

केन्द्रीय विद्यालय संगठन , बंगलूरु संभाग

KENDRIYA VIDYALAYA SANGATHAN, BANGALORE REGION

प्रथम प्री-बोर्ड परीक्षा 2024-25

**FIRST PRE BOARD EXAMINATION—2024-25**

CLASS: XII  
SUBJECT: BIOLOGY

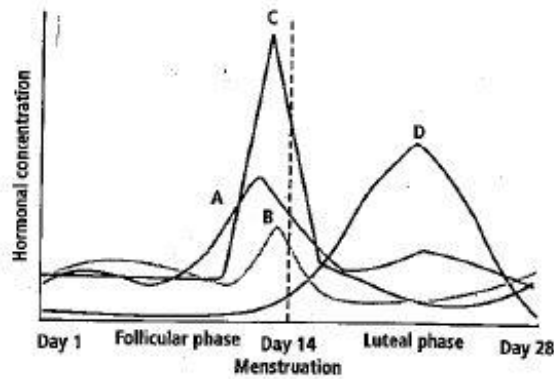
MAX.MARKS:70  
TIME: 3 HOURS

**General Instructions:**

- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions.
- (iii) Section–A has 16 questions of 1 mark 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. 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.

<b>SECTION-A</b>		
	<b>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</b>	
1.	Identify the statement that correctly differentiates between chasmogamous and cleistogamous flowers.  a) Chasmogamous flowers are always self-pollinating, while cleistogamous flowers require cross-pollination. b) Chasmogamous flowers have their petals open and are adapted for cross-pollination, whereas cleistogamous flowers remain closed and are adapted for self-pollination. c) Cleistogamous flowers are typically larger and more colorful to attract pollinators, while chasmogamous flowers are usually smaller and less conspicuous. d) Both chasmogamous and cleistogamous flowers require external pollinators for reproduction.	1

2. Refer to the chart given below represents the hormones produced during menstrual cycle. Identify the correct match of hormones.



	A	B	C	D
a	FSH	Estrogen	Progesterone	LH
b	LH	Progesterone	Estrogen	FSH
c	Estrogen	FSH	LH	Progesterone
d	Progesterone	LH	FSH	Estrogen

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3. Identify the methodology adopted to find out all the genes that produce proteins in Human Genome Project (HGP)?

- a) Sequence Annotation      b) Expressed Sequence Tags  
c) Karyotyping                      d) DNA finger printing.

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4. A researcher is investigating a new drug that is hypothesized to inhibit the function of DNA ligase, an enzyme crucial for DNA replication. Which of the following outcomes is most likely to occur in cells treated with this drug?

- a) Increased synthesis of RNA primers on the leading strand  
b) Formation of incomplete or fragmented DNA strands on the lagging strand  
c) Enhanced speed of DNA replication overall  
d) Inhibition of DNA unwinding at the replication fork

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5. In a plant species, flower color is determined by a single gene with two alleles: R (red) and r (white). Incomplete dominance is observed, where heterozygous plants exhibit pink flowers. If a pink-flowered plant is crossed with a white-flowered plant, what is the expected phenotypic ratio of the offspring?

- a) 1 red : 1 pink  
b) 1 pink : 1 white  
c) 1 red : 2 pink : 1 white  
d) 3 pink : 1 white

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6. Imagine an island ecosystem where a single species of bird, colonizes a previously uninhabited island. Over time, different populations of this bird evolve into distinct species with specialized beak shapes adapted to various available food sources on the island. If you were to analyze the evolutionary process of these bird species, which of the following scenarios would best illustrate

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	<p>adaptive radiation?</p> <p>a) Bird populations develop different beak shapes to exploit various food sources on the island, depicting divergent evolution.</p> <p>b) Bird populations evolve different beak shapes due to random genetic drift, with no relation to the availability of food sources depicting convergent evolution</p> <p>c) Bird populations remain morphologically similar despite the different food sources available on the island showing no evolution.</p> <p>d) Bird populations develop similar beak shapes regardless of the different food sources depicting random evolution.</p>	
7.	<p>A colour blind woman marries a normal man, what percentage of their children will be colour blind.</p> <p>a) All their children will be colour blind.</p> <p>b) All their sons will be colour blind.</p> <p>c) All their daughters will be colour blind.</p> <p>d) 50% sons and 50% daughters will be colour blind. .</p>	1
8.	<p>In the following, in each set, a conservation approach and an example of a method of conservation are given</p> <p>(a) In situ conservation - Biosphere Reserve</p> <p>(b) Ex situ conservation - Sacred groves</p> <p>(c) In situ conservation - Seed bank</p> <p>(d) Ex situ conservation - Cryopreservation`</p> <p>Select the option with the correct match of approach and method:</p> <p>a) (a) and (c)</p> <p>b) (a) and (d)</p> <p>c) (b) and (d)</p> <p>d) (a) and (b)</p>	1
9.	<p>Given below are pairs of disease and causative organism. Which out of these is not a matching pair?</p> <p>a) <i>Salmonella typhi</i> - typhoid</p> <p>b) <i>Haemophilus influenza</i> - pneumonia</p> <p>c) <i>Wuchereria malayi</i> - Ascariasis</p> <p>d) <i>Entamoeba histilytica</i> - Amoebiasis</p>	1

10. In the context of sewage treatment, which of the following stage is specifically designed to remove grit from sewage before further treatment?

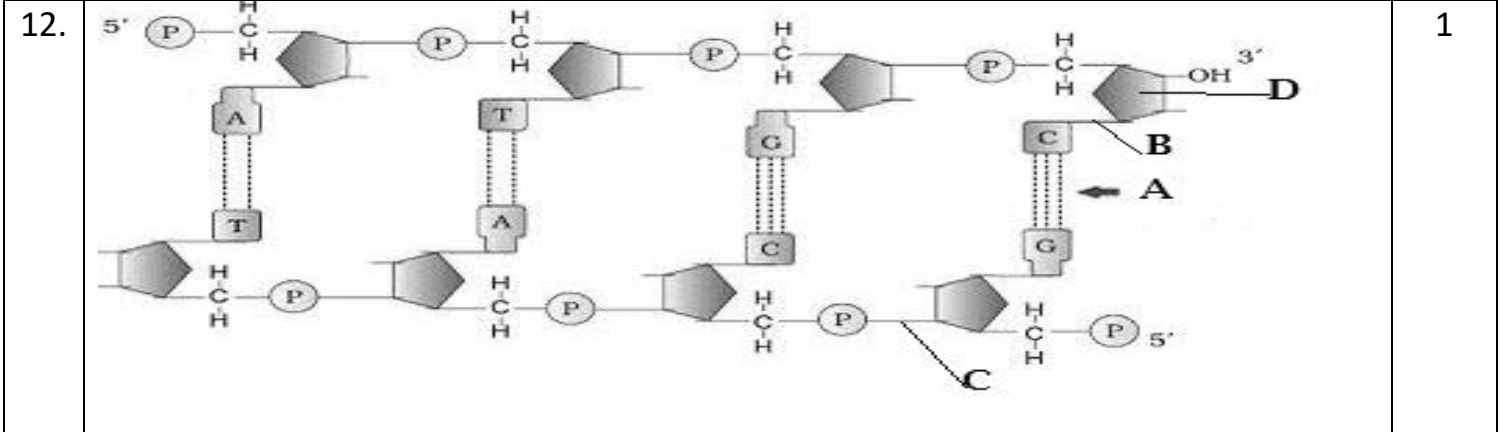
a) Primary treatment- sedimentation  
 b) Secondary treatment- aerobic  
 c) Secondary treatment- anaerobic  
 d) Primary treatment- sequential filtration.

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11. The sequence of bases on the coding strand of the DNA is as follows- TACCATCATCATTGACATCAT. How many amino acids will be coded by the m-RNA that is transcribed?

a) 6                      b) 5                      c) 4                      d) 3

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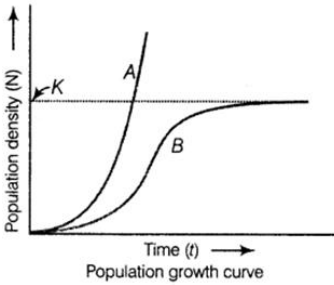
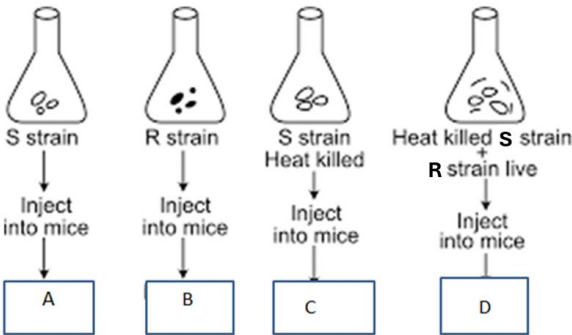
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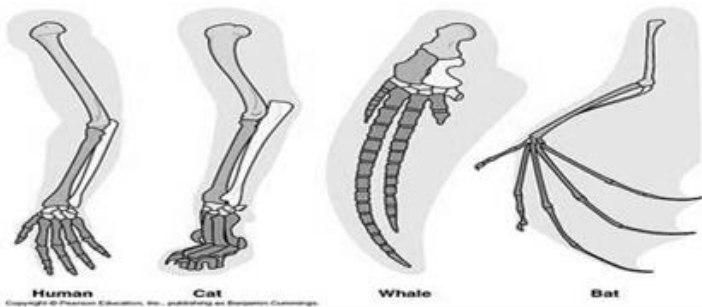
	A	B	C	D
a)	Phospho ester	Glycosidic bond	Deoxyribose sugar	Hydrogen bond
b)	Hydrogen bond	Glycosidic bond	Phospho ester	Deoxyribose sugar
c)	Glycosidic bond	Phospho ester	Deoxyribose sugar	Hydrogen bond
d)	Deoxyribose sugar	Hydrogen bond	Glycosidic bond	Phospho ester

Question No. 13 to 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.**

<b>D. A is False but R is true.</b>														
13.	<p><b>Assertion:</b> Interferon helps in the elimination of viral infections.</p> <p><b>Reason:</b> Interferon is released by bacteria infected cells which make them resistant to viral infection.</p>	1												
14.	<p><b>Assertion:</b> Transgenic animals are used to study the physiology and development of an organism.</p> <p><b>Reason:</b> Transgenic animals are specifically designed to allow the study of regulation of genes</p>	1												
15.	<p><b>Assertion:</b> There are two key concepts in Darwinian theory of evolution</p> <p><b>Reason:</b> It is Natural selection and Saltation.</p>	1												
16.	<p><b>Assertion:</b> Pyramid of biomass is always upright for aquatic ecosystem.</p> <p><b>Reason:</b> Total biomass of a fish in a specific area is more than that of planktons.</p>	1												
<b>SECTION-B</b>														
17.	Assess the advantage of using copper-releasing IUDs to hormone releasing IUDs as a method of contraception based on their action.	2												
18.	A student performs gel electrophoresis and obtains a gel image with several bands. Describe the principle of gel electrophoresis. How can the student determine the size of the DNA fragments in their sample? What is the purpose of staining the gel after electrophoresis?	2												
19.	<p>Drugs addiction is one of the major concerns among adolescence. Identify A, B, C and D in the following table with respect to the source of drug and its impact.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Scientific name of the source plant</th> <th style="width: 33%;">Drug</th> <th style="width: 33%;">Harmful effects/Human body part affected</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Papaver somniferum</td> <td style="text-align: center;">--- A ---</td> <td style="text-align: center;">Depressant/Slows down body function</td> </tr> <tr> <td style="text-align: center;">Cannabis sativa</td> <td style="text-align: center;">Cannabinoids</td> <td style="text-align: center;">--- B ---</td> </tr> <tr> <td style="text-align: center;">-----C-----</td> <td style="text-align: center;">Cocaine</td> <td style="text-align: center;">--- D ---</td> </tr> </tbody> </table> <p style="text-align: center;"><b>OR</b></p> <p>a) Cancer is the leading cause of death accounting for about 12.6 million deaths worldwide in the year 2023. What is the most feared property of cancer? Why is it significant in the progression of the disease?</p> <p>b) Enumerate the role of genes in cancer.</p>	Scientific name of the source plant	Drug	Harmful effects/Human body part affected	Papaver somniferum	--- A ---	Depressant/Slows down body function	Cannabis sativa	Cannabinoids	--- B ---	-----C-----	Cocaine	--- D ---	2
Scientific name of the source plant	Drug	Harmful effects/Human body part affected												
Papaver somniferum	--- A ---	Depressant/Slows down body function												
Cannabis sativa	Cannabinoids	--- B ---												
-----C-----	Cocaine	--- D ---												

20.	<p>Given below is the population growth curve.</p> <p>i) What is the key factor causing the difference between curve A and B? Write the equation for the more realistic one.</p> <p>ii) Define K given in the graph.</p> 	2
21.	<p>Analyze the structural features of tRNA and discuss why is it called an adapter molecule? Draw a tRNA molecule for the amino acid methionine.</p>	2
<b>SECTION-C</b>		
22.	<p>With respect to Griffith experiment what would be the outcome in each case. What was his conclusion on observing the result?</p> 	3
23.	<p>Compare and contrast spermatogenesis and oogenesis in terms of their processes and outcomes by tabulating the differences.</p> <p style="text-align: center;"><b>OR</b></p> <p>a) Intra cytoplasmic sperm injection and gamete intra fallopian transfer “- are two assisted reproductive technologies. How are they different from each other?</p> <p>b) Our government has intentionally imposed strict conditions for MTP in our country. Justify giving a reason.</p>	3
24.	<p>A boy while playing in the ground was hurt by a sharp metallic rod. The boy was immediately rushed to the nearby hospital. The doctor right away gave him an injection to prevent infection.</p> <p>(i) What did the doctor inject and why?</p> <p>(ii) Name the type of immunity it provides and an example for such immunity.</p>	3

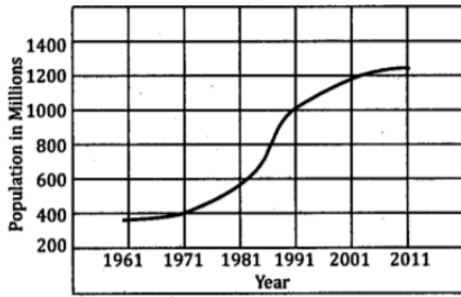
25.	<p>a) Identify the organs in the light of evolution. Explain the type of evolution involved.</p>  <p>b) Give an example of similar evolution in plants.</p>	3
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26.	<p>Tobacco is an economically viable crop which is infested by a nematode which feeds on the sap and weakens the plant.</p> <p>a. Name the nematode that infects roots of tobacco plants  b. What was the strategy adopted to develop pest resistant tobacco plants? Explain.  c. What is the source of complementary RNA in this method?</p>	3
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27.	<p>(a) Draw a pyramid of numbers of a situation, where a large population of insects feed upon a very big tree.</p> <p>(b) Write any two limitations of ecological pyramids.</p>	3
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28	<p>Introduction of alien species affect the indigenous organisms leading to their extinction. Substantiate this statement with the help of examples.</p>	3
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<b>SECTION-D</b>		
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29	<p>India was amongst the first countries in the world to initiate action plans and programme at a national level to attain total reproductive health as a social goal. These programmes called ‘family planning’ were initiated in 1951 and were periodically assessed over the past decades. Improved programmes covering wider reproduction-related areas were implemented.</p> <p>a) Currently the programme is in operation under a popular name. Name it.</p>  <p>b) Observe the graph it shows a steady increase in the population from 1961 to 2011. List the reasons which led to the increase.</p> <p>c) Amniocentesis helps detect genetic issues in the foetus yet there is a statutory ban. Give reason</p>	4
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**OR**

Creating awareness on STDs is also an agenda of this programme. State two early symptoms of STD.

30 HIV remains a major global public health issue, having claimed an estimated 42.3 million lives to date. In 2023, an estimated 630 000 people died from HIV-related causes and an estimated 1.3 million people acquired HIV. There is no cure for HIV infection. However, with access to effective HIV prevention, diagnosis, treatment and care HIV infection has become a manageable chronic health condition, enabling people living with HIV to lead long and healthy live.

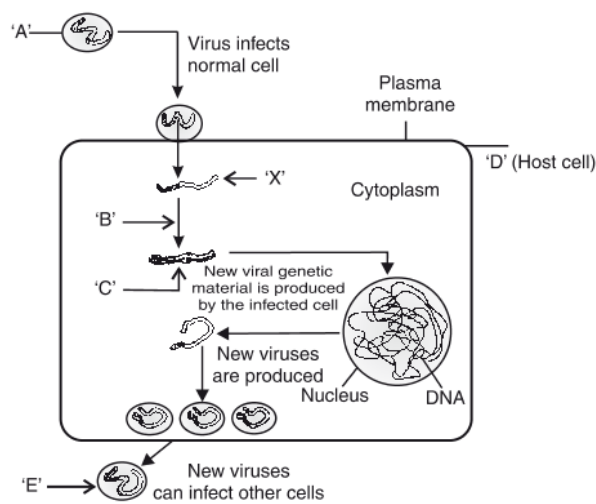
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- a) Which type of immune cells are primarily targeted and destroyed by HIV in the human body?
- b) As a teacher what advice should you give students regarding the risk of HIV transmission through casual contact like hugging or sharing school supplies?

**OR**

Name the technique employed to detect HIV in our body.

- c) You are given the replication of retrovirus. What does X and C stand for? Name the enzyme responsible for this change. Why is it called retrovirus?



**SECTION-E**

31 Why is the process of fertilization in angiosperms termed as double fertilization? Explain.

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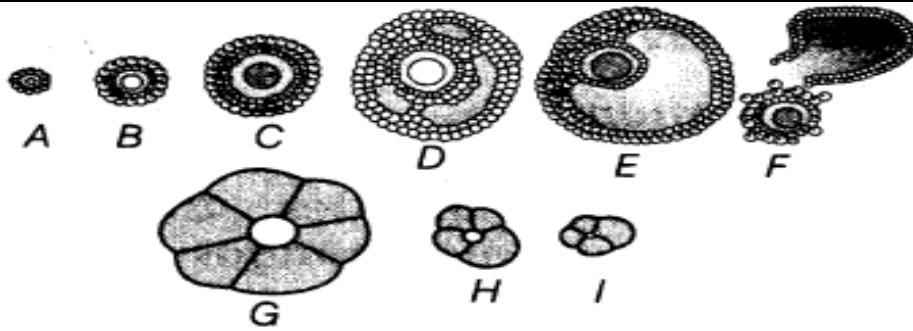
ii) Draw a diagram of an angiosperm embryo sac where fertilization is just completed. Label the following parts:

- a) Micropylar end of the embryo sac
- b) The part that develop into an embryo
- c) The part that develops into an endosperm
- d) The degenerating cells at the chalazal end.

**OR**

The following is the illustration of the sequence of ovarian events A to I in a human female which prepares for fertilization and implantation.





- (i) Identify the figures that illustrates corpus luteum and name the pituitary hormones that influences its formation.
- (ii) Specify the endocrine function of corpus luteum. How does it influence the uterus? Why is it essential?
- (iii) Identify D and E
- (iv) If the events culminate in implantation it leads to formation of placenta. State any two functions of placenta.

32 Insulin is a hormone secreted by pancreas which helps maintain blood sugar. The deficiency of this hormone leads to diabetes mellitus. Such patients must be administered insulin.

- a) Name the source from which insulin was extracted earlier.
- b) Why is this insulin no more in use by diabetic patients?
- c) Explain how was human insulin produced using r-DNA technology by Eli Lilly company.
- d) Differentiate between pro insulin and insulin.

**OR**

You are a research student asked to extract DNA from plant source. Step wise explain the process you would follow if you have spooled the DNA also suggest a method each to make both plant and animal cell competent to receive the recombinant DNA.

33 Regulation of lac-operon can be visualized as regulation of enzyme synthesis by its substrate. Support your answer with a labelled diagram.

**OR**

A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds.

- a) What would be the phenotype and the genotype of the F1?
- b) Work out the phenotypic ratio of the F2 generation with the help of a Punnett square.