

Time allowed: 45 minutes

Maximum Marks: 200

*General Instructions: Same as Practice Paper-1.***Choose the correct option:**

1. A few statements with regard to sexual reproduction are given below.

- (i) Sexual reproduction always require two individuals
- (ii) Sexual reproduction generally involves gametic fusion
- (iii) Meiosis never occurs during sexual reproduction
- (iv) External fertilisation is a rule during sexual reproduction

Choose the correct statements from the options below.

- (a) (i) and (iv) (b) (i) and (ii) (c) (ii) and (iii) (d) (i) and (iv)
2. After fertilisation, _____ forms the pericarp.
- (a) cotyledons (b) ovary wall
- (c) scutellum (d) outer integument
3. Match the items in column I with the items in column II.

Column I	Column II
(A) Remains of nucellus in a seed	(1) Scutellum
(B) Formation of seed without fertilisation	(2) Perisperm
(C) Cotyledon in the seeds of grasses	(3) Polyembryony
(D) Occurrence of more than one embryo in a seed	(4) Apomixis

- (a) A—1, B—2, C—3, D—4 (b) A—2, B—1, C—4, D—3
- (c) A—2, B—4, C—1, D—3 (d) A—4, B—3, C—1, D—2
4. Which of the following statements is correct about majority of angiosperms?
- (a) Egg has five antipodal cells.
- (b) Reduction division occurs in the megaspore mother cells.
- (c) A small central cell is present in the embryo sac.
- (d) Egg has filiform apparatus.
5. A dioecious flowering plant prevents both
- (a) autogamy and geitonogamy (b) autogamy and xenogamy
- (c) cleistogamy and xenogamy (d) geitonogamy and xenogamy

6. The immature male germ cells undergo division to produce sperms by the process of spermatogenesis. Choose the correct one with reference to above.
 - (a) Spermatogonia have 46 chromosomes and always undergo meiotic cell division.
 - (b) Primary spermatocytes divide by mitotic cell division.
 - (c) Secondary spermatocytes have 23 chromosomes and undergo second meiotic division.
 - (d) Spermatozoa are transformed into spermatids.
7. Number of chromosomes in polar body of human is
 - (a) 23
 - (b) 46
 - (c) 21
 - (d) 1
8. Which of the following hormones is not secreted by human placenta?
 - (a) hCG
 - (b) Estrogen
 - (c) Progesterone
 - (d) LH
9. The vas deferens receives duct from the seminal vesicle and opens into urethra as
 - (a) epididymis
 - (b) ejaculatory duct
 - (c) efferent ductule
 - (d) ureter
10. Increased IMR and decreased MMR in a population will
 - (a) cause rapid increase in growth rate.
 - (b) result in decline in growth rate
 - (c) not cause significant change in growth rate.
 - (d) result in an explosive population
11. If a genetic disease is transferred from a phenotypically normal but carrier female to only some of the male progeny, the disease is
 - (a) autosomal dominant
 - (b) autosomal recessive
 - (c) sex-linked dominant
 - (d) sex-linked recessive
12. A cross between two tall plants resulted in offspring having few dwarf plants. What would be the genotypes of both the parents?
 - (a) TT and Tt
 - (b) Tt and Tt
 - (c) TT and TT
 - (d) Tt and tt
13. It is said that Mendel proposed that the factor controlling any character is discrete and independent. His proposition was based on the
 - (a) results of F_1 generation of a cross
 - (b) observations that the offspring of a cross made between the plants having two contrasting characters shows only one character without any blending
 - (c) self-pollination of F_1 offsprings
 - (d) cross-pollination of F_1 generation with recessive parent
14. Which of the following represents a pair of contrasting characters?
 - (a) Allele (or allelomorphs)
 - (b) Phenotype
 - (c) Homozygous
 - (d) Heterozygous
15. Which of the following acts as vehicle of genetic material?
 - (a) Nucleosome
 - (b) Centrosomes
 - (c) Ribosomes
 - (d) Chromosomes
16. DNA is a polymer of nucleotides which are linked to each other by $3' \rightarrow 5'$ phosphodiester bond. To prevent polymerisation of nucleotides, which of the following modifications would you choose?
 - (a) Replace purine with pyrimidines
 - (b) Remove/replace $3'$ OH group in deoxyribose
 - (c) Remove/replace $2'$ OH group with some other group in deoxyribose
 - (d) Both (b) and (c)

- 17. Which of the following statements is correct about the role of regulatory proteins in transcription in prokaryotes?**
 (a) They only increase expression.
 (b) They only decrease expression.
 (c) They interact with RNA polymerase but do not affect the expression.
 (d) They can act both as activators and as repressors.
- 18. While analysing the DNA of an organism a total number of 5386 nucleotides were found, out of which the proportion of different bases were: Adenine = 29%, Guanine = 17%, Cytosine = 32%, Thymine = 17%. Considering the Chargaff's rule it can be concluded that**
 (a) it is a double stranded circular DNA. (b) it is single stranded DNA.
 (c) it is a double stranded linear DNA. (d) no conclusion can be drawn.
- 19. If Meselson and Stahl's experiment is continued for four generations in bacteria, the ratio of N^{15}/N^{15} : N^{15}/N^{14} : N^{14}/N^{14} containing DNA in the fourth generation would be**
 (a) 1 : 1 : 0 (b) 1 : 4 : 0
 (c) 0 : 1 : 3 (d) 0 : 1 : 7
- 20. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is: 5' - A T G A A T G - 3', the sequence of bases in its RNA transcript would be**
 (a) 5' - A U G A A U G - 3' (b) 5' - U A C U U A C - 3'
 (c) 5' - C A U U C A U - 3' (d) 5' - G U A A G U A - 3'
- 21. Which of the following organs are homologous?**
 (a) Forelimbs of man and wings of bat (b) Wings of bat and bird
 (c) Wings of bat and petrodactyl (d) None of these
- 22. Palaentological evidences for evolution refer to the**
 (a) development of embryo (b) homologous organs
 (c) fossils (d) analogous organs.
- 23. Which one of the following scientist's name is correctly matched with the theory put forth by him?**
 (a) de Vries – Natural selection (b) Mendel – Theory of Pangenesis
 (c) Weismann – Theory of continuity of germplasm (d) Pasteur – Inheritance of acquired characters
- 24. In malignant tumors, the cells proliferate, grow rapidly and move to other parts of the body to form new tumors. This stage of disease is called**
 (a) metagenesis (b) metastasis
 (c) teratogenesis (d) mitosis
- 25. Antibodies present in colostrum which protect the newborn from certain diseases is of**
 (a) Ig G type (b) Ig A type
 (c) Ig D type (d) Ig E type
- 26. Haemozoin is a**
 (a) precursor of hemoglobin
 (b) toxin released from *Streptococcus* infected cells
 (c) toxin released from *Plasmodium* infected cells
 (d) toxin released from *Haemophilus* infected cells
- 27. One of the unique features of adaptive immunity is**
 (a) discrimination between self and non-self (b) interferons
 (c) inflammatory response (d) monocytes

- 28. Which one of the following is not a fungal disease?**
 (a) Rust of wheat (b) Smut of Bajra
 (c) Black rot of crucifers (d) Red rot of sugarcane
- 29. In virus-infected plants the meristematic tissues in both apical and axillary buds are free of virus because**
 (a) the dividing cells are virus resistant.
 (b) meristems have anti viral compounds.
 (c) the cell division of meristems are faster than the rate of viral multiplication.
 (d) Viruses cannot multiply within meristem cell(s).
- 30. Several South Indian states raise 2-3 crops of rice annually. The agronomic feature that makes this possible is because of**
 (a) shorter rice plant (b) better irrigation facilities
 (c) early yielding rice variety (d) disease resistant rice variety
- 31. Match the following list of bioactive substances and their roles**
- | Bioactive Substance | Role |
|---------------------|--|
| A. Statin | (i) Removal of oil stains |
| B. Cyclosporin A | (ii) Removal of clots from blood vessels |
| C. Streptokinase | (iii) Lowering of blood cholesterol |
| D. Lipase | (iv) Immuno-suppressive agent |
- Choose the correct match.**
 (a) A—(ii), B—(iii), C—(i), D—(iv) (b) A—(iv), B—(ii), C—(i), D—(iii)
 (c) A—(iv), B—(i), C—(ii), D—(iii) (d) A—(iii), B—(iv), C—(ii), D—(i)
- 32. The free-living fungus *Trichoderma* can be used for**
 (a) insects (b) biological control of plant diseases
 (c) controlling butterfly caterpillars (d) producing antibiotics
- 33. Which of the following is commonly called Brewer's yeast?**
 (a) *Saccharum barberi* (b) *Saccharomyces cerevisiae*
 (c) *Streptococcus* (d) *Trichoderma*
- 34. The role of DNA ligase in the construction of a recombinant DNA molecule is**
 (a) formation of phosphodiester bond between two DNA fragments
 (b) formation of hydrogen bonds between sticky ends of DNA fragments
 (c) ligation of all purine and pyrimidine bases
 (d) None of the above
- 35. Which of the following steps are catalysed by *Taq* DNA polymerase in a PCR reaction?**
 (a) Denaturation of template DNA
 (b) Annealing of primers to template DNA
 (c) Extension of primer end on the template DNA
 (d) All of the above
- 36. Which of the following should be chosen for best yield if one were to produce a recombinant protein in large amounts?**
 (a) Laboratory flask of largest capacity
 (b) A stirred-tank bioreactor without in-lets and out-lets
 (c) A continuous culture system
 (d) Any of the above

37. Which of the following statements does not hold true for restriction enzyme?
- It recognises a palindromic nucleotide sequence.
 - It is an endonuclease.
 - It is isolated from viruses.
 - It can produce the same kind of sticky ends in different DNA molecules.
38. The first clinical gene therapy was done for the treatment of
- AIDS
 - Cancer
 - Cystic fibrosis
 - SCID (Severe Combined Immuno Deficiency resulting from deficiency of ADA)
39. Insect resistant transgenic cotton has been produced by inserting a piece of DNA from
- an insect
 - a bacterium
 - a wild relative of cotton
 - a virus
40. _____ is not allowed to take place in case of RNAi employed in making tobacco plants resistant to nematode.
- Translation of mRNA
 - Replication of DNA
 - Reverse transcription
 - Transcription of mRNA
41. An association of individuals of different species living in the same habitat and having functional interactions is
- biotic community
 - ecological niche
 - ecosystem
 - population
42. $\frac{dN}{dt} = rN\left\{\frac{K-N}{K}\right\}$
- What does 'r' represent in the above equation?
- Population density at time 't'
 - Intrinsic rate of natural increase
 - Carrying capacity
 - The base of natural logarithm
43. Adaptations to avoid unfavourable conditions in time include
- aestivation
 - hibernation
 - diapause
 - all of the above
44. An inverted pyramid of biomass can be found in which ecosystem?
- Forest
 - Marine
 - Grassland
 - Tundra
45. What is the difference between a community or group of communities and an ecosystem?
- A community and the abiotic environment comprise an ecosystem.
 - An ecosystem is a type of community.
 - A biome includes only the plant community or communities present in an environment.
 - An ecosystem includes only the abiotic aspects of a particular environment.
46. Which of the following ecosystems is most productive in terms of net primary production?
- Deserts
 - Tropical rain forests
 - Oceans
 - Estuaries
47. Sacred groves are especially useful in
- generating environmental awareness
 - preventing soil erosion
 - year-round flow of water in rivers
 - conserving rare and threatened species

- 48. Which of the following statements are correct about the Amazon rainforest ?**
1. In this rainforest there might be at least two million insects species waiting to be discovered and named.
 2. This forest is known as lungs of the planet.
 3. In this forest digging of mine is performed by dynamite.
 4. This forest is destroyed for the cultivation of soyabeans.
 5. This forest contains world famous biodiversity.
- (a) 1, 2, 4 and 5 (b) 1, 2, 3 and 4
(c) 2, 3 and 4 (d) 3 and 4
- 49. Non-biodegradable pollutants are created by**
- (a) nature (b) excessive use of resources
(c) humans (d) natural disasters
- 50. Compressed Natural Gas (CNG) is**
- (a) propane (b) methane
(c) ethane (d) butane



Answers

PRACTICE PAPER – 4

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|---------|---------|---------|---------|---------|---------|---------|
| 1. (b) | 2. (b) | 3. (c) | 4. (b) | 5. (a) | 6. (c) | 7. (a) |
| 8. (d) | 9. (b) | 10. (c) | 11. (d) | 12. (b) | 13. (b) | 14. (a) |
| 15. (d) | 16. (b) | 17. (d) | 18. (b) | 19. (d) | 20. (a) | 21. (a) |
| 22. (c) | 23. (c) | 24. (b) | 25. (b) | 26. (c) | 27. (a) | 28. (c) |
| 29. (c) | 30. (c) | 31. (d) | 32. (b) | 33. (b) | 34. (a) | 35. (c) |
| 36. (c) | 37. (c) | 38. (d) | 39. (b) | 40. (a) | 41. (a) | 42. (b) |
| 43. (d) | 44. (b) | 45. (a) | 46. (b) | 47. (d) | 48. (a) | 49. (c) |
| 50. (b) | | | | | | |