

Time : 1 Hour]

PART - A

[Total Marks : 50

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

- 1) A plant seed germinated after 10,000 years of dormancy is....  
(A) Lupine (B) Banyan (C) Orchid (D) Striga
- 2) Pollen of which plant is long and ribbon like ?  
(A) Wind pollinated (B) Insect pollinated  
(C) Water pollinated (D) Bird pollinated
- 3) In which ecological pyramid small standing crop of phytoplankton supports large standing crop of zooplankton ? [March-2023]  
(A) Straight pyramid of biomass  
(B) Inverted pyramid of biomass  
(C) Straight pyramid of energy  
(D) Straight pyramid of number
- 4) Which option shows correctly matched pairs of Column-I and Column-II ? [March-2023]

Column-I	Column-II
(P) Natural method	(i) Cervical caps
(Q) Barrier method	(ii) Hormone releasing IUD
(R) Multiload 375	(iii) Coitus interruptus
(S) LNG-20	(iv) Non medicated IUD
	(v) Copper releasing IUD

- |         |    |    |    |
|---------|----|----|----|
| P       | Q  | R  | S  |
| (A) i   | iv | v  | ii |
| (B) iii | iv | ii | v  |
| (C) iii | i  | v  | ii |
| (D) iv  | i  | v  | ii |
- 5) Choose the correct option for given statements.
    - (i) In western countries a large number of pollen product in form of syrup are available in the market.
    - (ii) In rice, pollen grain loss viability after 30 months of their release.
    - (iii) Pollen grain are stored at room temperature for sowing in next season by farmers.
    - (iv) After bursting seeds of wheat and rice, pollen grains get scattered by wind at far of places. [March-2023]

(A) (i) true (B) (i) and (ii) true  
(C) (i), (ii) and (iv) true (D) (i), (iii) and (iv) true

- 6) Select the correct option for containing the antibiotic resistance genes in E-coli cloning vector pBR 322. [March-2023]  
(A) Hind III, amp<sup>R</sup> (B) Bam HI, Sal I  
(C) amp<sup>R</sup>, tet<sup>R</sup> (D) Pvu II, tet<sup>R</sup>
- 7) Select correct sequence for the process of VNTR technique. [March-2023]  
X = Hybridisation using labelled VNTR probe  
Y = Digestion of DNA by restriction endonucleases.  
Z = Transferring (blotting) of separated DNA fragments to synthetic membrane, such as nitrocellulose.  
(A) X → Z → Y (B) Z → X → Y  
(C) Y → Z → X (D) Y → X → Z
- 8) When emergency contraceptive could be used ? [March-2023]  
(A) within 72 hours before secondary oocyte release.  
(B) 72 hours before coitus.  
(C) within 72 hours of coitus.  
(D) 72 hours before menstrual cycle start.
- 9) The discovery of blood circulation by which scientist ? [March-2023]  
(A) William Harvey (B) Carl Landstiner  
(C) Norman Barlog (D) George Gamow
- 10) The first human hormone produced by recombinant DNA technology is ..... [March-2023]  
(A) Estrogen (B) Insulin  
(C) Thyroxin (D) Progesterone
- 11) To cure ADA deficiency as a first step towards gene therapy, which cells from the blood of the patient are grown in culture outside the body ? [March-2023]  
(A) RBCs (B) WBCs  
(C) Lymphocytes (D) Platelets
- 12) Assertion-A and Reason-R,  
Assertion-A : Smoking increases the blood pressure and heart beat rate  
Reason-R : Nicotin stimulates adrenal gland [March-2023]

- (A) Assertion 'A' is correct and Reason 'R' is not correct.  
 (B) Assertion 'A' and Reason 'R' both are correct but 'R' is explanation of 'A'.  
 (C) Assertion 'A' is not correct but Reason 'R' is correct.  
 (D) Assertion 'A' and Reason 'R' both are correct but 'R' is not correct explanation of 'A'.

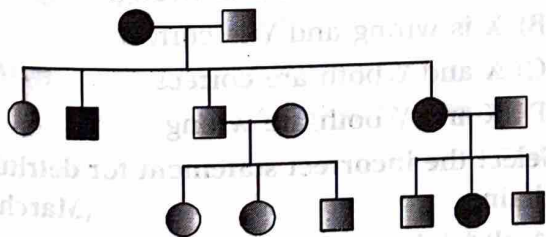
13) Among the statements given below which statement is correct on the basis of observation of Ernst Heckel ? [March-2023]

- (A) Homologous structures are a result of convergent evolution.  
 (B) During embryonic stage common to all vertebrates that are absent in adult.  
 (C) Similarities in proteins and genes performing a given function among diverse organisms.  
 (D) Embryos never pass through the adult stages of other animals.

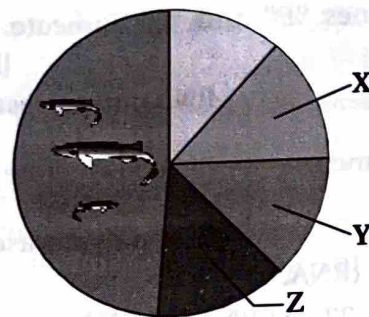
14) In a population of 1000 individuals 490 belong to genotype MM, 420 to Mm and remaining to mm. Based on this data, the frequency of allele m in the population is ..... [March-2023]

- (A) 0.3 (B) 4.9 (C) 4.2 (D) 0.6
- 15) ..... is a first step of sewage treatment. [March-2023]

- (A) Formation of activated sludge  
 (B) Chlorination  
 (C) Aeration by force  
 (D) Filtration and sedimentation
- 16) Study the given chart of pedigree, select the correct option for it. [March-2023]

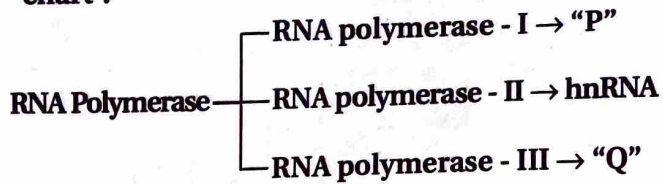


- (A) Autosomal Dominant  
 (B) Autosomal Recessive  
 (C) X-linked Dominant  
 (D) X-linked recessive
- 17) According to representing global biodiversity proportionate number of species of major taxa of vertebrates, select appropriate option for label of X, Y, and Z in given figure. [March-2023]



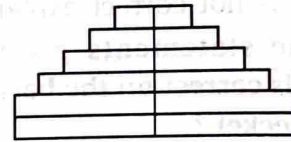
- (A) X-Amphibians, Y-Birds, Z-Mammals  
 (B) X-Bird, Y-Amphibians, Z-Reptiles  
 (C) X-Reptiles, Y-Amphibians, Z-Birds  
 (D) X-Mammals, Y-Birds, Z-Amphibians
- 18) Which of the following is false regarding male sterilization ?
- (A) The vas deferens is cut and ligated  
 (B) Sperm is secreted without spermatocytes  
 (C) Spermatogenesis is inhibited  
 (D) Testes do not contain spermatozoa
- 19) Identify the free-living bacteria which can fix atmospheric nitrogen in the soil. [March-2023]
- (A) Staphylococci (B) Bt  
 (C) Azospirillum (D) Rhizobium
- 20) Which types of interaction is found between fungi and the roots of higher plants ? [March-2023]
- (A) Parasitism (B) Mutualism  
 (C) Commensalism (D) Competition
- 21) Which of the following is not a step of downstream processing ? [March-2023]
- (A) Separation (B) Purification  
 (C) Preservation (D) Expression
- 22) In Bt-cotton, the Bt-toxin present in plant tissue as pro-toxin is converted into active toxin due to... [March-2023]
- (A) Acidic pH of insect gut  
 (B) Action of gut micro-organisms  
 (C) Alkaline pH of insect gut  
 (D) Presence of Neutral pH in insect gut
- 23) While examining a patient, following symptoms can be seen :
- (i) Chronic inflammation shown in a lymphatic vessels of the lower limbs.  
 (ii) Genital organs are also affected so, doctor diagnosed disease is [March-2023]
- (A) Ascariasis (B) Filariasis  
 (C) Amoebiasis (D) Ringworm

- 24) What does "P" and "Q" indicate in the given chart ? [March-2023]



- (A) P = tRNA, 18s, 5.8s  
Q = 28s, snRNA, hnRNA
- (B) P = mRNA, 18s, 28s  
Q = rRNA, 8.5s, hnRNA
- (C) P = tRNA, snRNAs, 18s  
Q = 28s, 18s, 5.8s
- (D) P = 28s, 18s, 5.8s  
Q = tRNA, 5srRNA, snRNAs
- 25) For what aminocentesis is done for ?
- (A) To test for chromosomal abnormalities
- (B) To test caste
- (C) To test for chromosomal abnormalities and to test for race
- (D) To test for chromosomal abnormalities or to test for race
- 26) Trichoderma is a [March-2023]
- (A) Protozon (B) Fungus
- (C) Bryophytes (D) Blue green algae
- 27) Statement-A : Caspian a subspecies of tiger is one of the recently extinct.  
Reason-R : The colonisation of tropical pacific Islands by human. [March-2023]
- (A) Statement (A) and Reason (R) both are true, (R) is a right explanation of statement (A)
- (B) Statement (A) and Reason (R) both are true but (R) is not right explanation of (A)
- (C) Statement (A) is right but Reason (R) is wrong
- (D) Statement (A) is wrong but Reason (R) right
- 28) For Genetic code, choose the correct option for given statements. Where T-stands for true and F stands for False. [March-2023]
- (1) Phenylalanine (phe.) amino acid is coded by more than three codons.
- (2) The codon is read in t-RNA in a contiguous fashion.
- (3) UUC would code for phenylalanine.
- (4) AUG codes for Methionine.
- (A) FTFT (B) TTFT (C) FTTF (D) FFTT

- 29) What is the correct chromosome composition in a Karyotype of Klinefelter's syndrome ? [March-2023]
- (A) 22AA + XXY (B) 22AA + XO
- (C) 22AA + XXX (D) 22AA + XY
- 30) A given figure of age pyramid for human population indicate ? [March-2023]



- (A) Expanding human population
- (B) Stable human population
- (C) Declining human population
- (D) Expanding - Declining human population
- 31) Sex chromosomes found in birds .....
- (A) ZW (B) ZZ
- (C) ZO (D) (A),(B) both
- 32) E.coli that has only  $4.6 \times 10^6$  bp, During the process of replication average rate of polymerisation has to be approximately ..... per second. [March-2023]
- (A) 5000 bp (B) 7000 bp
- (C) 2000 bp (D) 9000 bp
- 33) Select correct options for the given statement :
- X - Formation of hemoglobin controlled by two closely linked genes HBA<sub>1</sub> and HBA<sub>2</sub> on chromosome 16 of each parent.
- Y - "β" Thalassemia is controlled by a single gene HBB on chromosome 21 of each parent. [March-2023]
- (A) X is correct and Y is wrong
- (B) X is wrong and Y is correct
- (C) X and Y both are correct
- (D) X and Y both are wrong
- 34) Select the incorrect statement for detritus food chain. [March-2023]
- (A) It begins with dead organic matter.
- (B) Bacteria meet their nutrient requirements by degrading dead organic matter.
- (C) Decomposers secrete digestive enzymes.
- (D) Complex organic materials is formed from waste materials by decomposers.
- 35) Find out the mismatched according to comparative morphology. [March-2023]

- (A) Thorn of Bougainvillea and Tendrils of Cucurbita.  
 (B) Flippers of penguins and Dolphins.  
 (C) Forelimb of Human and Cheetah.  
 (D) Fins of Whale and wing of Bat.

36) Which of the following is target sequences for ECORI ? [March-2023]

- (A) 5'GAATTC 3' (B) 5'GAGCTC 3'  
 (C) 5'AAGCTT 3' (D) 5'GATATC 3'

37) Which of the following is correct order steps in PCR ? [March-2023]

- (A) Extension → Denaturation → Annealing  
 (B) Denaturation → Extension → Annealing  
 (C) Annealing → Denaturation → Extension  
 (D) Denaturation → Annealing → Extension

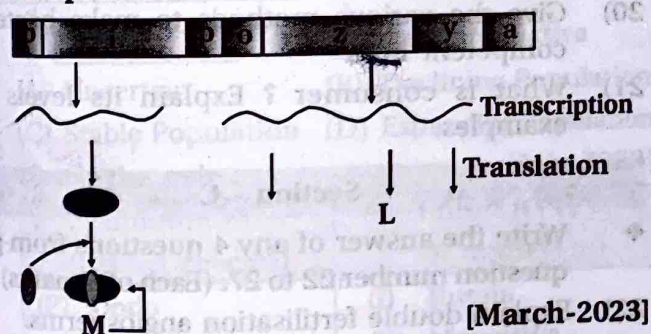
38) Which one following is not a mendelian disorders ? [March-2023]

- (A) Cystic Fibrosis (B) Ascariasis  
 (C) Phenyl Ketonuria (D) Sickle Cell anaemia

39) Insertions of one or two bases of DNA causes ..... [March-2023]

- (A) Frame shift insertion (B) Point mutations  
 (C) Deletion mutations (D) Probe mutations

40) For Select the correct option for given diagram and past labelled as "L" and "M" in it.



- (A) L = Transacetylase, M = Repressor mRNA  
 (B) L = Permease, M = Inactive repressor  
 (C) L =  $\beta$ -Galactosidase, M = Repressor mRNA  
 (D) L = lac mRNA, M = inducer

41) Statement-A : It is right to ignore the important role of Banyan tree in society.

Statement-R : The population density of banyan trees is very low relative to the proportion of carrot grass.

- (A) Both A and R are correct.  
 (B) A is true, R is wrong.  
 (C) A is correct and R is its correct reason.  
 (D) A is correct but R is not true reason for it.

42) In human, fertilisation is possible only when, [March-2023]

- (A) The haploid ovum (ootid) release from ovary and insemination to vaginal orifice at the same time.  
 (B) Haploid ovum (ootid) enter into the fallopian tube and sperm enter into uterus at the same time.  
 (C) Ovum and sperm enter into uterus at the same time.  
 (D) Ovum and sperm are transported simultaneously to the ampullary region.

43) Connect the appropriate joints.

Column - 1	Column - 2
(M) Competition	(Q) flower-insect
(N) Parasite	(R) flamingo-fish
(O) Commensalism	(S) dog-tick
(P) Mutualism	(T) sea anemone-clown fish

- (A) M - R, N - S, O - Q, P - T  
 (B) M - R, N - S, O - T, P - Q  
 (C) M - S, N - T, O - Q, P - R  
 (D) M - S, N - T, O - R, P - Q

44) Choose the correct option for showing right arrangement of different wall layers from sporogenous tissue to perepheral are in T S of young anther. [March-2023]

- (A) Epidermis, Middle layer, Endothecium, Tapetum  
 (B) Tapetum, Endothecium, Middle layer, Epidermis  
 (C) Epidermis, Endothecium, Middle layer, Tapetum  
 (D) Tapetum, Middle layer, Endothecium, Epidermis

45) Which method is used by doctor to inject sperm directly in to the ovum ? [March-2023]

- (A) ICSI (B) GIFT (C) IUI (D) ET

46) What is the reason of extinctions of steller's-sea-cow ? [March-2023]

- (A) Co-extinctions (B) Alien species invasion  
 (C) Over-exploitation (D) Habitat loss

47) Which of the following option is not correct for pollen grain ? [March-2023]

- (A) Exine is made up of sporopollenin.  
 (B) Pollen grain is measuring about 25-50 micrometers in diameter.

- (C) Pollen grain exine has prominent apertures called germ pore.  
 (D) When pollen grain is mature it contains two cells, the vegetative cell and male gamete.
- 48) During which days of menstrual cycle, secretion of LH from pituitary leading to its maximum level. [March-2023]  
 (A) 1 to 5 days (B) 13 to 15 days  
 (C) 19 to 23 days (D) 25 to 28 days
- 49) In vasectomy, initially, [March-2023]

- (A) removal of Rate testis.  
 (B) a small incision on the middle part of testis.  
 (C) an incision on upper part of the abdominal region.  
 (D) a small incision on the scrotum.
- 50) Identify the barrier of innate immunity in which virus infected cells secrete proteins called interferons. [March-2023]  
 (A) Physical barriers (B) Physiological barriers  
 (C) Cellular barriers (D) Cytokine barriers

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) When mammals took over this earth? Write the characters and continental drift of the mammals of that time. [March-2023]
  - 2) Differentiate between : Endospermic and Non-Endospermic seed.
  - 3) State a source and uses of statins and cyclosporin-A. [March-2023]
  - 4) What is polyembryony and how can it be commercially exploited?
  - 5) Explain : Terminal method to prevent pregnancy.
  - 6) Energy flow is unidirectional in ecosystem - explain. [March-2023]
  - 7) Write short note on Biochemical characterisation of Transforming Principle.
  - 8) Lymph nodes are secondary lymphoid organs. Explain the role of lymph nodes in our immune response.
  - 9) Why is protection of traditional knowledge necessary?
  - 10) If a population growing exponentially double in size in 3 years, what is the intrinsic rate of increase ( $r$ ) of the population?
  - 11) Write short notes on : Sacred grooves
  - 12) How is sex determined in Honey bee?

## Section - B

- ❖ Write the answer of any 6 questions from given question number 13 to 21. (Each of 3 marks) [18]
- 13) Write a note on male accessory glands.
  - 14) Explain the importance of biological production obtained from animal in which foreign gene is introduced. [March-2023]

- 15) In eukaryotes, explain splicing and tailing (figure is not necessary). [March-2023]
- 16) Among the reasons of biodiversity loss, how does extinction of indigenous species is carried out by invasion of alien species? Explain. [March-2023]
- 17) State the theory of abiogenesis. How does Miller's experiment support this theory?
- 18) Give the name and characters of the disease caused by *Antamoeba histolytica*, *Trichophyton* and *wuchereria* in human.
- 19) How are microbes useful in industrial production of chemicals, enzymes and other bioactive molecules?
- 20) Give the various methods to make bacteria a competent host.
- 21) What is consumer? Explain its levels with examples.

## Section - C

- ❖ Write the answer of any 4 questions from given question number 22 to 27. (Each of 4 marks) [16]
- 22) Explain double fertilisation angiosperms.
  - 23) Mention salient features of human genome.
  - 24) Describe about the exaggerated response of immune system to certain antigens present in the environment. [March-2023]
  - 25) In Oogenesis, describe the process between primary follicle formation to ovulation (chart is necessary). [March-2023]
  - 26) During monohybrid experiment, in  $F_2$  generation the Ratio of phenotype and genotype remain same - explain by giving suitable example. (chart is necessary). [March-2023]
  - 27) How will make separation and isolation of DNA fragments by using gel electrophoresis? [March-2023]

