

PUMDET-2024

Subject : Life Science

4032000797

(Booklet Number)



Duration : 90 Minutes

No. of Questions : 50

Full Marks : 100

INSTRUCTIONS

1. All questions are of objective type having four answer options for each. Only one option is correct. Correct answer will carry full marks 2. In case of incorrect answer or any combination of more than one answer, $\frac{1}{2}$ mark will be deducted.
2. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C or D.
3. Use only **Black/Blue ink ball point pen** to mark the answer by complete filling up of the respective bubbles.
4. Mark the answers only in the space provided. Do not make any stray mark on the OMR Sheet.
5. Write question booklet number and your roll number carefully in the specified locations of the **OMR Sheet**. Also fill appropriate bubbles.
6. Write your name (in block letter), name of the examination centre and put your signature (as is appeared in Admit Card) in appropriate boxes in the OMR Sheet.
7. The OMR Sheet is liable to become invalid if there is any mistake in filling the correct bubbles for question booklet number/roll number or if there is any discrepancy in the name/signature of the candidate, name of the examination centre. The OMR Sheet may also become invalid due to folding or putting stray marks on it or any damage to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be sole responsibility of candidate.
8. Candidates are not allowed to carry any written or printed material, calculator, pen, docu-pen, log table, wristwatch, any communication device like mobile phones, bluetooth devices etc. inside the examination hall. Any candidate found with such prohibited items will be **reported against** and his/her candidature will be summarily cancelled.
9. Rough work must be done on the question booklet itself. Additional blank pages are given in the question booklet for rough work.
10. Hand over the OMR Sheet to the invigilator before leaving the Examination Hall.
11. Candidates are allowed to take the Question Booklet after examination is over.

Signature of the Candidate : _____
(as in Admit Card)

Signature of the Invigilator : _____

Life Science



CONFIDENTIAL

CONFIDENTIAL

PUMDET-2024
SPACE FOR ROUGH WORK

4032000797

(Booklet Number)



Full Marks : 100

No. of Questions : 50

Duration : 80 Minutes

INSTRUCTIONS

1. All questions are of objective type having four answer options for each. Only one option is correct. Correct answer will carry full marks & in case of incorrect answer or any combination of more than one answer, no mark will be deducted.
2. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C or D.
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(as in Admit Card)

Signature of the Invigilator : _____



1. Flagship species are
- (A) the most abundant and cared species in a region
 - (B) threatened species selected to act as icon or symbol for a defined habitat issue or environmental cause
 - (C) species that play essential role in structure, functioning or productivity of a habitat
 - (D) those that indicate extent of degradation of an ecosystem
2. A point mutation that replaces a purine with another purine or a pyrimidine with another pyrimidine is called
- (A) Nonsense
 - (B) Silent
 - (C) Transition
 - (D) Transversion
3. The bacterial genus where sterols are present in the cell membrane is
- (A) *Vibrio*
 - (B) *Mycoplasma*
 - (C) *Escherichia*
 - (D) *Chlamydia*
4. Which of the following resistance mechanisms describes the function of β -lactamase ?
- (A) Efflux pump
 - (B) Target mimicry
 - (C) Drug inactivation
 - (D) Target over production



5. Coliforms are used as indicator organisms of domestic sewage pollution because
- (A) they are pathogen
 - (B) they ferment lactose
 - (C) they are abundant in human intestine
 - (D) they grow profusely within 48 hrs
6. Identity between two antigens can be verified by
- (A) Rocket immunoelectrophoresis
 - (B) Single radial immunodiffusion
 - (C) Denaturing gel electrophoresis
 - (D) Ouchterlony double immunodiffusion
7. An ecotone has
- (A) higher species diversity compared to adjoining ecosystems
 - (B) lower species diversity compared to adjoining ecosystems
 - (C) no difference in species diversity compared to adjoining ecosystems
 - (D) declining species diversity
8. In bacterial peptidoglycan, N-acetylglucosamine and N-acetylmuramic acid are linked by
- (A) beta-(1, 4) glycosidic linkage
 - (B) alpha-(1,4) glycosidic linkage
 - (C) alpha-(1,6) glycosidic linkage
 - (D) beta-(1,6) glycosidic linkage



9. A mixture of p-dimethylaminobenzaldehyde, isoamyl alcohol and concentrated hydrochloric acid is popularly known as

- (A) Kovac's reagent (B) Ehrlich's reagent
(C) Grignard reagent (D) Fenton reagent

10. All of the following are the effects of water pollution with domestic sewage except

- (A) the spread of infectious diseases
(B) increased eutrophication
(C) decreased BOD
(D) increased algal growth

11. Five cardinal signs of inflammation are

- (A) heat, pain, redness, swelling and loss of function
(B) heat, pain, blueness, swelling and loss of sense
(C) cold, pain, blueness, swelling and loss of function
(D) heat, pain, redness, wrinkling and loss of sense

12. To suppress the immune system and to prevent rejection after tissue or organ transplant, the drug commonly used is

- (A) Vancomycin (B) Bacitracin
(C) Cyclosporine (D) Methicillin



13. An inverted pyramid of biomass can be seen in

- (A) Desert ecosystem (B) Grassland ecosystem
(C) Ocean ecosystem (D) A montane forest

14. During apoptosis, which of the following phospholipids is exposed to the outer leaflet of plasma membrane ?

- (A) Phosphatidyl ethanolamine (B) Phosphatidyl serine
(C) Phosphatidyl choline (D) Phosphatidyl inositol

15. Match the following columns in respect to gastrulation in frog

Column A (Precursor layers)	Column B (organs)
1. Ectoderm	(a) gut lining
2. Endoderm	(b) nervous system
3. Mesoderm	(c) skeleton

- (A) 1-a, 2-c, 3-b (B) 1-b, 2-c, 3-a
(C) 1-b, 2-a, 3-c (D) 1-a, 2-b, 3-c

16. As an important part of the non-specific immune defense mechanism, which of the following enzyme is present in human tears, saliva and mucus ?

- (A) Adenylate kinase (B) Pyruvate carboxylase
(C) Lysozyme (D) Aldolase



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17. During human menstrual cycle, progesterone is secreted by
- (A) Graafian follicle (B) Primordial follicle
(C) Corpus luteum (D) Pituitary gland
18. Acetyl number refers to the number of _____ required to neutralize the acetic acid liberated by hydrolysis of _____ of acetylated oil or fat
- (A) NaOH, 1g (B) KOH, 1 kg
(C) KOH, 1g (D) NaOH, 1 mg
19. Soil horizon layers are differentiated by
- (A) physical, chemical and biological characteristics
(B) biological characteristics only
(C) physical characteristics only
(D) constituent mineral composition
20. During mammalian early embryonic development, the trophoblast cells of 16-celled morula develop into
- (A) Yolk sac (B) Allantois
(C) Chorion (D) Amnion
21. Which of the following is not a secondary lymphoid organ ?
- (A) Tonsil (B) Spleen
(C) Thymus (D) Lymph node



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22. According to the histogen theory of Hanstein (1868), the cortical part of angiosperm leaf is developed from
- (A) Dermatogen (B) Both dermatogen and plerome
(C) Periblem (D) Plerome
23. One strand of a double stranded DNA is mutated, changing all the cytosines to uracils. After one round of replication of the mutated DNA strand, the T_m value of the resultant DNA will
- (A) be higher (B) be lower
(C) remain same (D) result in insufficient data
24. In *Arabidopsis* embryogenesis, an apparent distinction between adaxial and abaxial tissues can be seen in
- (A) Globular stage (B) Mature stage
(C) Torpedo stage (D) Zygotic stage
25. The two mammals of India, included in the Red list of IUCN are
- (A) Red panda and Hoolock gibbon
(B) Golden cat and spotted deer
(C) Red panda and spotted deer
(D) Hoolock gibbon and spotted deer



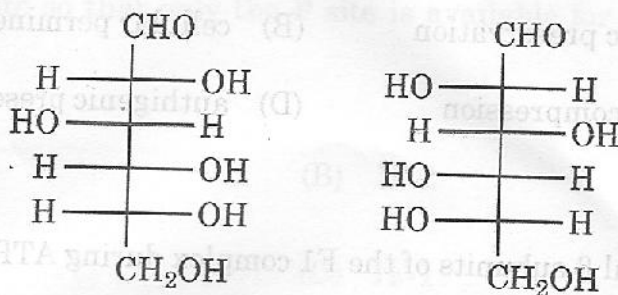
26. The DNA polymerase involved in base excision repair is
- (A) DNA polymerase α (B) DNA polymerase β
 (C) DNA polymerase σ (D) DNA polymerase γ
27. Histone acetylation increases transcription of gene because
- (A) it increases DNA-histone interaction
 (B) the acetyl groups of histones are recognized by RNA polymerase
 (C) it loosens the DNA histone complex making it more accessible to RNA polymerase
 (D) it increases DNA bending which is recognized by RNA polymerase
28. Which of the following transposable element causes hybrid dysgenesis?
- (A) Non-composite transposon
 (B) LINE
 (C) P-element
 (D) Ac-element
29. In a cladogram, any branch with more than two lineages indicates
- (A) Homoplasy (B) Polytoimy
 (C) Passimony (D) Symplesiomonphy



30. In evolutionary studies, "Dollo passimomy" refers to
- (A) an advanced state evolved only once
 - (B) an advanced state evolved many times
 - (C) retention of the primitive state
 - (D) loss of the primitive state
31. Clathrin-coated vesicles mainly transport proteins from
- (A) Rough ER to Golgi bodies
 - (B) Golgi bodies to rough ER
 - (C) Plasma membrane to endosome
 - (D) Plasma membrane to Golgi bodies
32. Anagenesis means
- (A) branching or splitting during speciation leading to two or more lineages
 - (B) two or more species sharing common characters
 - (C) gradual change that occurs in a species without the need for splitting
 - (D) evolutionary lineage persists through time without splitting or changing
33. Choose the correct hierarchical sequence of the following geological periods/epochs
- (A) Ordovician-Pennsylvanian-Triassic-Cretaceous-Palaeocene-Holocene
 - (B) Ordovician-Triassic-Palaeocene-Cretaceous-Pennsylvanian-Holocene
 - (C) Ordovician-Pennsylvanian-Cretaceous-Triassic-Palaeocene-Holocene
 - (D) Ordovician-Triassic-Pennsylvanian-Palaeocene-Cretaceous-Holocene



34. These two sugars are called



- (A) Epimers (B) Enantiomers
 (C) Diastereomers (D) Tautomers

35. In a population of rabbits, the allele for white hair is recessive and the allele for brown hair is dominant. The population consists of 500 individuals and the frequency of homozygous brown hair rabbit is 49%. What will be the frequency of the recessive allele if the population is in Hardy-Weinberg equilibrium ?

- (A) 0.70 (B) 0.49
 (C) 0.30 (D) 0.51

36. Which of the following is not promoted by histone tail modification ?

- (A) Nucleosome sliding
 (B) Nucleosome remodelling
 (C) Base and sugar phosphate backbone interaction
 (D) Base pairing and gene expression



37. The mode of preservation of coal ball is
- (A) duripartic preservation (B) cellular permineralization
(C) coalified compression (D) authigenic preservation
38. Three identical β subunits of the F1 complex during ATP synthesis have
- (A) similar affinities for ADP and ATP
(B) different affinities for ATP and ADP
(C) higher affinities for ADP
(D) different affinities for ADP but not ATP
39. The α -helix in proteins is formed due to
- (A) intramolecular hydrogen bonds in an amino acid
(B) intermolecular hydrogen bonds between amino acids
(C) van der Waals interaction between amino acids
(D) ionic interactions between amino acids
40. A paraphyletic taxon is one that
- (A) includes the recent common ancestor and all of its descendants
(B) includes all the descendants of a common ancestor
(C) includes the recent common ancestor, but not all of its descendants
(D) does not include common ancestor of all members of the taxon



41. When bound to the 30S subunit, which of the following initiation factors blocks the A site so that only the P site is available for the initiator tRNA to bind ?

- (A) IF-4 (B) IF-2
(C) IF-3 (D) IF-1

42. Which of the following rRNA is intimately involved with the peptidyl transferase activity ?

- (A) 5S rRNA (B) 16S rRNA
(C) 28S rRNA (D) 23S rRNA

43. Why are rRNA genes and internal transcribed spacers (ITS) frequently used for organismal identification and evolutionary comparisons between organisms ?

- (A) Only bacteria have ITS and only eukaryotes have rRNA genes
(B) rRNA genes and ITS are highly divergent among all species
(C) rRNA genes and ITS have highly conserved regions and highly divergent regions
(D) rRNA genes and ITS are highly conserved among all species



44. In the SOS repair system, cleavage of LexA and UmuD is mediated by
- (A) Rec A (B) Rec B
(C) Rec C (D) Uvr A
45. A phenomenon where a single gene has more than one phenotypic effect is known as
- (A) Phenocopy (B) Phenotype
(C) Pleiotropy (D) Phenology
46. Amensalism is an association between two species where
- (A) one species is harmed and other is benefitted
(B) one species is harmed and other is unaffected
(C) one species is benefitted and other is unaffected
(D) both the species are harmed
47. Capillaries with tight junctions are found in
- (A) Brain (B) Skin
(C) Liver (D) Spleen



