

1. Booklungs are found in :

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|--------------|------------------|
| (1) Amoeba | (2) Polystomella |
| (3) Euglypha | (4) Arachnids |

2. Silk is obtained from :

- | | |
|----------------|-----------------------|
| (1) Adult moth | (2) Caterpillar stage |
| (3) Egg | (4) Cocoon |

3. Neurogenic heart is found in :

- | | |
|------------------|-------------------|
| (1) Human beings | (2) Rat |
| (3) Rabbit | (4) Invertebrates |

4. Epiphysis is also known as :

- | | |
|-------------|------------------|
| (1) Pineal | (2) Pituitary |
| (3) Thyroid | (4) Hypothalamus |

5. Simplest and smallest form of amino acid is :

- | | |
|-------------|--------------|
| (1) Glycine | (2) Proline |
| (3) Lysine | (4) Argenine |

6. PCOS is related to :
- | | |
|------------|-------------|
| (1) Ovary | (2) Uterus |
| (3) Testes | (4) Oviduct |
7. Seminogelin is secreted by :
- | | |
|------------------|---------------------|
| (1) Epididymis | (2) Seminal Vesicle |
| (3) Thecal cells | (4) Oviduct |
8. First cleavage in frog is :
- | | |
|----------------|-----------------|
| (1) Horizontal | (2) Meridional |
| (3) Equatorial | (4) Latitudinal |
9. Which of the following is nuclear receptor ?
- | | |
|--------|----------|
| (1) AR | (2) GPCR |
| (3) IR | (4) MT1 |
10. Cryptorchidism is related to :
- | | |
|------------|--------------|
| (1) Testes | (2) Thyroid |
| (3) Ovary | (4) Pancreas |
11. Atoke and Epitoke regions in the body are found in :
- | | |
|-------------------------|------------------------|
| (1) <i>Heteronereis</i> | (2) <i>Hirudinaria</i> |
| (3) <i>Peripatus</i> | (4) <i>Pennatulula</i> |

12. Which one of the following is correct match of all the mentioned larval forms with their groups ?

- (1) Brachiolaria- Trochophore; Cysticercus-Cestoda; planula-Jelly fish; Asteroidea-Polycheta
- (2) Brachiolaria-Asteroidea; Cysticercus-Cestoda; Planula-Jelly fish; Trochophore-Polycheta
- (3) Brachiolaria-Asteroidea; Cysticercus-Jelly fish; Planula-Cestoda; Trochophore-Polycheta
- (4) Brachiolaria-Cestoda; Cysticercus-Asteroidea; Planula-Polycheta; Trochophore-Jelly fish

13. Which of the following is early gnathostome ?

- (1) Osteostracian
- (2) Heterostracian
- (3) Arthrodiran
- (4) Anapsidan

14. Which of the following lack secondary palate ?

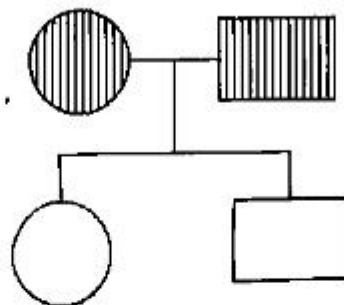
- (1) Mammals
- (2) Birds
- (3) Reptiles
- (4) Amphibians

15. Juvenile hormone is produced by :

- (1) Corpora allata
- (2) Corpora cardiaca
- (3) Prothoracic gland
- (4) Ring gland

16. If an object is viewed under a compound microscope in the following conditions : Wevelenght of light used= 500nm; Refractive index of medium=1.0; Angular aperture $\sin 70^\circ=0.94$, the limit of fesolution will be approximately :
- (1) 150nm (2) 275nm (3) 325nm (4) 400nm
17. Beer's law states that the absorbance equal to :
- (1) $2\text{-log}\%$ transmission
(2) Extinction coefficient x light path x concentration
(3) Natural log of the concentration x the light path length
(4) Extinction coefficient x light path x concentration and $2\text{-log}\%$ transmission
18. A 60 kD molecular weight protein made up of two identical subunits when resolved on SDS-polyacrylamide gel will show :
- (1) a single band of 60kD (2) two bands of 60kD each
(3) a single band of 120kD (4) a single band of 30kD
19. gRNA-dependent insertion of uridylate residue during RNA editing requires all the enzymes except :
- (1) 3-U-exonuclease (2) Endonuclease
(3) TuTase (4) RNA ligase

20. Which one of the following is called as a pace maker enzyme in glycolytic pathway ?
- (1) Hexokinase (2) Phosphofructokinase I
(3) Pyruvate kinase (4) Glucokinase
21. What will happen if a lysosome is ruptured inside a cell ?
- (1) The individual will get inclusion cell disease
(2) All organelles of the cell will get digested
(3) The lysosomal proteins will get transported back to other lysosomes
(4) The lysosomal enzymes will get inactivated due to non acidic pH of cytoplasm
22. Following are four considerable modes of inheritance for the given pedigree :
- A. X-linked recessive B. X-linked dominant
C. Autosomal dominant D. Autosomal recessive



Which of the above modes of inheritance can explain the pedigree shown below ?

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

23. Segregation of the two alleles takes place at which phase of cell cycle ?

- A. At anaphase I during gamete formation
- B. After fertilization at mitotic anaphase
- C. At anaphase II if crossing over between maternal and paternal chromosomes has taken place involving the given allele
- D. At diplotene when crossing over is completed

Which of the above statement/s can answer the question most appropriately ?

- (1) A and C
- (2) A,C and D
- (3) A and B
- (4) C

24. If a *Drosophila* species has 3 pairs of metacentric chromosomes and 1 pair of telocentric chromosome, this species will have :

- (1) 5 arms in polytene chromosomes
- (2) 6 arms in polytene chromosomes
- (3) 7 arms in polytene chromosomes
- (4) 9 arms in polytene chromosomes

25. The hormone that causes acromegaly if present in abnormally high concentration in an adult is :

- (1) Antidiuretic hormone
- (2) Growth hormone
- (3) Gonadotropic hormone
- (4) Thyroid-stimulating hormone

26. Androgen binding protein is secreted by :

- (1) Leydig cells
- (2) Peritubular cells
- (3) Germ cells
- (4) Sertoli cells

27. The hormone required for conversion of carotene to vitamine-A is :

- (1) Thyroid hormone
- (2) Glucagon
- (3) Calcitonin
- (4) Parathormone

28. In doing histochemistry for enzymes the tissue is :

- (1) fixed in Bouins prior to sectioning and staining
- (2) fixed in gluteraldehyde prior to sectioning and staining
- (3) frozen prior to sectioning and staining
- (4) stained prior to fixation

29. Methyl-green pyronin-Y is used to stain :

- (1) DNA only
- (2) DNA and RNA
- (3) RNA only
- (4) Nucleoproteins

30. Chi-square test is a :

- (1) parametric test and is calculated by using mean and SE of mean values
- (2) parametric test and is calculated by using observed and expected values
- (3) non-parametric test and is calculated by using mean and SE of mean values
- (4) non-parametric test and is calculated by using observed and expected values

31. OMIM is a bioinformatical tool for :

- (1) Analyzing restriction endonuclease sites in a DNA sequence
- (2) DNA sequence comparison
- (3) Wide area network
- (4) Human genes and genetic disorders

32. The given molecules are numbered as follows :

Fibrin-1; Fibrinogen-2; Prothrombin-3; Thrombin-4

Choose the order in which they come during clot formation.

- | | |
|-------------|-------------|
| (1) 1,2,3,4 | (2) 2,1,3,4 |
| (3) 3,4,2,1 | (4) 3,2,1,4 |

33. In cerebral ischemia, blood brain barrier becomes leaky due to :
- (1) decline in the neuronal ATP content and reduction in the Na⁺-K⁺ ATPase activity
 - (2) decline in the endothelial cell ATP content and reduction in the Na⁺-K⁺ ATPase activity
 - (3) decline in the astrocytes ATP content and reduction in the Na⁺-K⁺ ATPase activity
 - (4) increase in the astrocytes ATP content and increased Na⁺-K⁺ ATPase activity
34. The following statements are given for the gene products that help in body pattern formation during development :
- A. contain 180 bp homeodomain
 - B. act as transcription factors
 - C. have four paralogous groups
 - D. the genes are clustered in two complexes
- Which combination of above statements is best appropriate for *Drosophila* homeotic gene products ?
- (1) A,B and D
 - (2) B and D
 - (3) A,B and C
 - (4) B and C
35. The generic and specific name of an animal is written by the same word, e.g., *Naja naja*. This convention of naming is known as :
- (1) Tautonym
 - (2) Synonym
 - (3) Homonym
 - (4) Binomen

36. A chromosome locus is represented by two alleles 'A' and 'a'. The frequency of 'A' allele in a population of 200 individuals is 0.3. The expected number of heterozygotes in this population will be :

- (1) 98 (2) 84 (3) 18 (4) 42

37. The following terms are given for specific events towards developing adaptive immunity :

- A. Allelic exclusion B. Class switching
C. Clonal selection D. Clonal deletion

Which of the above terms is/are associated with the generation of antibody diversity ?

- (1) A,B and C (2) B,C and D
(3) B (4) B and D

38. Which of the following best illustrates ecological succession ?

- (1) Imported pheasants increase in number while local quails disappear
(2) A mouse eats seed and an owl eats the mouse
(3) Grasses grow in a deserted field followed by shrubs and then tree
(4) Decomposition in soil releases nitrogen that plants can use

39. A traditional display site that females visit to select a mate from a group of males defending a small resource-free territory is called as :

- | | |
|---------------|----------------|
| (1) Male site | (2) Lek |
| (3) Mate site | (4) Peek-order |

40. The activity cycle that an animal exhibits when placed in a constant darkness is known as :

- | | |
|-----------------------|------------------------|
| (1) Zeiteber cycle | (2) Transient cycle |
| (3) Entrainment cycle | (4) Free running cycle |

Short Answer Questions

Note: Attempt any **five** questions. Write answer in **150-200** words. Each question carries **16** marks. Answer each question on separate page, after writing Question Number.

01. Write a note on retrogressive metamorphosis in urochordates.
02. Write a note on digestion of keratin in insects.
03. What is ion-exchange chromatography ? Briefly describe how would you purify a cationic protein using this technique.
04. What is charge relay network ? How is it achieved during conversion of chymotrypsinogen to chymotrypsin.
05. Discuss the significance of G-and C-banding on karyotyping and how the nomenclature is given for chromosome subdivisions?
06. Define 'Two cell-Two gonadotropin' concept of estrogen synthesis.
07. Differentiate between Enzyme-histochemistry and Immunohistochemistry.
08. How does counter current exchange and multiplier mechanisms differ from each other ? Explain the role of these mechanisms in the formation of concentrated urine.

- 09.** Illustrate molecular understanding of antero-posterior axis formation in *Drosophila* during embryogenesis.

- 10.** Explain energy flow in an ecosystem considering the laws of thermodynamics.