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PRACTICE PAPER

Time allowed: 45 minutes **Maximum Marks: 200**

General Instructions: *Same as Practice Paper–1.*

Choose the correct option:

1. **The period of growth from birth till attainment of sexual maturity is called**
   (*a*) Asexual phase (*b*) Immature phase
   (*c*) Maturation phase (*d*) Juvenile phase

2. **A bilobed dithecous anther has 500 microspore mother cells per microsporangium. How many male gametophytes can this anther produce?**
   (*a*) 10,000 (*b*) 25,000
   (*c*) 20,000 (*d*) 8,000

3. **A group of compactly arranged homogenous cells, occupying the centre of each microsporangium when the anther is young is the**
   (*a*) tapetal layer of cells (*b*) epithelial cells
   (*c*) sporogenous tissue (*d*) endothelium tissue

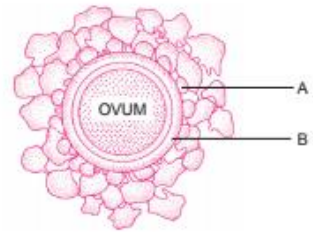
4. **In majority, matured angiospermic pollen grain is**
   (*a*) 3-celled (*b*) 2-celled
   (*c*) 4-celled (*d*) 1-celled

5. **The organisation of the typical embryo sac begins at**
   (*a*) 8-nucleate stage (*b*) 8-celled stage
   (*c*) 4-celled stage (*d*) none of these

6. **'The middle piece of human sperm is considered as the powerhouse of the sperm'. This is because**
   (*a*) it contains numerous mitochondria which produce energy for movement of sperms
   (*b*) it is responsible for the movement of sperms which helps in fertilisation
   (*c*) it holds the DNA of the cell to break through the egg membrane
   (*d*) both (*b*) and (*c*)

7. **_____ ova and _____ functional sperms will be formed by a primary oocyte and primary spermatocyte, respectively.**
   (*a*) One, four (*b*) Four, one
   (*c*) Four, four (*d*) One, one

8. In the following diagram of 'ovum' identify 'A' and 'B'.



(*a*) A : Zona pellucida, B : Corona radiata
(*b*) A : Corona radiata, B: Zona pellucida
(*c*) A : Yolk sac, B : Zona pellucida
(*d*) A : Corona radiata, B : Yolk sac

9. Which of the following stimulates the pituitary to release the hormone responsible for parturition?
(*a*) Oxytocin
(*b*) Foetal ejection reflex
(*c*) Relaxin
(*d*) Chorionic villi

10. Choose the correct statement regarding the ZIFT procedure.
(*a*) Ova collected from a female donor are transferred to the fallopian tube to facilitate zygote formation.
(*b*) Zygote is collected from a female donor and transferred to the fallopian tube.
(*c*) Zygote is collected from a female donor and transferred to the uterus.
(*d*) Ova collected from a female donor and transferred to the uterus.

11. The inheritance pattern of a gene over generations among humans is studied by the pedigree analysis. Character studied in the pedigree analysis is equivalent to
(*a*) quantitative trait
(*b*) Mendelian trait
(*c*) polygenic trait
(*d*) maternal trait

12. The four daughter cells (*n*) derived from a single meiosis differ from each other due to
(*a*) difference in chromosome number.
(*b*) crossing-over only.
(*c*) independent assortment of chromosomes only.
(*d*) crossing-over as well as independent assortment of chromosomes.

13. ABO blood group system is seen to occur in
(*a*) human beings and monkeys
(*b*) human beings and species of primates
(*c*) monkeys and primates
(*d*) all of the above

14. Which of the following is the exception to the law of independent assortment?
(*a*) Crossing-over (*b*) Linkage (*c*) Recombination (*d*) Epistasis

15. In the monohybrid cross, the test cross ratio of a heterozygous individual results in the ratio of
(*a*) 9 : 3 : 3 : 1 (*b*) 1 : 1 (*c*) 1 (*d*) 1 : 1 : 1 : 1

16. Gene '*i*' which is present in the *lac* operon of *E.coli* codes for
(*a*) repressor (*b*) permease (*c*) transacetylase (*d*) inducer

17. The dark staining region in a chromosome is called
(*a*) euchromatin (*b*) heterochromatin (*c*) plectonemic (*d*) paranemic

18. Histone proteins are rich in
(*a*) lysine (*b*) tyrosine (*c*) arginine (*d*) both (*a*) and (*c*)

19. DNA polymerase is required for the synthesis of
(*a*) DNA from DNA
(*b*) DNA from RNA
(*c*) DNA from nucleotides
(*d*) DNA from nucleosides

20. Genetic code determines

(*a*) structural pattern of an organism.
(*b*) sequence of amino acid in protein chain.
(*c*) variation in offsprings.
(*d*) constancy of morphological trait.

21. The most accepted line of descent in human evolution is

(*a*) *Australopithecus* → *Ramapithecus* → *Homo sapiens* → *Homo habilis*
(*b*) *Homo erectus* → *Homo habilis* → *Homo sapiens*
(*c*) *Ramapithecus* → *Homo habilis* → *Homo erectus* → *Homo sapiens*
(*d*) *Australopithecus* → *Ramapithecus* → *Homo erectus* → *Homo habilis* → *Homo sapiens*.

22. Disruptive selection favours

(*a*) only one extreme form of a trait
(*b*) both the extreme forms of a trait
(*c*) intermediate form of a trait
(*d*) none of these

23. Match the scientists listed under column 'I' with ideas listed column 'II'.

Column I	**Column II**
A. Darwin	**(*i*) Abiogenesis**
B. Oparin	**(*ii*) Use and disuse of organs**
C. Lamarck	**(*iii*) Continental drift theory**
D. Wagner	**(*iv*) Evolution by natural selection**

(*a*) A-(*i*); B-(*iv*); C-(*ii*); D-(*iii*)
(*b*) A-(*iv*); B-(*i*); C-(*ii*); D-(*iii*)
(*c*) A-(*ii*); B-(*iv*); C-(*iii*); D-(*i*)
(*d*) A-(*iv*); B-(*iii*); C-(*ii*); D-(*i*)

24. The substance produced by a cell in viral infection that can protect other cells from further infection is

(*a*) serotonin (*b*) colostrum (*c*) interferon (*d*) histamine

25. Choose the correct statement.

(*a*) Humoral immunity is responsible for rejection of organ transplants.
(*b*) α-interferon activates the immune system and help to destroy the tumour cells.
(*c*) Cannabinoids does not affect the digestive system.
(*d*) Nicotine, the alkaloid in tobacco does not causes the hallucinogenic effect.

26. Which one of the following is not an effect of tobacco?

(*a*) Blood vessels are dilated
(*b*) Blood pressure increases
(*c*) Decreasing blood sugar level
(*d*) Heartbeat increases

27. Transformation of normal cells to cancerous neoplastic cells is induced by

(*a*) mutagens (*b*) carcinogens (*c*) neogens (*d*) none of these

28. The biggest constraint of plant breeding is

(*a*) availability of desirable gene in the crop and its wild relatives
(*b*) infrastructure
(*c*) trained manpower
(*d*) transfer of genes from unrelated sources.

29. Micropropagation is

(*a*) propagation of microbes *in vitro*
(*b*) propagation of plants *in vitro*
(*c*) propagation of cells *in vitro*
(*d*) growing plants on smaller scale.

30. Protoplast is

(*a*) another name for protoplasm
(*b*) an animal cell
(*c*) a plant cell without a cell wall
(*d*) a plant cell.

31. **Which one of the following is not a nitrogen-fixing organism?**

(*a*) *Anabaena* (*b*) *Nostoc* (*c*) *Azotobacter* (*d*) *Pseudomonas*

32. **The residue left after methane production from cattle dung is**

(*a*) burnt (*b*) burried in land fills

(*c*) used as manure (*d*) used in civil construction.

33. **Match the following :**

Column I	Column II
1. *Saccharomyces cerevisiae*	(*a*) Biogas
2. Methanobacterium	(*b*) Cyclosporin A
3. *Trichoderma polysporum*	(*c*) Baker's yeast

(*a*) 1—*a*, 2—*b*, 3—*c* (*b*) 1—*c*, 2—*b*, 3—*a*

(*c*) 1—*c*, 2—*a*, 3—*b* (*d*) 1—*b*, 2—*a*, 3—*c*

34. **The DNA polymerase enzyme used in PCR is obtained from which of the following?**

(*a*) *Thermus aquaticus* (*b*) *Escherichia coli*

(*c*) *Agrobacterium tumefaciens* (*d*) *Salmonella typhimurium*

35. **In genetic engineering, a DNA segment of interest, is transferred to the host cell through a vector. Consider the following four agents in this regard and select the correct option about which one or more of these can be used as a vector/vectors.**

(*i*) Bacterium **(*ii*) Plasmid**

(*iii*) *Plasmodium* **(*iv*) Bacteriophage**

(*a*) (*i*), (*ii*) and (*iv*) (*b*) (*i*) only

(*c*) (*i*) and (*iii*) (*d*) (*ii*) and (*iv*)

36. **Given below is a sample of a portion of DNA strand giving the base sequence on the opposite strands. What is so special shown in it?**

5′ ___GAATTC___3′

3′ ___CTTAAG___5′

(*a*) Replication completed (*b*) Deletion mutation

(*c*) Start condon at the 5′ end (*d*) Palindromic sequence of base pairs

37. **Which of the following is used as a cloning vector for transformation in plant cells?**

(*a*) *Streptococcus* (*b*) *Agrobacterium tumifaciens*

(*c*) *Penicillium notatum* (*d*) *Saccharomyces*

38. **Some of the characteristics of Bt cotton are:**

(*a*) Long fibres and resistant to aphids.

(*b*) Medium yield, long fibres and resistance to beetle pests.

(*c*) Low yield and production of toxic protein crystals which kill dipterans.

(*d*) High yield and resistance to bollworms.

39. **A probe which is a molecule used to locate specific sequences in a mixture of DNA or RNA molecules could be**

(*a*) a single stranded RNA (*b*) a single stranded DNA

(*c*) both (*a*) and (*b*) (*d*) can be ssRNA but not ssDNA

40. **Gene recombinant technology is used for**

(*a*) vector-less gene transfer into target cell. (*b*) vector-based gene transfer into target cell.

(*c*) direct transfer of DNA protein complex. (*d*) liposome based direct gene transfer into target cell.

41. A biologist studied the population of rats in a barn. He found that the average natality was 250, average mortality was 240, immigration was 20 and emigration was 30. The net increase in population is

(*a*) 10 (*b*) 20 (*c*) 5 (*d*) zero

42. Which of the following is considered a parasite in true sense?

(*a*) Human foetus developing inside the uterus draws nourishment from the mother.

(*b*) Head louse living on the human scalp as well as laying eggs on human hair.

(*c*) The cuckoo lays its eggs on crow's nest.

(*d*) The female *Anopheles* bites and sucks blood from humans.

43. When it is scorchingly hot outside, we usually turn on the AC. It is a _____ means of maintaining homeostasis.

(*a*) behavioural (*b*) artificial (*c*) morphological (*d*) none of the above

44. The reservoir for the gaseous type of biogeochemical cycle exists in

(*a*) stratosphere (*b*) atmosphere (*c*) ionosphere (*d*) lithosphere

45. If the carbon atoms fixed by producers already have passed through three species, the trophic level of the last species would be

(*a*) scavenger (*b*) tertiary producer (*c*) tertiary consumer (*d*) secondary consumer

46. Humans benefit from ecosystems because ecosystems provide

(*a*) buffers from natural disasters such as floods. (*b*) maintenance of a clean water supply.

(*c*) climate moderation. (*d*) All of the above

47. Which of the following is true regarding biodiversity?

(*a*) It increases towards the equator. (*b*) It decreases towards the equator.

(*c*) It remains same throughout the planet. (*d*) It has no effect on change in latitude.

48. The most important reason for decrease in biodiversity is

(*a*) habitat pollution (*b*) introduction of exotic species

(*c*) over-exploitation (*d*) habitat destruction

49. Which of the following material takes the longest time for biodegradation?

(*a*) Cotton (*b*) Paper

(*c*) Bone (*d*) Jute

50. Choose the incorrect statement.

(*a*) The Montreal protocol is associated with the control of emission of ozone depleting substances.

(*b*) Methane and carbon dioxide are green house gases.

(*c*) Dobson units are used to measure oxygen content of air.

(*d*) Use of incinerators is crucial to disposal of hospital wastes.

Answers

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

Explanations

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2. (*d*) Each microsporangium has 500 microspore mother cells which form 2000 microspores by meiosis (500 × 4).

In an anther, there are four microsporangia. So, the total number of microspores will be 4 × 2000 = 8000. As each microspore forms one male gametophyte, 8000 male gametophytes can be produced.

41. (*d*) Net increase in population can be calculated by the formula: (B+I) - (D+E) wherein B refers to Birth rate/Natality, I refers to Immigration, D refers to Death rate/Mortality and E refers to Emigration.

Therefore, net increase = (250 + 20) – (240 + 30) = 0

45. (*c*) In an ecological pyramid the different trophic levels chronologically are: (1^{st})producers – (2^{nd}) primary consumers – (3^{rd}) secondary consumers – (4^{th}) tertiary consumers

47. (*a*) There is more biodiversity near the equator because its warmer year round, allowing organisms to continue growing.