

Time allowed: 45 minutes

Maximum Marks: 200

General Instructions: Same as Practice Paper-1.

Choose the correct option:

1. Which of the following statements, support the view that elaborate sexual reproductive process appeared much later in the organic evolution.
- (i) Lower groups of organisms have simpler body design.
 - (ii) Asexual reproduction is common in lower groups.
 - (iii) Asexual reproduction is common in higher groups of organisms.
 - (iv) The high incidence of sexual reproduction in angiosperms and vertebrates.

Choose the correct answer from the options given below:

- (a) (i) and (iii)
 - (b) (i) and (ii)
 - (c) (ii) and (iv)
 - (d) (ii) and (iii)
2. After triple fusion, the central cell becomes the
- (a) central endosperm cell
 - (b) zygote
 - (c) primary endosperm cell
 - (d) embryo
3. How many megaspores are functional after megasporogenesis?
- (a) Four
 - (b) Three
 - (c) One
 - (d) Two
4. To produce 20,000 pollen grains, how many microspore mother cells will be required?
- (a) 10,000
 - (b) 15,000
 - (c) 20,000
 - (d) 5000
5. 'Corn cobs have long tassels'. This is because
- (a) they can easily trap the air-borne pollen grains.
 - (b) they are useful in protecting the pollen grains from wetting.
 - (c) they can easily attract insects.
 - (d) it helps them to reach the surface of water which helps them to get pollinated by insects.
6. Choose the odd one out.
- (a) Rete testis
 - (b) Vasa efferentia
 - (c) Vas deferens
 - (d) Ampulla
7. Temperature in scrotum necessary for sperm formation should be
- (a) 4°C lower than body temperature
 - (b) 2°C lower than body temperature
 - (c) 4°C above body temperature
 - (d) 2°C above body temperature
8. Common duct formed by union of vas deferens and duct from seminal vesicle is
- (a) ejaculatory duct
 - (b) epididymis
 - (c) urethra
 - (d) spermatic duct

9. **Seminal plasma of human is rich in**
 (a) fructose and magnesium (b) glucose and calcium
 (c) fructose and calcium (d) glucose and sodium
10. **Medical Termination of Pregnancy is safe up to**
 (a) 8 weeks of pregnancy (b) 12 weeks of pregnancy
 (c) 18 weeks of pregnancy (d) 24 weeks of pregnancy
11. **A hybrid red coloured plant was selfed and 1600 seeds were produced. How many will be red in colour?**
 (a) 1200 (b) 1600 (c) 800 (d) 400
12. **X-linked traits are inherited from mother to**
 (a) son (b) daughter (c) both (a) and (b) (d) none of these
13. **Which of the following statements is false?**
 (a) Crossing the F_1 hybrid with a homozygous recessive individual is called test cross.
 (b) For sex-linked traits, reciprocal crosses don't give the same result.
 (c) Test cross distinguishes homozygosity and heterozygosity of a trait.
 (d) None of these
14. **If Mendel had studied the 7 traits using a plant with 12 chromosomes instead of 14, how could have his interpretations varied?**
 (a) He would have not discovered law of segregation.
 (b) He would not have discovered law of independent assortment.
 (c) Both (a) and (b)
 (d) None of the above
15. **Which one of the following statements is correct?**
 (a) Homozygous sex chromosomes (ZZ) determine female sex in birds.
 (b) XO type of sex chromosomes determine male sex in grasshopper.
 (c) XO condition in human as found in Turner's syndrome determine female sex.
 (d) Homozygous sex chromosomes (XX) produce male in *Drosophila*.
16. **Khorana synthesised a RNA molecule with repeating sequence of UG nitrogen bases (UGUGUGUGUGUG). It produced a tetrapeptide with alternating sequence of cysteine and valine. It proves that codon for cysteine and valine, respectively is**
 (a) UGG and GUU (b) UUG and GGU (c) UGU and GUG (d) GUG and UGU
17. **The genetic information is carried by long chain molecules of**
 (a) enzymes (b) amino acids (c) nucleotides (d) chromosomes
18. **In order to enable a chemical to serve as a genetic code, it is essential that chemical should be**
 (a) able to duplicate itself (b) able to form itself into long spiral molecules
 (c) a compound of pyrimidines and purines (d) easily changed
19. **In protein synthesis, the codon used as a start signal is**
 (a) AUG (b) UGA
 (c) GUA (d) UAG
20. **In an operon, the RNA polymerase binds to**
 (a) regulator (b) promotor gene
 (c) operator gene (d) constitutive gene
21. **Which of the following exhibit convergent evolution?**
 (a) Flippers of penguins and dolphins (b) Eyes of octopus and mammals
 (c) Sweet potato and potato tubers (d) All of the above

22. The common ancestor of the great apes and man is
 (a) *Homo habilis* (b) *Australopithecus* (c) *Homo erectus* (d) *Ramapithecus*
23. Darwin's finches are an excellent example of
 (a) divergent evolution (b) adaptive selection (c) connecting link (d) both (a) and (b)
24. A protozoan parasite, *Entamoeba histolytica* which causes amoebiasis is present in the _____ of humans.
 (a) spleen (b) large intestine (c) lymphoid organs (d) liver
25. The function of helper T-cells is to
 (a) stimulate B-cells (b) kill the antigen (c) kill the antibodies (d) suppress B-cells
26. Which one of the following is not true during excessive intake of alcohol?
 (a) Decreased reaction time (b) Blurred vision
 (c) Impaired judgement (d) Lack of alertness
27. Which of the following organs of the body enlarges during malaria ?
 (a) Liver (b) Spleen (c) RBC (d) Kidney
28. Outbreeding means
 (a) breeding in non-breeding season
 (b) breeding in laboratory conditions and not in natural environments
 (c) breeding between two different species
 (d) None of these
29. Which of the following can be used as single cell protein?
 (a) *Amoeba* (b) *Streptococcus*
 (c) *Spirulina* (d) None of these
30. Crop plants grown in monoculture are
 (a) low yielding (b) highly prone to pest
 (c) characterised by poor root system (d) free from intraspecific competition
31. Match the items in Column 'A' and Column 'B' and choose correct answer.
- | Column I | Column II |
|-----------------------|-----------------------------|
| A. Lady bird | (i) <i>Methanobacterium</i> |
| B. Mycorrhiza | (ii) <i>Trichoderma</i> |
| C. Biological control | (iii) Aphids |
| D. Biogas | (iv) <i>Glomus</i> |
- The correct answer is:
 (a) A—(ii), B—(iv), C—(iii), D—(i) (b) A—(iii), B—(iv), C—(ii), D—(i)
 (c) A—(iv), B—(i), C—(ii), D—(iii) (d) A—(iii), B—(ii), C—(i), D—(iv)
32. Biogas is produced by
 (a) aerobic breakdown of biomass (b) anaerobic breakdown of biomass
 (c) with the help of methanogenic bacteria (d) both (b) and (c)
33. Which of the following is true of Biological Oxygen Demand (BOD)?
 (a) The greater the BOD of a waterbody, more is its polluting potential.
 (b) BOD is the measure of uptake of oxygen by the microbes in the water sample.
 (c) It indicates the amount of organic matter present in the water.
 (d) All of the above

- 34. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of**
 (a) insertional inactivation of α -galactosidase in recombinant bacteria.
 (b) inactivation of glycosides enzyme in recombinant bacteria.
 (c) non-recombinant bacteria containing β -galactosidase.
 (d) insertional inactivation of α -galactosidase.
- 35. Restriction endonuclease are useful in**
 (a) creating sticky ends (b) breaking DNA at specific sites
 (c) both (a) and (b) (d) linkage
- 36. The specific sequence of DNA in a plasmid that the 'gene of interest' ligates with, to enable it to replicate is**
 (a) *rop* (b) *ori*
 (c) palindromic sequence (d) *tel^R*
- 37. Which of the following palindromic base sequences in DNA can be easily cut at about the middle by some particular restriction enzyme?**
 (a) 5' CACGTA 3' : 3' CTCAGT 5' (b) 5' CGTTCG 3' : 3' ATGGTA 5'
 (c) 5' GATATC 3' : 3' CTAATA 5' (d) 5' GAATTC 3' : 3' CTTAAG 5'
- 38. Arrange the following events in order of first to last in the action of Bt toxin.**
 1. Binding to epithelial cells 2. Lysis
 3. Creating pores 4. Swelling
 (a) 1 → 2 → 3 → 4 (b) 1 → 3 → 4 → 2
 (c) 4 → 3 → 2 → 1 (d) 4 → 2 → 1 → 3
- 39. Silencing of a gene could be achieved through the use of**
 (a) short interfering RNA (RNAi) (b) antisense RNA
 (c) both (a) and (b) (d) none of the above
- 40. Bt toxin protein crystals present in bacterium *Bacillus thuringiensis*, do not kill the bacteria themselves because**
 (a) bacteria are immune to the toxin.
 (b) toxins occur as inactive protoxins in bacteria.
 (c) bacteria enclose toxins in a special sac.
 (d) they are released by the bacteria only when it senses danger.
- 41. Geometric representation of age structure is a characteristic of**
 (a) biotic community (b) population
 (c) landscape (d) ecosystem
- 42. Response to abiotic factors, shown by majority of animals and nearly all plant species is**
 (a) regulate (b) conform (c) suspend (d) partial conformer
- 43. The mango trees do not and cannot grow in countries like Canada and Germany. Which abiotic factor is responsible for it?**
 (a) Soil type (b) Temperature (c) Water (d) Rainfall
- 44. Which of the following is not used for construction of ecological pyramids?**
 (a) Rate of energy flow (b) number of individuals
 (c) dry weight (d) fresh weight
- 45. Which one of the following ecosystem types has the highest annual net primary productivity?**
 (a) tropical deciduous forest (b) temperate evergreen forest
 (c) tropical rain forest (d) temperate deciduous forest

Answers

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

Explanations

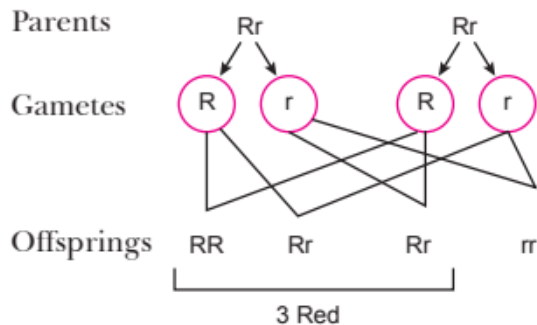
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4. (d) Each microspore mother cell produces four pollen grains.

So, 20,000 pollens are produced by $\frac{20,000}{4}$
= 5,000 microspore mother cells.

6. (d) Rete testis, vasa efferentia and vas deferens are parts of male reproductive system whereas ampulla is a part of female reproductive system.

11. (a) Parents



$$\text{Red coloured plants} = \frac{3}{4} \times 1600$$

$$= 1200$$

21. (d) Convergent evolution is the process whereby distantly related organisms evolve similar traits to adapt to similar conditions.

25. (a) Helper T-cells help activate B-cells to secrete antibodies and macrophages to destroy antigens. They also help cytotoxic T-cells to kill infected target cells.

26. (b) Alcohol has an anaesthetic effect on nervous system affecting cerebrum, cerebellum and other parts.

30. (b) Monoculture is a system in which only one crop is grown over an extensive area, showing very low diversity.

37. (d) 5' GAATTC 3' is the palindromic sequence for the restriction enzymes *EcoRI*.

45. (c) Net primary productivity is defined as the total organic matter stored by producers per unit area per unit time. Tropical forests have the maximum productivity because of ambient temperature and rainfall.

