

W-121**Ph.D. Entrance Examination, 2024****ZOOLOGY****Maximum Marks : 50****Note :** Each question carrying 2 marks.**Q. 1.** α -Helix in protein is mainly stabilized by :

- (a) Hydrophobic interactions
- (b) Van der waals interactions
- (c) H-bond
- (d) Salt bridge

Q. 2. Production of acetyl CoA involves :

- (a) Multienzyme complex
- (b) Oxidation of pyruvate
- (c) Decarboxylation of pyruvate
- (d) All the above

Q. 3. Which of the following is NOT true for protein sorting :

- (a) SRP-recognise signal peptide
- (b) SRP-receptors are associated with translocon
- (c) V-SNARE and T-SNARE helps in fusion of vessicles to target membrane
- (d) COP II vesicles produced by Golgi

Q. 4. Which of the following is NOT true for ATP synthase ($\alpha_3\beta_3$ complex) in F_0 - F_1 complex :

- (a) ADP and Pi reaction occur in T conformation of β -protein
- (b) Loose conformation weakly binds to ADP and Pi

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- (c) Rotation of $\alpha_3\beta_3$ complex occurs due to H^+ flow through half channels
- (d) ADP and P_i reaction occurs in open conformation of β -protein

Q. 5. A highly specific inhibitor that targets the phosphorylation activity of TF-II H is added to an invitro transcription reaction. Which of the following step is most likely to be affected ?

- (a) Promoter clearance
- (b) Recruitment of TF II D
- (c) Binding of RNA polymerase to promotor sequence
- (d) Open promotor complex formation

Q. 6. Which of the following statements about chromatin is true :

(4)

- (a) Covalent modification of histone influence chromatin compaction
- (b) DNA winds approximately 1.65 times around the nucleosome
- (c) Both (a) and (b)
- (d) H_3 and H_4 bind to both entry and exit ends of DNA in nucleosomes

Q. 7. Which of the following cell junction proteins allow transport of ion and small molecules between cells :

- (a) Adherent junction proteins
- (b) Gap-junction proteins
- (c) Hemidesmosome proteins
- (d) Tight junction proteins

(5)

Q. 8. In α fluorescence microscope a fluorescent dye was used which has excitation wavelength λ_1 and emission wavelength λ_2 . Which of the following statement is NOT correct :

- (a) $\lambda_1 < \lambda_2$
- (b) $E_1 > E_2$
- (c) Both (a) and (b)
- (d) $\lambda_2 > \lambda_1$

Q. 9. Which of the following statement is NOT correct about homologous characters ?

- (a) Similar traits may NOT be a result of convergent evolution
- (b) Homologous characters may show structural similarity but functional diversity

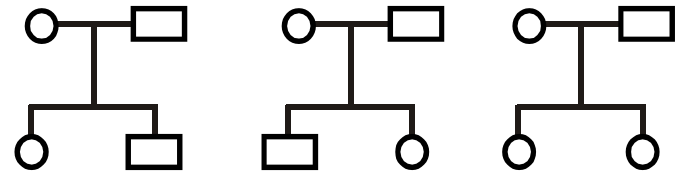
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- (c) Similar traits may not be homologous
- (d) A homologous trait that is derived and shared from common ancestor is called an autopomorphy

Q. 10. The inheritance of a given disorder is recorded in three small families shown below :



Based on above limited information, which of the following inheritance pattern best explains the observations :

- (a) X-linked dominant
- (b) Autosomal recessive

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(7)

- (c) Autosomal dominant
- (d) X-linked recessive

Q. 11. A population grows according to the logistic growth equation.

$$\frac{dN}{dt} = rN \left(1 - \frac{N}{K} \right)$$

Where $\frac{dN}{dt}$ = Rate of population growth

r = is intrinsic rate of increase

N = population size

K = carrying capacity of the environment

According to this equation population growth rate

is maximum at :

- (a) K/4
- (b) K/2

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- (c) 2K
- (d) K

Q. 12. During cell cycle in an animal cell, metaphase to anaphase transition is regulated by degradation of :

- (a) CDK1
- (b) Aurora A. Kinase
- (c) Polo-like kinases
- (d) Cyclin B1

Q. 13. In which of the following category of protected area in India local people are NOT allowed to collect and use the Biomass ?

- (a) Biosphere Reserves
- (b) National parks

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(9)

- (c) Wetlands declared under Ramsar convention
- (d) Wildlife sanctuaries

Q. 14. In grassland ecosystem the pyramid of energy is :

- (a) Inverted
- (b) Upright
- (c) Inverted or Upright
- (d) None of the above

Q. 15. Which of the following microscope is used to obtain the surface view of a sample ?

- (a) TEM
- (b) SEM
- (c) Phase contrast microscope
- (d) Student microscope

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Q. 16. The cell resting membrane potential is maintained by :

- (a) Na^+/K^+ pump only
- (b) K^+ leak channel only
- (c) Both (a) and (b)
- (d) Voltage gated Na^+ channel only

Q. 17. In a saturated complex of IgM and antigen what is ratio of Antibody : Antigen :

- (a) 1 : 1
- (b) 1 : 2
- (c) 2 : 1
- (d) 10 : 50

Q. 18. A student microscope eye piece and objective magnifications are M_o and M_e respectively. What is total magnification of the microscope ?

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- (a) $M_o + M_e$
- (b) $M_o + 2 M_e$
- (c) $M_o \times M_e$
- (d) M_o / M_e

Q. 19. α -D Glucose and β -D-glucose are :

- (a) α and β are cyclic forms of D-Glucose
- (b) α and β are Anomers
- (c) C_1 is anomeric carbon in both α and β
- (d) All the above

Q. 20. In a sample mitochondrial outer membrane is removed and inner membrane is intact. The above mitochondria kept in a media having pH less than mitochondrial matrix and plenty of ADP and P_i consider the following statements :

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- (i) ATP synthesis takes place
 - (ii) Protons move through half channel into matrix
 - (iii) Rotational catalysis takes place
- (a) Only (i) is correct
 - (b) Both (i), (ii) are correct
 - (c) (i), (ii) and (iii) are correct
 - (d) (i), (ii) are correct but (iii) incorrect

Q. 21. In a female newborn baby primordial follicles are arrested in :

- (a) Metaphase II
- (b) Anaphase II
- (c) Diplotene
- (d) Diakinesis

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(13)

Q. 22. Which of the following statement is NOT true for ventilation :

- (a) Relax state diaphragm is flat
- (b) During inspiration-rib cage move upward and outward due to contraction of external intercostal muscle
- (c) Human inhale by negative pressure
- (d) During expiration external intercostal muscle relax and diaphragm relax

Q. 23. The cell fate commitment in *Drosophila* appears to have two steps specification and determination.

Which of the following statement is true :

- (a) Determination is flexible

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(b) Determination and specification both are flexible

(c) Specification is flexible

(d) Determination is flexible and specification is irreversible

Q. 24. Transition from specification to determination in *Drosophila* is mediated by :

(a) Gap Genes

(b) Pair rule genes

(c) Segment polarity genes

(d) All the above

Q. 25. A DNA fragment was treated with *EcoRI* produces three DNA fragments of size A (200 bp), B (300 bp) and C (100 bp). Arrange the DNA

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fragments according to their size from positive to

negative terminal of Agarose Gel :

(a) ABC

(b) BAC

(c) CAB

(d) BCA

