

Time : 1 Hour]

PART - A

[Total Marks : 50

❖ Select the following questions with proper alternative and answer it :

- 1) How many years ago modern man Homo sapiens arose ?
(A) 1,00,000 - 90,000 (B) 5,000 - 4,000
(C) 1,50,000 - 1,30,000 (D) 75,000 - 10,000
- 2) Crystals Bt toxin produced by some bacteria do not kill the bacteria themselves because....
(A) Bacteria are resistant to the toxin.
(B) Toxin is inactive. (C) Toxin is mature.
(D) Bacteria encloses toxin in a special sac.
- 3) Which of the following layer of micro-sporangium provides nutrition to developing pollen grains ?
(A) Epidermis (B) Middle layer
(C) Endothelium (D) Tapetum
- 4) Which of the following hormone is secreted in high amount causing ovulation in women ?
(A) Estrogen
(B) Luteinizing Hormone (LH)
(C) Follicle Stimulating Hormone (FSH)
(D) Androgens
- 5) Statutory ban on 'amniocentesis' for which test
(A) Down's syndrome (B) Sickle - Cell anemia
(C) Haemophilia (D) Sex determination
- 6) In klinefelter syndrome
(A) Monosomy of 23rd pair of chromosome
(B) Trisomy of 23rd pair of chromosome
(C) Monosomy of 21st pair of chromosome
(D) Trisomy of 21st pair of chromosome
- 7) If a double stranded DNA has 35 percent Guanine, calculate the percent of thymine in the DNA.
(A) 35% (B) 70% (C) 15% (D) 30%
- 8) Which is the correct example for divergent evolution ?
(A) Thorn of Bougainvillea and tendril of cucurbita.
(B) Flippers of Penguins and Dolphins.
(C) Octopus and human eye.
(D) Sweet potato root and potato stem.
- 9) Secretion of interferon is which type of barrier ?

- (A) Physical barrier (B) Cellular barrier
(C) Cytokine barrier (D) Physiological barrier

10) Match the Column - I and Column - II :

Column - I	Column - II
(P) Aspergillus niger	(i) Acetic acid
(Q) Acetobacter aceti	(ii) Butyric acid
(R) Clostridium butylicum	(iii) Citric acid
(S) Lactobacillus	(iv) Lactic acid

- (A) (P - i), (Q - iii), (R - ii), (S - iv)
(B) (P - iii), (Q - i), (R - ii), (S - iv)
(C) (P - iii), (Q - i), (R - iv), (S - ii)
(D) (P - i), (Q - iii), (R - iv), (S - ii)
- 11) Eco-RI cuts the DNA between only when the sequence GAATTC is present in the DNA.
(A) G and A (B) T and C
(C) A and T (D) A and A
- 12) Golden rice is enriched with which vitamin ?
(A) Vitamin-A (B) Vitamin-C
(C) Vitamin-B (D) Vitamin-D
- 13) Match Column-I and Column-II by suitable manner :

Column-I	Column-II
(P) Lichens	(i) Parasitism
(Q) Abingdon tortoise and goat	(ii) Commensalism
(R) Sea anemone and clown fish	(iii) Competition
(S) Human and liver fluke	(iv) Mutualism

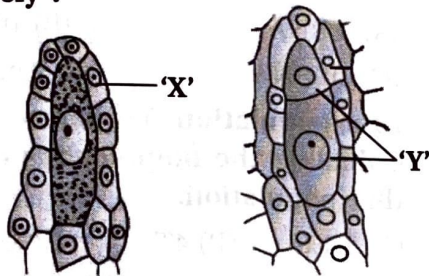
- (A) (P - i), (Q - ii), (R - iii), (S - iv)
(B) (P - iii), (Q - iv), (R - ii), (S - i)
(C) (P - iv), (Q - iii), (R - i), (S - ii)
(D) (P - iv), (Q - iii), (R - ii), (S - i)
- 14) Choose the correct option for given statement.
(T = True, F = False)
(i) Pyramid of energy is always upright.
(ii) Pyramid of number in sea is generally inverted.
(iii) Pyramid of biomass in sea is generally inverted.
(iv) In most ecosystem the pyramid of number and energy are always inverted.
(A) F T F T (B) T F T T (C) F F T F (D) T F T F

15) What is the main cause of biodiversity losses of Amazon rain forest ?

- (A) Habitat loss and fragmentation
(B) Alien species invasions
(C) Over exploitation
(D) Co-extinctions

16) In given figure, megasporogenesis is shown in angiosperms-What are ploidy in given 'X' and 'Y' respectively ?

- (A) $n, 2n$
(B) $2n, n$
(C) $3n, n$
(D) n, n



17) Which gland helps in the lubrication of the penis during coitus ?

- (A) Prostate glands (B) Bulbourethral glands
(C) Seminal Vesicles (D) Testis

18) LNG-20 is

- (A) Hormone releasing IUD
(B) Vaults
(C) Copper releasing IUD
(D) Non-medicated IUD

19) What is represented by following cross ?

$Tt \times tt$

- (A) Test cross
(B) Dihybrid cross
(C) Co-dominance
(D) Incomplete dominance

20) The length of DNA double helix in human sperm is approximately

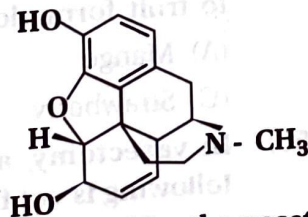
- (A) 1.36 mm (B) 2.2 m
(C) 1.1 m (D) 2.2 mm

21) The brain capacity of Neanderthal man was

- (A) 900 cc (B) 650 cc (C) 1400 cc (D) 800 cc

22) Chemical structure of which drug is given below ?

- (A) Amphetamine
(B) Cannabinoids
(C) Barbiturates
(D) Morphine



23) Assertion-A : The statin produced by the yeast *monascus purpureus* lowered the blood cholesterol.

Reason-R : Statin act as by competitively in habiting the enzyme responsible for synthesis of cholesterol.

- (A) A and R both are correct and R is correct explanation of A.
(B) A is correct and R is wrong.
(C) A and R both are correct and R is not correct explanation of A.
(D) A is wrong and R is correct.

24) The amp^R gene contain the recognition sites for which endonucleases in pBR 322

- (A) Pvu II and Pvu I (B) Pst I and Pvu I
(C) Sal I and Bam H I (D) Pst I and Sal I

25) Which part of tobacco plant is infected by nematode *meloidogyne incognita* ?

- (A) Stem (B) Leaf (C) Root (D) Fruit

26) Which of the following is correct equation for Verhulst Pearl Logistic Growth ?

- (A) $dN/dt = rN$ (B) $N_t = N_0 e^{rt}$
(C) $dN/dt = rN \left(\frac{K-N}{K} \right)$ (D) $dN/dt = rN \left(\frac{K}{K-N} \right)$

27) The second trophic level in a lake is

- (A) Phytoplankton (B) Algae
(C) Zooplankton (D) Fishes

28) Which of the following is not the part of in situ conservation ?

- (A) National Park (B) Biosphere reserve
(C) Sanctuaries (D) Zoological parks

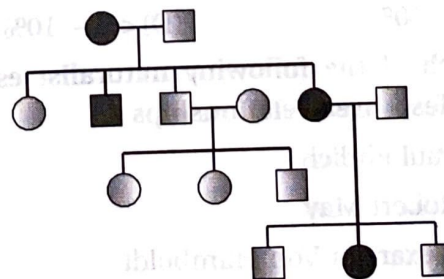
29) Which pollinating agent is responsible for pollination in water hyacinth and water lily ?

- (A) Wind, Water (B) Insects, Water
(C) Insects, Wind (D) Only Water

30) MTPs are considered relatively safe during the

- (A) 30 weeks (B) 18 weeks
(C) 24 weeks (D) 12 weeks

31) In given chart which mendelian disorder is represented ?



- (A) Autosomal dominant trait
 (B) Sex linked dominant trait
 (C) Autosomal recessive trait
 (D) Sex linked recessive trait
- 32) If E-coli was allowed to grow for 60 minutes then what would be the respective proportions of light and hybrid densities DNA molecule ?
 (A) 1 : 1 (B) 3 : 1 (C) 1 : 3 (D) 7 : 1
- 33) "Single step, large mutation is known as saltation." This statement is given by
 (A) Darwin (B) Thomas Malthus
 (C) Hugo de vries (D) Lamark
- 34) Which fungus is taking part in the formation of mycorrhiza ?
 (A) Mucor (B) Glomus
 (C) Rhizopus (D) Monascus
- 35) Which chemical is utilised during the isolation of DNA at the end for the precipitation ?
 (A) Chilled methanol (B) Chilled butanol
 (C) Chilled ethanol (D) Chilled phenol
- 36) In mature insulin, chain-A and chain-B is interlinked by which bond ?
 (A) Peptide bond (B) Hydrogen bond
 (C) Glycosidic bond (D) Disulphide bond
- 37) Once in a habitat there are 80 Cheeth's present, their birth rate is 4 and death rate is 2 and six (6) new cheeth's added by immigration and 3 decreases by emigration. What is the population density of Cheeth's in that habitat ?
 (A) 85 (B) 90 (C) 83 (D) 95
- 38) What is the percentage of photosynthetically active radiation (PAR) in the incident solar radiation ?
 (A) 100% (B) < 20 - 30%
 (C) < 50% (D) < 2 - 10%
- 39) Which of the following naturalist established species - area relationships ?
 (A) Paul Ehrlich
 (B) Robert May
 (C) Alexander Von Humboldt
 (D) David Tilman
- 40) Emasculation in angiospermic plant is
 (A) Removal of anther (B) Removal of petals
 (C) Removal of style (D) Removal of calyx
- 41) In which process sperm is directly introduced into ovum ?
 (A) AI (B) ZIFT (C) ICSI (D) GIFT
- 42) The RNA polymerase III is responsible for transcription of which RNA ?
 (A) tRNA (B) 18S rRNA
 (C) mRNA (D) hnRNA
- 43) In a population frequency of M allele is 0.8. Calculate the homologous recessive allele in that population.
 (A) 64% (B) 4% (C) 32% (D) 10%
- 44) Which bioactive molecule is produced by Trichoderma polysporum ?
 (A) Streptokinase (B) Pectinase
 (C) Cyclosporin A (D) Lipases
- 45) Which metals are used in gene gun for the insertion of alien DNA in competent host ?
 (A) Gold and Zinc (B) Gold and Tungsten
 (C) Copper and Gold (D) Tungsten and Iron
- 46) In which disease α -1 antitrypsin is used to treat ?
 (A) Asthama (B) Common cold
 (C) Pneumonia (D) Emphysema
- 47) "India is a country of pre-reproductive aged people". On the basis of this statement, what is the representation of age pyramids for Indian ?
 (A) Declining (B) Stable
 (C) Irregular (D) Expanding
- 48) Detritus food chain begin from
 (A) Phytoplanton (B) Dead organic matter
 (C) Zooplanton (D) Grass
- 49) In which of the following, thalamus contributes to fruit formation ?
 (A) Mango (B) Sapota
 (C) Strawberry (D) Orange
- 50) In vasectomy, a small part of which of the following is cut for sterilisation ?
 (A) Vas deferens (B) Urethra
 (C) Vasa efferentia (D) Rete Testis

Time : 2 Hours]

PART - B

[Total Marks : 50

Section - A

◆ Write the answer of any 8 questions from given question number 1 to 12. (Each of 2 marks) [16]

- 1) Explain - Geitonogamy and Xenogamy
- 2) What is sexually Transmitted infections ? Give simple principles to control it.
- 3) Write short note - Phenylketonuria
- 4) Give the successive steps for DNA - finger printing technique.
- 5) Draw only neat and labelled diagram of S.L. Miller's experiment.
- 6) What is withdrawal syndrome ? Give their symptoms.
- 7) How the first antibiotic was discovered ? Explain it.
- 8) Explain four basic processes for population density. (Figure is not required)
- 9) Define Gross primary productivity and Net primary productivity.
- 10) Draw the labelled diagram of typical anatropus ovule.
- 11) When medical termination of pregnancy is needed ?
- 12) Explain the Brood parasitism in birds.

Section - B

◆ Write the answer of any 6 questions from given question number 13 to 21. (Each of 3 marks) [18]

- 13) Explain the ex situ conservation.
- 14) Define decomposition and Describe the processes of decomposition. (Diagram is not required)

- 15) What is gene therapy ? Illustrate using the example of adenosine deaminase (ADA) deficiency.
- 16) Explain a typical biogas plant with diagram.
- 17) Illustrate the chart of Replication of retrovirus.
- 18) Explain - adaptive radiation.
- 19) Give the salient features of genetic code.
- 20) Explain the internal structure of testis (Figure is not essential).
- 21) What are cry proteins ? Name an organism that produce it. How has man exploited this protein to his benefit ?

Section - C

- ◆ Write the answer of any 4 questions from given question number 22 to 27. (Each of 4 marks) [16]
- 22) Describe out breeding devices in angiospermic plants.
 - 23) Describe the process of formation of mature gamete in female. (Figure is not required)
 - 24) Describe the inheritance of two genes with chart in garden pea.
 - 25) Explain the process of transcription in bacteria. (Diagram is essential)
 - 26) Describe Lymphoid organs.
 - 27) Describe briefly the following. (Diagram is not required)

- (i) Simple stirred-tank bioreactor
- (ii) Downstream processing