 5)}

OR

To prove f is one-one

Let $f(x_1) = f(x_2)$

$9x_1^2 + 6x_1 - 5 = 9x_2^2 + 6x_2 - 5$

$(x_1 - x_2)(9x_1 + 9x_2 + 6) = 0$

Since $9x_1 + 9x_2 + 6 \neq 0$; $x_1 - x_2 = 0$

$x_1 = x_2$ f is one- one

let f (x) = y

$9x^2 + 6x - 5 = y$

Since $x \in R_+$, $x = \frac{-1+\sqrt{6+y}}{3} \geq 0$

since $y \geq -5$

Range = [-5, ∞) = Co-domain f is onto

since f is both one-one and onto f is bijective

33. Ans. | A | = -6

$$\text{adj } A = \begin{bmatrix} -2 & -2 & 4 \\ -2 & 4 & 4 \\ 1 & -2 & -5 \end{bmatrix}$$

$$A^{-1} = \frac{adjA}{|A|} = -\frac{1}{6}\begin{bmatrix} -2 & -2 & 4 \\ -2 & 4 & 4 \\ 1 & -2 & -5 \end{bmatrix}$$

Given equations y + 2z = 7

2x + 3y + 4z = 17

x – y = 3 can be rewritten as

2x + 3y + 4z = 17

x – y = 3

y + 2z = 7

$$\begin{bmatrix} 2 & 3 & 4 \\ 1 & -1 & 0 \\ 0 & 1 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 17 \\ 3 \\ 7 \end{bmatrix}$$

AX = Q

$X = A^{-1}Q$

$$X = -\frac{1}{6}\begin{bmatrix} -2 & -2 & 4 \\ -2 & 4 & 4 \\ 1 & -2 & -5 \end{bmatrix}\begin{bmatrix} 17 \\ 3 \\ 7 \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 4 \end{bmatrix}$$

x = 2, y = -1, z = 4

34. Ans. $\int \frac{1}{1+x^2+x^4}\,dx = \frac{1}{2}\int \frac{x^2+1}{x^4+x^2+1}\,dx - \frac{1}{2}\int \frac{x^2-1}{x^4+x^2+1}dx$

$= \frac{1}{2}\int \frac{1+\frac{1}{x^2}}{(x-\frac{1}{x})^2+3}\,dx - \frac{1}{2}\int \frac{1-\frac{1}{x^2}}{(x+\frac{1}{x})^2-1}\,dx \rightarrow (1)$

Put $x - \frac{1}{x} = u$ and $x + \frac{1}{x} = v$

(1) => $\frac{1}{2}\int \frac{du}{u^2+(\sqrt{3})^2} - \frac{1}{2}\int \frac{dv}{v^2-1}$

$= \frac{1}{2\sqrt{3}} tan^{-1}\frac{u}{\sqrt{3}} - \frac{1}{4}\log\frac{v-1}{v+1}$

$= \frac{1}{2\sqrt{3}} tan^{-1}\frac{x^2-1}{x\sqrt{3}} - \frac{1}{4}\log\frac{x^2-x+1}{x^2+x+1} + C$

OR

$I = \int_0^{\pi} \frac{x\tan x}{\sec x+\tan x}\,dx$ —-(1)

$I = \int_0^{\pi} \frac{(\pi-x)\tan(\pi-x)}{\sec(\pi-x)+\tan(\pi-x)}\,dx = \int_0^{\pi} \frac{(\pi-x)\tan x}{\sec x+\tan x}\,dx$ —-(2)

(1) + (2) => $2I = \pi\int_0^{\pi} \frac{\tan x}{\sec x+\tan x}\,dx$

$= \pi\int_0^{\pi} \frac{\tan x\,(sec x-\tan x)}{(sec^2 x - tan^2 x)}\,dx$

$= \pi\int_0^{\pi} (\sec x\tan x - sec^2 x + 1)\,dx$

$I = \frac{\pi}{2}[\sec x - \tan x + x]\,]_0^{\pi} = \frac{\pi}{2}[\pi - 2] = \pi(\frac{\pi}{2} - 1)$

35. Ans. Let Q be the foot of the perpendicular from the point P (1, 2, 3) to the given line .

General point on the line Q (2λ + 4, 3 λ + 2, 6 λ + 2)

Direction ratio of PQ is < 2λ +4-1, 3λ+*2-2,* 6 λ+2-3> => < 2λ +3, 3λ, 6 λ-1>

Since PQ is perpendicular to the line

(2 λ +3)2 + (3 λ)3 + (6 λ- 1)6 = 0

λ = 0

Q = (4, 2, 2)

PQ = $\sqrt{10}$ units

36. Ans. (i) $\frac{dx}{d\theta} = -5\,sin\theta$; $\frac{dy}{d\theta} = \frac{20}{3}\,cos\theta$

(ii) $\frac{dy}{dx} = -\frac{4}{3}cot\theta$

At $\theta = -\frac{\pi}{4}$, $\frac{dy}{dx} = \frac{4}{3}$

(iii) $16x^2 + 9y^2 = 400$ Given $-\frac{dx}{dt} = \frac{dy}{dt}$

$32\,x\,\frac{dx}{dt} + 18y\,\frac{dy}{dt} = 0$

$16x = 9y$

Substituting in the equation of ellipse we get $x = \pm 3$

Points are $(3, \frac{16}{3}), (-3, -\frac{16}{3})$

OR

$$\frac{d^2y}{dx^2} = -\frac{4}{15}\, cosec^3\theta$$

$$\frac{d^2y}{d\theta^2} \div \frac{d^2x}{d\theta^2} = \frac{4}{3}\, tan\theta$$

$$\frac{d^2y}{dx^2} \neq \frac{d^2y}{d\theta^2} \div \frac{d^2x}{d\theta^2}$$

37. **Ans**. (i) Area of the land = $\frac{250}{h}$

(ii) total cost (C) = $50 \times \frac{250}{h} + 400h^2$

(iii) $\frac{dC}{dh} = 50 \times 250 \times \left(-\frac{1}{h^2}\right) + 800h = 0$

$$h = \frac{5}{2}\,\text{m}$$

$$\frac{d^2C}{dh^2} = \frac{25000}{h^3} + 800 > 0$$

OR

(iii) $\frac{dC}{dh} = 50 \times 250 \times \left(-\frac{1}{h^2}\right) + 800h = 0$

$$h = \frac{5}{2}$$

$$(0, \tfrac{5}{2}),\ (\tfrac{5}{2}, 5)$$

Decreasing in the interval $(0, \frac{5}{2})$ and increasing in the interval $(\frac{5}{2}, 5)$

38. **Ans.** Let A be the event, there is at least one tail

B be the event that a die shows a number greater than 4

A = {HT, T1, T2, T3, T4, T5, T6}

B = {T5, T6}

A∩B = {T5, T6}

(i) P(A) = $\frac{1}{2}\times\frac{1}{2} + \frac{1}{2}\times\frac{1}{6} + \frac{1}{2}\times\frac{1}{6} + \frac{1}{2}\times\frac{1}{6} + \frac{1}{2}\times\frac{1}{6} + \frac{1}{2}\times\frac{1}{6} + \frac{1}{2}\times\frac{1}{6}$

$= \frac{3}{4}$

(ii) P(B/A) = $\frac{P(A \cap B)}{P(A)}$

P(A ∩ B) = $\frac{1}{2}\times\frac{1}{6} + \frac{1}{2}\times\frac{1}{6} = \frac{1}{6}$

P(B/A) = $\frac{1/6}{3/4} = \frac{2}{9}$

Pre Board Examination (2025-26)

Class- XII Subject: Mathematics (041) M.M: 80 Time: 3:00H

Instruction:

1. This Question paper contains – **five sections** A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. **Section A** has **18 MCQ's and 02 Assertion-Reason** based questions of 1 mark each.
3. **Section B** has **5 Very Short Answer** (VSA)- type questions of 2 marks each.
4. **Section C** has **6 Short Answer** (SA)-type questions of 3 mark each.
5. **Section D** has **4 Long Answer** (LA) – type questions of 5 mark each.
6. **Section E** has **3 source based/case based** units of assessment (4 marks each) with sub parts.

SECTION A

(Multiple Choice Questions)

Each question carries 1 mark

1. For two matrices $P^T = \begin{bmatrix} 3 & -1 & 0 \\ 4 & 2 & 1 \end{bmatrix}$ and $Q = \begin{bmatrix} -1 & 1 \\ 2 & 2 \\ 1 & 3 \end{bmatrix}$, P – Q equals

a. $\begin{bmatrix} 4 & -3 & -1 \\ 3 & 0 & -2 \end{bmatrix}$ **b.** $\begin{bmatrix} 4 & 3 \\ -3 & 0 \\ -1 & -2 \end{bmatrix}$ **c.** $\begin{bmatrix} 2 & 3 & -1 \\ 5 & 1 & -2 \end{bmatrix}$ **d.** $\begin{bmatrix} 2 & 5 \\ 3 & 1 \\ -1 & -2 \end{bmatrix}$

2. If $\begin{bmatrix} 2+x & -y \\ 7+y & 9 \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 3 & 9 \end{bmatrix}$, then $x + y$ equals

a. 3 **b.** -4 **c.** 1 **d.** -1

3. If A = $[a_{ij}]$ is a matrix of order 3×3 such that | A | = 25 and C_{ij} represents the cofactor of a_{ij} then $a_{11}\, C_{21} + a_{12}\, C_{22} + a_{13}\, C_{23}$ is

a. 0 **b.** 25 **c.** -25 **d.** $\frac{1}{25}$

4. The point which does not lie in the half plane $x + y \geq 15$ is

a. (15, 10) **b.** (8, 4) **c.** (0, 20) **d.** (15, 15)

5. Derivative of e^{2x} with respect to e^x is

a. 2 **b.** $2e^x$ **c.** $2e^{2x}$ **d.** e^{2x}

6. $\int (cos^2 2x - sin^2 2x)\, dx$ is

a. $\frac{\sin 4x}{4}$ + C **b.** $2\, cos2x - 2\, sin2x$ + C

c. $cos2x + sin2x$ + C **d.** $\frac{cos^3 2x}{3} - \frac{sin^3 2x}{3}$ + C

7. Area bounded by the curve y = cos x and x-axis between x = 0 and x = π is

a. 0 sq. units **b.** 1 sq. units **c.** 2 sq. units **d.** 4 sq. units

8. If p and q are respectively the order and degree of the differential equation

$\frac{d}{dx}\left(\frac{dy}{dx}\right) = 0$. then p - q is

a. 0 **b**. 1 **c.** 2 **d**. 3

9. General solution of the differential equation $\log\left(\frac{dy}{dx}\right) = x$ is

a. $y = x + C$ **b**. $y = e^x + C$ **c**. $y = \frac{x^2}{2} + C$ **d.** $y = \frac{1}{x} + C$

10. If | A | = 4 and $A^{-1} = \frac{1}{2}\begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$, then **adj A** =

a. 1 **b.** 4 **c**. $\begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$ **d**. $\begin{bmatrix} 14 & 6 \\ 8 & 4 \end{bmatrix}$

11 If a matrix A is both symmetric and skew symmetric, then matrix A is

a. Identity matrix **b**. Zero matrix **c**. Diagonal matrix **d**. Scalar matrix

12. If $\vec{a} = 2\hat{\imath} - \hat{\jmath} + 2\hat{k}$ and $\vec{b} = 5\hat{\imath} - 3\hat{\jmath} - 4\hat{k}$, then $\frac{Projection\ of\ \vec{b}\ on\ \vec{a}}{Projection\ of\ \vec{a}\ on\ \vec{b}}$ is

a. $\frac{5\sqrt{2}}{3}$ **b.** $\frac{3}{5\sqrt{2}}$ **c**. $\frac{3}{5}$ **d**. $\frac{5}{3}$

13. Unit vector in the direction opposite to $-\frac{1}{4}\hat{k}$

a. $\hat{k}$ **b.** $-\hat{k}$ **c**. $\frac{1}{4}\hat{k}$ **d.** $4\hat{k}$

14. If $\vec{a}$ and $\vec{b}$ are along adjacent sides of a rectangle, then

a. $|\vec{a}| = |\vec{b}|$ **b.** $|\vec{a} - \vec{b}|^2 = |\vec{a}|^2 - |\vec{b}|^2$

c. $|\vec{a} + \vec{b}|^2 = |\vec{a}|^2 - |\vec{b}|^2$ **d.** $|\vec{a} + \vec{b}|^2 = |\vec{a}|^2 + |\vec{b}|^2$

15. Equation of line parallel to the vector $3\hat{\imath} + \hat{\jmath} + 2\hat{k}$ and passing through the point (4, -3,7) is

a. X = 4t+3, y= -3t+1, z= 7t+2 **b**. X= 3t+4, y= t+3, z= 2t+7

c. X = 3t+4, y = t-3, z= 2t+7 **d.** X= 3t+4, y= -t+3, z= 2t+7

16. If $f(x) = \begin{cases} \frac{1-\sin x}{(\pi - 2x)^2}, & when\ x \neq \frac{\pi}{2} \\ k, & when\ x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$ then the value of k is

a. $\frac{1}{2}$ **b**. $\frac{1}{4}$ **c**. $\frac{1}{8}$ **d.** $\frac{1}{16}$

17. orner points of the feasible region for an LPP are (0, 2), (3, 0), (6, 0), (6, 8) and (0, 5). Let Z = 4x + 6y be the objective function. The minimum value of Z occurs at

a. (0, 2) only
b. (3, 0) only
c. Mid-point of the line segment joining points (0, 2) and (3, 0) only
d. Any point on the line segment joining the points (0, 2) and (3, 0)

18. An urn contains 6 balls of which 2 are red and 4 are black. Two balls are drawn at random. Probability that they are of different colours is

a. $\frac{2}{5}$ **b**. $\frac{1}{15}$ **c**. $\frac{8}{15}$ **d**. $\frac{4}{15}$

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (**A**) is followed by a statement of Reason (**R**). Choose the correct answer out of the following choices.

(**a**) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.

(**c**) A is true but R is false.

(**d**) A is false but R is true.

19. Assertion (**A**): Principal value of $\cos^{-1}(\cos\frac{7\pi}{6}) = \frac{7\pi}{6}$

Reason (R): Range of principal value branch of $cos^{-1}x$ is $[0, \pi]$

20. Assertion (**A**): If a line makes angles α, β, γ with x-axis, y-axis and z-axis respectively, then $cos2\alpha + cos2\beta + cos2\gamma = -1$

Reason (R): $cos^2\alpha + cos^2\beta + cos^2\gamma = 1$

SECTION B

This section comprises of very short answer type-questions (VSA) of 2 marks each

21. If A = {1, 2, 3}, find the number of relations on A containing (1, 2) and (2, 3) which are reflexive and transitive but not symmetric. List them.

OR

Find the value of $\sin(2\tan^{-1}\frac{1}{4})$

22. If $\sin y = x\sin(a + y)$, prove that $\frac{dy}{dx} = \frac{sin^2(a+y)}{\sin a}$

OR

If $cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right) = tan^{-1}a$, (a is scalar) prove that $\frac{dy}{dx} = \frac{y}{x}$

23. Show that $f(x) = \cos(2x + \frac{\pi}{4})$ is increasing in $(\frac{3\pi}{8}, \frac{7\pi}{8})$

24. Find the area of the parallelogram whose one side and a diagonal are represented by coinitial vectors $\hat{\imath} - \hat{\jmath} + \hat{k}$ and $4\hat{\imath} + 5\hat{\jmath}$ respectively.

25. If $\vec{a}$ and $\vec{b}$ are unit vectors such that the vector $\vec{a} + 3\vec{b}$ is perpendicular to $7\vec{a} - 5\vec{b}$, then find the angle between $\vec{a}$ and $\vec{b}$

SECTION C

This section comprises of short answer type questions (SA) of 3 marks each

26. Evaluate $\int x\, sin^{-1}x\, dx$

27. Evaluate $\int_1^3 |x^2 - 2x|dx$ **OR** $\int \frac{1}{(1+e^x)(1-e^{-x})}dx$

28. Find the area bounded by the curve y = x | x | and the ordinates x = -1 and x = 1

29. Find the solution of the differential equation $(x - y^3)dy + y\,dx = 0$ given x = 0 when y = 2

30. There are two boxes, namely B1 and B2. Box B1 contains 3 red and 6 black balls. Box B2 contains n red and 25 black balls. One of the two boxes, B1 and B2 is selected at random and a ball is drawn at random. The ball drawn is found to be red. If the probability that this red ball comes out from B2 is $\frac{1}{3}$, find the value of n.

OR

A letter is known to have come either from TATANAGAR or CALCUTTA. On the envelope just two consecutive letters TA are visible. What is the probability that the letter has come from TATANAGAR

31. Maximize $Z = 10500x + 9000y$ subject to the constraints

$x + y \leq 50;\quad 2x + y \leq 80;\quad x \geq 0;\quad y \geq 0$

SECTION D

This section comprises of long answer type questions (LA) of 5 marks each

32. Let A = {1, 2, 3, 4, 5}. Let R be a relation on A × A defined by (a, b) R (c, d) iff a + d = b + c. Prove that R is an equivalence relation in A × A. Find the equivalence class of [(1, 2)]

OR

Consider f: $R_+ \rightarrow [-5, \infty)$ given by f (x) = $9x^2 + 6x - 5$, where R_+ is the set of all non-negative real numbers. Check whether the function is bijective. Justify your answer.

33. If A = $\begin{bmatrix} 2 & 3 & 4 \\ 1 & -1 & 0 \\ 0 & 1 & 2 \end{bmatrix}$ find A^{-1}.

Hence solve the system of equations:

y + 2z = 7

2x + 3y + 4z = 17

x – y = 3

34. Evaluate: $\int \frac{1}{1 + x^2 + x^4}\, dx$ **OR** Prove that: $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x}\, dx = \pi(\frac{\pi}{2} - 1)$

35. Find the length of the perpendicular drawn on the line $\frac{x-4}{2} = \frac{y-2}{3} = \frac{z-2}{6}$ from a point with position vector $\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$

SECTION E

This section comprises of 3 case-study/passage-based questions of 4 marks each with sub-parts. First two case study questions have three sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively. The third case study question has two sub-parts of 2 marks each.

36. **Case-study I**

A man running a race course notes that the sum of the distances from the two flag posts from him is always a constant. Any point P (x, y) on the path traced by the man is connected parametrically in the equation x = 5 cos θ

and y = $\frac{20}{3}$ sin θ.



(i) find the rate of change of both x and y with respect to θ

(ii) find $\frac{dy}{dx}$ at $\theta = -\frac{\pi}{4}$

(iii) If the locus of the point P is an ellipse $16x^2 + 9y^2 = 400$, at what point of the ellipse does the ordinate decreases at the same rate at which the abscissa increases?

OR

(iii) Check whether $\frac{d^2y}{dx^2} = \frac{d^2y}{d\theta^2} \div \frac{d^2x}{d\theta^2}$

37. **Case study II**

A square tank of capacity of 250cm^3 has to be dug out. The cost of the land is Rs.50 per sq. metre. and the cost of digging is $400h^2$ rupees, where h is the depth of the tank



(i) Find the area of the square land for the tank in terms of h.

(ii) Find the total cost in terms of h.

(iii) For what value of h is the total cost minimum?

OR

(iii) If they decide that the height of the tank should not be more than 5m, find the intervals in which the cost is increasing or decreasing.

38. **Case study III**

Consider the experiment of tossing a coin. If the coin shows head, toss it again but if it shows tail, then throw a die.





(i) Find the probability of the event ‘there is at least one tail ’

(ii) Find the conditional probability of the event ‘the die shows a number greater than 4 ’ given that ‘ there is at least one tail ’