

PRACTICE PAPER

15

Time allowed: 45 minutes

Maximum Marks: 200

General Instructions: Same as Practice Paper-1.

Choose the correct option:

- 1. During formation of zygote**
(a) fertilisation of male gamete occurs
(b) fertilisation of both gametes occurs
(c) fertilisation of female gamete occurs
(d) either (a) or (c)
- 2. Dioecy refers to**
(a) unisexuality of a flower
(b) bisexuality of a flower
(c) bisexuality of a plant
(d) unisexuality of a plant
- 3. In the embryos of a typical dicot plant and a grass, true homologous structures are**
(a) coleorhiza and coleoptile
(b) coleoptile and scutellum
(c) cotyledons and scutellum
(d) hypocotyl and radicle
- 4. 'Pollen grains are well preserved as fossils.' This is so because**
(a) pollen grains measure about 25–50 micrometers
(b) they have two-layered wall
(c) both (a) and (b)
(d) sporopollenin is present in pollens
- 5. Which of the following statements is true for filiform apparatus?**
(a) It is located at the chalazal end.
(b) It is located at the micropylar end.
(c) They play an important role in guiding the pollen tubes into the synergid.
(d) Both (b) and (c)
- 6. If Cowper's glands are removed, they will affect**
(a) erection of penis
(b) ova
(c) sperm mobility
(d) sperm protection
- 7. Which of the following statements is incorrect?**
(a) GnRH stimulates secretion of FSH and LH.
(b) LH stimulates the Leydig cells to secrete androgen.
(c) FSH acts on the Sertoli cells and stimulates spermiogenesis.
(d) GnRH stimulates secretion of estrogen.
- 8. Implantation occurs between**
(a) 3rd and 5th day after fertilisation
(b) 5th and 7th day after fertilisation
(c) 9th and 11th day after fertilisation
(d) 6th and 10th day after fertilisation

- 9. Colostrum contains**
- (a) IgE (b) IgG
(c) IgM (d) IgA
- 10. Which of the following statements are true about diaphragms?**
- (1) They block the entry of sperms.
(2) They are re-usable.
(3) They are placed to cover the cervix.
(4) They are contraceptive devices used by males.
- (a) 1 and 2 (b) 2 and 3
(c) 1 and 3 (d) 1, 2 and 3
- 11. Mother's blood group is B and father has blood group A. Both are heterozygous. If they have identical twins, the percentage probability of both twins having blood group A is**
- (a) 100% (b) 50%
(c) 25% (d) 6.25%
- 12. How many types of phenotypes will be produced in the cross $AaBb \times AaBb$?**
- (a) 1 (b) 3
(c) 4 (d) 8
- 13. Sex of a human child is determined by**
- (a) strength of the sperm (b) time of fertilisation
(c) sex chromosome of father (d) sex chromosome of mother
- 14. Down's syndrome is due to**
- (a) 21st trisomy (b) trisomy of sex chromosome
(c) monosomy of sex chromosome (d) 18th trisomy
- 15. 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
- 16. The codon for anti-codon 3'-UUUA - 5' is**
- (a) ' UAAA 3' (b) 5' AAAU - 3'
(c) 3' UAAG - 5' (d) 3' AAAU -5'
- 17. Genetic code is said to be degenerate because**
- (a) codons degenerate very quickly
(b) one amino acid is coded by more than one codon
(c) one codon codes for more than one amino acid
(d) none of the above
- 18. The presence of which of the following bonds makes the DNA strands antiparallel?**
- (a) H-bonds (b) Peptide bonds
(c) Disulphide bonds (d) Phosphodiester bonds
- 19. The type of RNA specifically responsible for directing the proper sequence of amino acids in protein synthesis is**
- (a) ribosomal RNA (b) messenger RNA
(c) chromosomal RNA (d) transfer RNA

20. According to Chargaff's rules
- (a) $A+C=G+T$ (b) $A+T=G+C$
 (c) $A+T=T+C$ (d) $A+G=C+U$
21. Which one of the following options gives one correct example each of convergent evolution and divergent evolution?
- | Convergent evolution | Divergent evolution |
|---|-----------------------------------|
| (a) Eyes of octopus and mammals | Bones of forelimbs of vertebrates |
| (b) Thorns of <i>Bougainvillea</i> and tendrils of <i>Cucurbita</i> | Wings of butterflies and birds |
| (c) Bones of forelimbs of vertebrates | Wings of butterflies and birds |
| (d) Thorns of <i>Bougainvillea</i> and tendrils of <i>Cucurbita</i> | Eyes of octopus and mammals |
22. What was the most significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors?
- (a) Shortening of jaws (b) Binocular vision
 (c) Increasing cranial capacity (d) Upright posture
23. The extinct human who lived 1,00,000 to 40,000 years ago, in Europe, Asia and part of Africa, with short stature, heavy eyebrows, retreating foreheads, large jaws with heavy teeth, stocky bodies, a lumbering gait and stooped posture was
- (a) *Homo habilis* (b) Neanderthals
 (c) Cro-magnons (d) *Ramapithecus*
24. The vector for dengue fever is
- (a) female *Anopheles* (b) female *Aedes*
 (c) male *Culex* (d) female *Culex*
25. Which of the following provides third line of defence?
- (a) HCl (b) T-lymphocytes and B-lymphocytes
 (c) PMNL (d) None of these
26. Which of the following antibodies forms innate immunity?
- (a) IgG (b) IgA
 (c) IgM (d) All the above
27. A person is detected positive to ELISA test. The next best test to establish the disease is
- (a) Western blot (b) Southern blot
 (c) VDRL test (d) Northern blot
28. Breeding of crops with high levels of minerals, vitamins and proteins is called
- (a) somatic hybridisation (b) biofortification
 (c) biomagnification (d) micropropagation
29. "Jaya" and "Ratna" developed for Green revolution in India are the varieties of
- (a) maize (b) rice
 (c) wheat (d) bajra
30. Biocontrol measures reduce our dependence on
- (a) pests (b) microbes
 (c) nematodes (d) toxic chemicals
31. In paddy fields, _____ serves as an important biofertiliser.
- (a) cyanobacteria (b) fungi
 (c) yeast (d) virus

32. Which of the following is used as a “clot buster” (removing clots inside blood vessels)?
(a) *Streptococcus* (b) *Staphylococcus*
(c) *Lactobacillus* (d) *Acetobacter*
33. Activated sludge contains
(a) impure solvent (b) settled ‘flocs’
(c) a solution at high temperature (d) none of these
34. What is the role of agarose in gel electrophoresis?
(a) It provides the sieving effect for the DNA to resolve according to their size.
(b) It is used to view the separated DNA bands when exposed to UV light.
(c) It facilitates easy linking of foreign DNA.
(d) All of the above.
35. There is a restriction endonuclease called *EcoRI*. What does ‘co’ part in it stand for?
(a) Common factor (b) Coenzymes
(c) Cohesive end (d) *coli*
36. GAATTC is the recognition site for which of the following restriction endonuclease?
(a) *HindIII* (b) *BamHI*
(c) *EcoRI* (d) *HaeIII*
37. Read the following statements and choose the correct option.
(i) The most commonly used ligase in DNA formation is T₄DNA ligase.
(ii) Bacteriophage is not used as vector.
(iii) MALAYALAM is a palindrome.
(iv) Ethidium bromide can be used for staining DNA.
(a) (i) and (ii) are wrong (b) Only (ii) is wrong
(c) (ii) and (iii) are wrong (d) All are correct
38. Which of the following would be considered a permanent cure for ADA deficiency?
(a) Bone marrow transplantation.
(b) Enzyme replacement therapy.
(c) Gene isolated from marrow cells producing ADA is introduced into cells at early embryonic stages.
(d) None of the above
39. The main challenge for production of insulin using *rDNA* techniques was
(a) getting insulin assembled into a mature form
(b) growing large quantity of the bacteria
(c) insulin from animal sources caused some patients to develop allergy or other types of reactions to the foreign protein
(d) synthesising C-peptide
40. RNA interference technique involves
(a) synthesis of *cDNA* and RNA using reverse transcriptase
(b) silencing of specific *mRNA* by complementary RNA
(c) interference of RNA in synthesis of DNA
(d) synthesis of *mRNA* from DNA

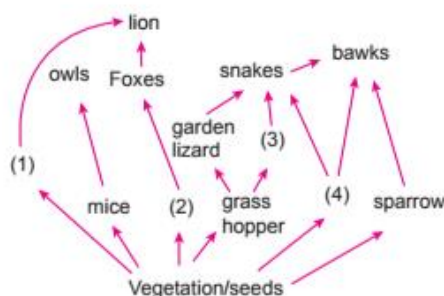
41. The table below gives the populations (in thousands) of ten species (A-J) in four areas (p-s) consisting of the number of species, and habitats given within brackets against each.

Study the table and answer the question which follows

Area and No. of habitats	Species and their populations (in thousands) in the areas									
	A	B	C	D	E	F	G	H	I	J
p (11)	2.3	1.2	0.52	6.0	-	3.1	1.1	9.0	-	10.2
q (11)	10.2	-	0.62	-	1.5	3.0	-	8.2	1.1	11.2
r (13)	11.3	0.9	0.48	2.4	1.4	4.2	0.8	8.4	2.2	4.1
s (12)	3.2	10.2	11.1	4.8	0.4	3.3	0.8	7.3	11.3	2.1

Which area out of p - s shows maximum species diversity?

- (a) s (b) p
(c) q (d) r
42. Match the columns I with column II.
- | Column I | Column II |
|-----------------|---------------|
| A. Stenothermal | (i) Shark |
| B. Eurythermal | (ii) Salmon |
| C. Euryhaline | (iii) Lizards |
| D. Stenohaline | (iv) Mammals |
- (a) A-(iii), B-(iv), C-(ii), D-(i) (b) A-(iii), B-(ii), C-(iv), D-(i)
(c) A-(i), B-(iv), C-(ii), D-(iii) (d) A-(iii), B-(iv), C-(i), D-(ii)
43. Evidence shows that some grasses benefit from being grazed. Which of the following terms would best describe this plant-herbivore interaction?
(a) Predation (b) Mutualism
(c) Commensalism (d) Competition
44. The breakdown of detritus into smaller particles by earthworm is a process called
(a) humification (b) fragmentation
(c) mineralisation (d) catabolism
45. Identify the likely organisms (1), (2), (3) and (4) in the food web shown below.



- | | | | |
|--------------|----------|----------|--------|
| (1) | (2) | (3) | (4) |
| (a) deer | rabbit | frog | rat |
| (b) dog | squirrel | bat | deer |
| (c) rat | dog | tortoise | crow |
| (d) squirrel | cat | rat | pigeon |

46. Which one of the following is not a gaseous biogeochemical cycle in ecosystem?
- (a) Sulphur cycle (b) Phosphorus cycle
(c) Nitrogen cycle (d) Carbon cycle
47. The relationship between species richness and area for a wide variety of taxa is described by the equation, $\log S = \log C + Z \log A$. In this equation Z represents
- (a) species richness (b) area converted
(c) slope of the line (d) Y intercept
48. With the change in environmental conditions, some species disappear and some remain. This loss of species which occurred in the geological past at a very slow rate is called
- (a) anthropogenic extinction (b) mass extinction
(c) natural extinction (d) none of these
49. Biochemical oxygen demand (BOD) in a river water
- (a) has no relationship with concentration of oxygen in the water.
(b) gives a measure of *Salmonella* in the water.
(c) increase when sewage gets mixed with river water.
(d) remains unchanged when algal bloom occurs.
50. Steps taken by the Government of India to control air pollution include
- (a) compulsory PUC (Pollution under control) certification of petrol driven vehicles which tests for carbon monoxide and hydrocarbons.
(b) permission to use only pure diesel with a maximum of 500 ppm sulphur as fuel for vehicles.
(c) use of non-polluting compressed natural gas (CNG) only as fuel by all buses and trucks.
(d) compulsory mixing of 20% ethyl alcohol with petrol and 20% biodiesel with diesel.



Answers

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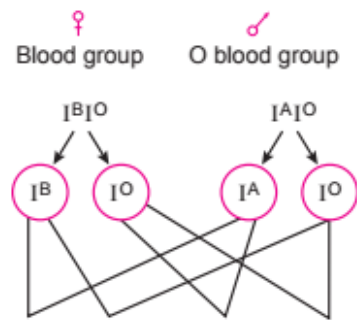
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|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (d) | 3. (c) | 4. (d) | 5. (d) | 6. (d) | 7. (d) |
| 8. (d) | 9. (d) | 10. (d) | 11. (c) | 12. (c) | 13. (c) | 14. (a) |
| 15. (b) | 16. (b) | 17. (b) | 18. (d) |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

Explanations

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4. (d) Sporopollenin is one of the most chemically inert substances and is highly resistant to any kind of degradation. It is present on the exine of pollen grains for its protection.
6. (d) The secretions of Cowper's gland create a more neutral environment in the urethra for the survival of sperms.

11. (c) Parent
Genotypes



- Offsprings IAIB IBIO IAIO IOIO
- Blood groups AB B A O
- There is 25% or 1/4 probability of the children to have the blood group A.

13. (c) Human females are homogametic, i.e., both the gametes are same (XX) whereas human males are heterogametic (XY). They produce two different types of gametes. They are responsible for the sex of the child.
41. (c) Species diversity refers to variety in the number of species within a region. As the area increases in size so does the species diversity. Varieties in the number, variety and kinds of species leads to greater diversity. This is visible in 'S' in the given table.
46. (b) Phosphorus cycle is a sedimentary cycle.

