PRACTICE PAPER

11

BIOLOGY

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

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

Choose the correct option:

1. **Offspring formed by sexual reproduction exhibit more variation than those formed by asexual reproduction because**
   (*a*) sexual reproduction is a lengthy process.
   (*b*) gametes of parents have qualitatively different genetic composition.
   (*c*) genetic material comes from parents of two different species.
   (*d*) greater amount of DNA is involved in sexual reproduction.

2. **In a cereal grain, the single cotyledon of embryo is represented by**
   (*a*) coleoptile (*b*) coleorhiza
   (*c*) scutellum (*d*) hypocotyl

3. **In a typical complete, bisexual and hypogynous flower the arrangement of floral whorls on the thalamus from the outermost to the innermost is**
   (*a*) calyx, corolla, androecium and gynoecium.
   (*b*) calyx, corolla, gynoecium and androecium.
   (*c*) gynoecium, androecium, corolla and calyx.
   (*d*) androecium, gynoecium, corolla and calyx.

4. **In angiosperms, male gametes are formed by the division of**
   (*a*) microspore mother cell (*b*) microspore
   (*c*) generative cell (*d*) vegetative cell

5. **From the statements given below, choose the option that are true for a typical female gametophyte of a flowering plant.**
   (*i*) It is 8-nucleate and 7-celled at maturity.
   (*ii*) It is free-nuclear during the development.
   (*iii*) It is situated inside the integument but outside the nucellus.
   (*iv*) It has an egg apparatus situated at the chalazal end.
   (*a*) (*i*) and (*iv*) (*b*) (*ii*) and (*iii*)
   (*c*) (*i*) and (*ii*) (*d*) (*ii*) and (*iv*)

6. **Which of the following doesn't contribute to seminal plasma?**
   (*a*) Seminal vesicle (*b*) Prostate
   (*c*) Urethral gland (*d*) Epididymis

7. Identify the odd one from the following.

(*a*) Vulva (*b*) Fimbriae

(*c*) Infundibulum (*d*) Isthmus

8. Match the column I with column II.

Column I	Column II
A. LH	1. Ovulation
B. Progesterone	2. Maturation of Graafian follicle
C. Estrogen	3. Female secondary sexual characters
D. FSH	4. Parturition
E. Oxytocin	5. Pregnancy

(*a*) A—2, B—5, C—3, D—1, E—4 (*b*) A—3, B—1, C—2, D—4 E—5

(*c*) A—1, B—2, C—3, D—4, E—5 (*d*) A—1, B—5, C—3, D—2, E—4

9. At least how many meiotic divisions are required for formation of 100 zygotes?

(*a*) 150 (*b*) 125

(*c*) 400 (*d*) 200

10. Which of the following is a contraceptive method in which the couples avoid coitus on 10 to 17 day of menstrual cycle?

(*a*) Lactational amenorrhea (*b*) Periodic abstinence

(*c*) Coitus interruptus (*d*) Withdrawal method

11. How many types of genotypes will be produced in the cross AaBb × AaBb?

(*a*) 2 (*b*) 9

(*c*) 8 (*d*) 4

12. Turner's syndrome is represented by genotype

(*a*) 44+XO (*b*) 44+XXY

(*c*) 44+XXX (*d*) an extra chromosome in 21st pair

13. Three children in a family have blood types O, AB and B respectively. What are the genotypes of their parents?

(*a*) $I^A I^A$ and $I^B I^0$ (*b*) $I^A I^O$ and $I^B I^O$

(*c*) $I^B I^B$ and $I^A I^A$ (*d*) None of these

14. Marriage in close blood relatives should be avoided because the offspring may receive

(*a*) two copies of dominant alleles (*b*) two copies of same harmful recessive allele

(*c*) two deleted pieces of DNA (*d*) none of these

15. Chromosomal theory of inheritance was given by

(*a*) Morgan (*b*) Morgan and Castle

(*c*) Sutton and Boveri (*d*) Correns

16. Which of the following is employed in recombinant DNA technology?

(*a*) Plastids (*b*) Plasmids

(*c*) Ribosomes (*d*) Histones

17. The operon model of gene regulation and organization in prokaryotes was proposed by

(*a*) Jacob and Monod (*b*) Beadle and Tatum

(*c*) Meselson and Stahl (*d*) Wilkins and Franklin

18. Successive nucleotides are covalently linked through

(*a*) glyosidic bonds (*b*) phosphodiester bonds

(*c*) hydrogen bonds (*d*) nitrogen bonds

19. *t*RNA takes part in

(*a*) transfer of genetic code to cytoplasm.

(*b*) transfer of amino acids to ribosome.

(*c*) collection of RNA in ribosome.

(*d*) copy the genetic code from DNA in nucleus.

20. In a DNA molecule cytosine is 28%. Percentage of adenine would be

(*a*) 64% (*b*) 22%

(*c*) 18% (*d*) 36%

21. The concept of chemical evolution is based on

(*a*) interaction of water, air and clay under intense heat.

(*b*) effect of solar radiation on chemicals.

(*c*) possible origin of life by combination of chemicals under suitable environmental conditions.

(*d*) crystallisation of chemicals.

22. The finches of Galapagos islands provide on evidence in favour of

(*a*) evolution due to mutation (*b*) retrogressive evolution

(*c*) biogeographical evolution (*d*) special creation

23. When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed as

(*a*) microevolution (*b*) co-evolution

(*c*) convergent evolution (*d*) divergent evolution

24. Widal test is used for the diagnosis of

(*a*) typhoid (*b*) TB

(*c*) pneumonia (*d*) malaria

25. Which of the following is auto-immune disease?

(*a*) Asthma (*b*) Cancer

(*c*) Erythroblastosis foetalis (*d*) Hashimoto's disease

26. The interferons are

(*a*) antibacterial proteins (*b*) antibiotic proteins

(*c*) antibody proteins (*d*) antiviral proteins

27. The drug 'Belladonna' is obtained from

(*a*) *Rauwolfia* (*b*) *Atropa*

(*c*) Capsicum (*d*) *Solanum*

28. In maize, hybrid vigour is exploited by

(*a*) inducing mutations.

(*b*) bombarding the protoplast with DNA.

(*c*) crossing of two inbred parental lines.

(*d*) harvesting seeds from the most productive plants.

29. In order to obtain virus-free plants through tissue culture the best method is

(*a*) meristem culture (*b*) protoplast culture

(*c*) embryo rescue (*d*) anther culture

30. *Triticale*, the first man-made cereal crop, has been obtained by crossing wheat with

(*a*) barley (*b*) rye

(*c*) pearl millet (*d*) sugarcane

31. Why is cow dung used in the production of biogas?

(*a*) It contains cellulosic materials, *i.e.*, the raw material.

(*b*) It contains methanogens.

(*c*) Both (*a*) and (*b*)

(*d*) It is cheap.

32. Expand IPM.

(*a*) Integrated Pest Management

(*b*) International Pest Management

(*c*) Integrated Pathogen Mitigation

(*d*) Integrated Pollination Measures

33. The estimation of BOD of wastewater is done by measuring the amount of

(*a*) oxygen consumption

(*b*) total inorganic matter

(*c*) microbes in water

(*d*) biodegradable organic matter

34. In the year 1963, two enzymes responsible for restricting the growth of bacteriophage in *E.coli* were isolated. How did the enzymes act to restrict the growth of the bacteriophage?

(*a*) One of them added carboxyl groups to DNA and the other cut the DNA at specific points within the DNA.

(*b*) One of them added methyl groups to DNA and the other cut the DNA at specific points within the DNA.

(*c*) One of them added methyl groups to DNA and the other cut the DNA at random points along the length of DNA.

(*d*) One of them added amino groups to DNA and the other cut the DNA at random points along the length of DNA.

35. Cloning is a method to

(*a*) replace original genotype

(*b*) preserve genotype

(*c*) production of HGH gene in *E.coli*

(*d*) none of these

36. Choose the incorrect statement(s).

(1) *Agrobacterium tumifaciens* is a natural genetic engineer.

(2) Extension of primer end on the template DNA is catalysed by *Taq* polymerase in a PCR reaction.

(3) Genetic engineering has been made possible due to observation of DNA under electron microscope.

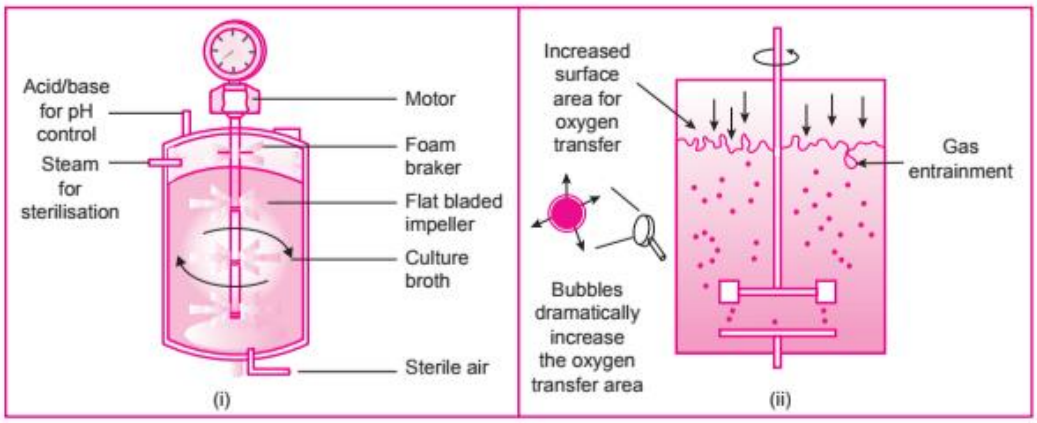
(*a*) 1 and 2

(*b*) Only 3

(*c*) 1 and 3

(*d*) 2 and 3

37. Identify (*i*) and (*ii*) in the following figure and choose the correct option.



(*a*) (*i*) Sparged stirred-tank bioreactor (*ii*) Simple stirred-tank bioreactor

(*b*) (*i*) Sparged stirred-tank bioreactor (*ii*) Sparged stirred-tank bioreactor

(*c*) (*i*) Simple stirred-tank bioreactor (*ii*) Simple stirred-tank bioreactor

(*d*) (*i*) Simple stirred-tank bioreactor (*ii*) Sparged stirred-tank bioreactor

38. Which of the following steps has been taken by Government of India to cater to the requirement of patent terms emergency provisions and research and development initiative?

(*a*) Biopiracy act (*b*) Indian Patents Bill

(*c*) RTI (*d*) Patents Act

39. A single stranded DNA tagged with a probe hybridises to its complimentary strand. It is then detected by using

(*a*) electrophoresis (*b*) blotting

(*c*) autoradiography (*d*) PCR

40. Choose the correct statement.

(*a*) Gene therapy can be referred to as pre-clinical testing for inherited diseases in newborns.

(*b*) Animals that have had their DNA manipulated to possess and express a foreign gene are called somaclones.

(*c*) PCR allows to detect genetic defects but does not involve antigen-antibody reaction.

(*d*) Only the detection of outer coat of pathogen is involved in ELISA.

41. Very small organisms like shrews and humming birds are rare in polar areas due to their large surface area relative to their volume, these organisms are

(*a*) conformers (*b*) regulators

(*c*) partial regulators (*d*) suspendors

42. Verhulst-Pearl population growth is described by the equation

(*a*) $\frac{dN}{dt} = rN$ (*b*) $N_t = N_o e^{rt}$

(*c*) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ (*d*) $\frac{dN}{dt} = rN\left(\frac{N-K}{N}\right)$

43. Find out the incorrect statement w.r.t. population interaction.

(*a*) Monarch butterfly is highly distasteful to its predators.

(*b*) Both parasite and host tend to co-evolve.

(*c*) McArthur showed that five closely related species of warblers living on the same tree follow the competitive exclusive principle.

(*d*) Fourteen species of finches co-exist in Galapagos island due to development of different feeding habits.

44. Consider the following statements concerning food chains

(*A*) Removal of 80% tigers from an area resulted in greatly increased growth of vegetation.

(*B*) Removal of most of the carnivores resulted in an increased population of deers.

(*C*) The length of food chains in generally limited to 3-4 trophic levels due to energy loss.

(*D*) The length of food chains may vary from 2 to 8 trophic levels.

Which two of the above statements are correct?

(*a*) A, D (*b*) A, B

(*c*) B, C (*d*) C, D

45. The correct sequence of plants in a hydrosere is

(*a*) *Volvox* → *Hydrilla* → *Pistia* → *Scirpus* → *Lantana* → Oak

(*b*) *Pistia* → *Volvox* → *Scirpus* → *Hydrilla* → Oak → *Lantana*

(*c*) Oak → *Lantana* → *Volvox* → *Hydrilla* → *Pistia* → *Scirpus*

(*d*) Oak → *Lantana* → *Scirpus* → *Pistlia* → *Hydrilla* → *Volvox*

46. Which one of the following types of organisms occupy more than one trophic level in a pond ecosystem?

(*a*) Fish (*b*) Zooplankton

(*c*) Frog (*d*) Phytonplankton

47. Introduction of Nile Perch in lake Victoria of East Africa resulted in

(*a*) excessive growth of water hyacinth.
(*b*) elimination of water hyacinth.
(*c*) elimination of many species of cichlid fish.
(*d*) excessive growth of cichlid fish.

48. The relation between species richness and area for a wide variety of taxa is

(*a*) rectangular hyperbola
(*b*) sigmoid curve
(*c*) sine curve
(*d*) J-shaped

49. Why is it necessary to remove sulphur from petroleum products?

(*a*) To reduce the emission of sulphur dioxide in exhaust fumes.
(*b*) To increase efficiency of automobiles engines.
(*c*) To use sulphur removed from petroleum for commercial purposes.
(*d*) To increase the life span of engine silencers.

50. Which one of the following impurities is easiest to remove from wastewater?

(*a*) Bacteria
(*b*) Colloids
(*c*) Dissolved solids
(*d*) Suspended solids

Answers

PRACTICE PAPER – 11

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

Explanations

PRACTICE PAPER – 11

4. (*d*) Pollen mother cell or microspore mother cell undergoes meiotic divisions to form cluster of four cells called microspore tetrad.

6. (*d*) Secretions of accessory glands constitute seminal plasma which is rich in fructose, calcium and certain enzymes. The accessory glands include a prostate gland, two seminal vesicles and two bulbourethral glands.

7. (*a*) Fimbriae, infundibulum and isthmus are parts of the fallopian tube whereas vulva is the external genitalia.

9. (*b*) For formation of zygote fusion of male and female gametes is required. In females 100 meiotic divisions are needed for producing 100 eggs. In males, one meiotic division forms 4 male gametes. So, for producing 100 male gametes, 25 meiotic divisions are needed.

Hence total number of meiotic divisions

$= 100 + 25$

$= 125$

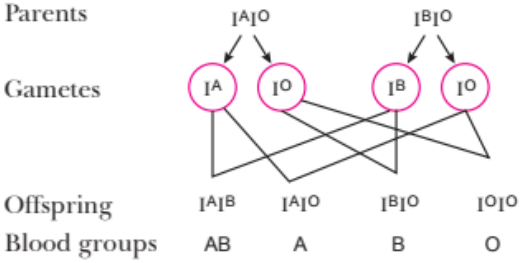
11. (*b*) Number of genotypes $= 3^n$

where n = number of genes

Here, $n = 2$

$\therefore$ No. of genotypes $= 3^2 = 9$

13. (*d*) The three blood groups, O, AB and B are possible only when the parents are heterozygous and are of A and B blood group.



20. (*b*) According to Chargaff's rule, adenine binds with thymine and cytosine binds with guanine. So [A] = [T] and [C] = [G].

Here, [C] = 28%. Therefore, [G] = 28%.

[C] + [G] = 28% + 28% = 56%

So, the remaining bases = 100 – 56 = 44%

Since [A] = [T]

Therefore, $[A] = \frac{44}{2} = 22\%$

22. (*d*) The finches on Galapagos islands had evolved from original seed-eating finches. With alteration in beaks some became vegetarian and some insectivorous.

25. (*a*) Auto-immune disease is an abnormal immune respone in which the immune system starts rejecting its own body cells.

29. (*a*) Meristematic region of the plant has actively dividing cells which are disease free.

38. (*b*) Government has passed The Patent Bill (2000) dealing with amendments of Patent Act (1970).