Sample Paper

7

Time : 90 Minutes **Max. Marks : 50**

General Instructions

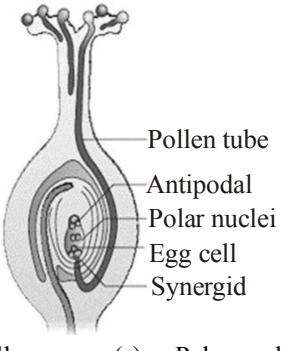
1. *The Question Paper contains three sections.*
2. ***Section A** has **24** questions. Attempt any **20** questions.*
3. ***Section B** has **24** questions. Attempt any **20** questions.*
4. ***Section C** has **12** questions. Attempt any **10** questions.*
5. *All questions carry equal marks.*
6. *There is no negative marking*

SECTION-A

DIRECTION: *This section consists of 24 questions. Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.*

1. As a pollen tube grows into the female organ, the nucleus that enters the synergid first is called the
(a) sperm nucleus (b) generative nucleus (c) tube nucleus (d) pollen nucleus

2. What are 3 chalazal cells called?

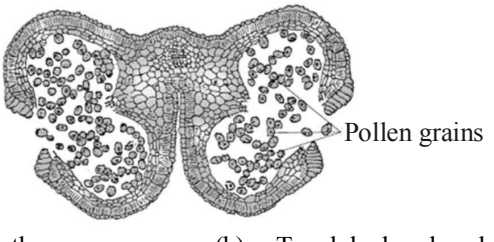


(a) Synergids (b) Antipodal cells (c) Polar nuclei (d) Chalaza

3. Cross-pollination is preferred over self-pollination because
(a) it results in better offspring. (b) the new varieties are formed.
(c) it is easy. (d) parthenogenesis can be induced.

4. Malacophily is pollination by
(a) Insects (b) Birds (c) Bats (d) Snails and slugs

5. A typical angiosperm anther is dithecous which means that it is:



(a) One lobed and the lobe has two theca (b) Two lobed and each lobe has two theca
(c) Two lobed and each lobe has one theca (d) Four lobed and each lobe has two theca

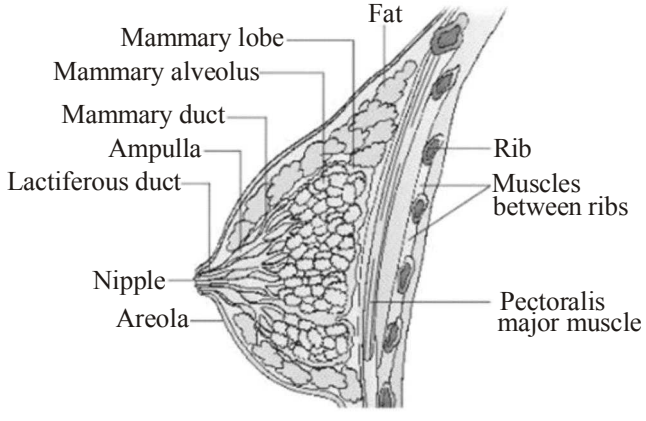
6. About which day in a normal human menstrual cycle does rapid secretion of LH (Popularly called LH-surge) normally occurs?
(a) 14th day (b) 20th day (c) 5th day (d) 11th day

7. The most important function of nuclear envelope is to
(a) regulate nucleo cytoplasmic traffic
(b) protect genetic material
(d) prevent the entrance of active ribosomes into the nucleus
(d) synthesis rRNAs.

8. What happens during fertilisation in humans after many sperms reach close to the ovum?
(a) Secretions of acrosome helps one sperm enter cytoplasm of ovum through zona pellucida
(b) All sperms except the one nearest to the ovum lose their tails
(c) Cells of corona radiata trap all the sperms except one
(d) Only two sperms nearest the ovum penetrate zona pellucida

9. Which one of the following statements is false in respect of viability of mammalian sperm ?
(a) Sperm is viable for only up to 24 hours.
(b) Survival of sperm depends on the pH of the medium and is more active in alkaline medium.
(c) Viability of sperm is determined by its motility.
(d) Sperms must be concentrated in a thick suspension.

10. What kind of tissue is the mammary gland mainly made of?



(a) Adipose tissue (b) Glandular tissue (c) Epithelial tissue (d) Connective tissue

11. When pollen is transferred from anther of a flower to stigma of another flower of the same plant, pollination is referred to as
(a) geitonogamy (b) allogamy (c) xenogamy (d) siphonogamy

12. Which is the most common mechanism of genetic variation in the population of sexually reproducing organism?
(a) Chromosomal aberrations (b) Genetic drift
(c) Recombination (d) Transduction

13. Select the correct statement from the ones given below with respect to dihybrid cross.
(a) Tightly linked genes on the same chromosome show higher recombinations
(b) Genes far apart on the same chromosome show very few recombinations
(c) Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones
(d) Tightly linked genes on the same chromosome show very few recombinations

14. Absence of one sex chromosome causes
(a) Turner's syndrome (b) Klinefelter's syndrome
(c) Down's syndrome (d) Tay-Sach's syndrome

15. The ratio of phenotypes in F_2 of a monohybrid cross is
(a) 3 : 1 (b) 1 : 2 : 1 (c) 9 : 3 : 3 : 1 (d) 2 : 1

16. The light stained and diffused region of chromatin is known as
(a) Heterochromatin (b) Euchromatin
(c) Chromatin (d) None of these

17. Chromosomal aberration occurs due to
(1) deletion (2) duplication
(3) inversion (4) translocation
(a) (1), (3) and (4) (b) (1), (2), (3) and (4)
(c) (2), (3) and (4) (d) (1), (2) and (3)

18. Pick out the correct statements :
1. Haemophilia is a sex-linked recessive disease
2. Down's syndrome is due to aneuploidy
3. Phenylketonuria is an autosomal recessive gene disorder.
4. Sickle cell anaemia is a X-linked recessive gene disorder
(a) (1) and (4) are correct (b) (2) and (4) are correct
(c) (1), (3) and (4) are correct (d) (1), (2) and (3) are correct

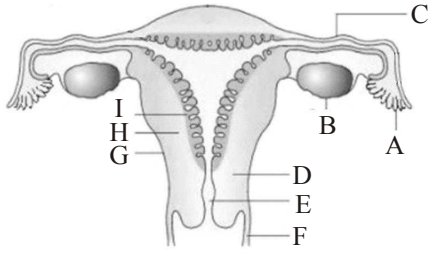
19. The incorrect statement with regard to Haemophilia is :
(a) It is a recessive disease
(b) It is a dominant disease
(c) A single protein involved in the clotting of blood is affected
(d) It is a sex-linked disease

20. In a mutational event, when adenine is replaced by guanine, it is a case of
(a) frame shift mutation (b) transcription (c) transition (d) transversion

21. Crossing over that results in genetic recombination in higher organisms occurs between
(a) sister chromatids of a bivalent
(b) non-sister chromatids of a bivalent
(c) two daughter nuclei
(d) two different bivalents

22. In order for the information contained in a gene to be used to produce a functioning protein, the
(a) DNA must be replicated.
(b) information must be transcribed into mRNA and then translated into amino acids.
(c) tRNA must be transcribed into rRNA and then translated into amino acids.
(d) ribosome must be converted from rRNA into mRNA.

23. What is the name of the (A), finger-like branches of the fallopian tube that reach out into the pelvic cavity and pick up the released egg?



(a) Fimbriae (b) Fallopian fingers
(c) Fallopian fimbriae (d) None of the answers are correct

24. Which one of the following triplet codes, is correctly matched with its specificity for an amino acid in protein synthesis or as 'start' or 'stop'codon?
(a) UAC – Tyrosine (b) UCG – Start
(c) UUU – Stop (d) UGU – Leucine

SECTION-B

DIRECTION: *This section consists of 24 questions (Sl. No.25 to 48). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.*

Question No. 25 to 28: *Consist of two statements Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:*

(a) If both Assertion and Reason are True and the Reason is a correct explanation of the Assertion.
(b) If both Assertion and Reason are True but Reason is not a correct explanation of the Assertion.
(c) If the Assertion is True but Reason is False.
(d) If both Assertion and Reason are False.

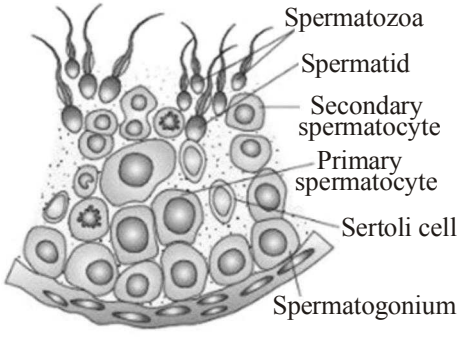
25. **Assertion:** The genes located on the x-chromosome are called sex-linked genes as x-linked genes and genes present on y-chromosome are described as holandric gene.
Reason: The number of linkage groups corresponds to the diploid number of chromosomes.

26. **Assertion:** The transfer of genes from one chromosome to another during synapsis is termed as crossing over.
Reason: Crossing over takes place at 4 strands stage, where each strand represent a chromatid.

27. **Assertion:** The reproductive cycle in the female primates (eg- monkey, apes and human being) is called menstrual cycle.
Reason: The first menstruation begin at puberty (12-13 years in girls) and is called menopause.

28. **Assertion :** During DNA replication, both the parental strands act as template for the synthesis of new daughter strands.
Reason : The Okazaki fragments are formed on the parent which runs in 5' → 3' direction and proves discontinuous synthesis.

29. Where are Sertoli cells located?



(a) In the walls of the seminiferous tubules
(b) In the lumen of the seminiferous tubules
(c) In the tight junction of the seminiferous tubules
(d) In the pituitary gland

30. Which of these pairs is mismatched?
(a) Cleavage – Cell division
(b) Blastula – Gut formation
(c) Gastrula – Three germ layers
(d) Neurula – Nervous system

31. Emasculation is not required when flowers are
(a) bisexual (b) intersexual (c) unisexual (d) either (1) or (2)

32. Cleavage in the fertilized egg of humans:
(a) Starts in uterus
(b) Is meroblastic
(c) Starts when egg is in fallopian tube
(d) Is discoidal

33. In amniocentesis, the fluid is taken from –
(a) foetal blood
(b) mother's blood
(c) body fluid of mother
(d) fluid surrounding foetus

34. Surgical removal of testes is known as –
(a) Testectomy (b) Gonadectomy (c) Castration (d) None of these

35. Attractants and rewards are required for :
(a) Entomophily (b) Hydrophily (c) Cleistogamy (d) Anemophily

36. Independent assortment of genes does not take place when
(a) genes are located on homologous chromosomes
(b) genes are linked and located on same chromosomes
(c) genes are located on non homologous chromosomes
(d) All the above

37. Incomplete dominance occurs when
(a) chromosomes are deleted.
(b) heterozygotes synthesized a reduced amount of an enzyme, producing an intermediate phenotype.
(c) the genes fail to segregate.
(d) the law of independent assortment is upheld.

38. The contrasting pairs of factors in Mendelian crosses are called
(a) multiple alleles (b) allelomorphs (c) alloloci (d) paramorphs

39. Condoms are barriers that cover:

(a) Penis is male and ovary in female (b) Penis in male and cervix and vagina in female
(c) Scrotum in male and cervix and vagina in female (d) Cervix in male and vagina in female

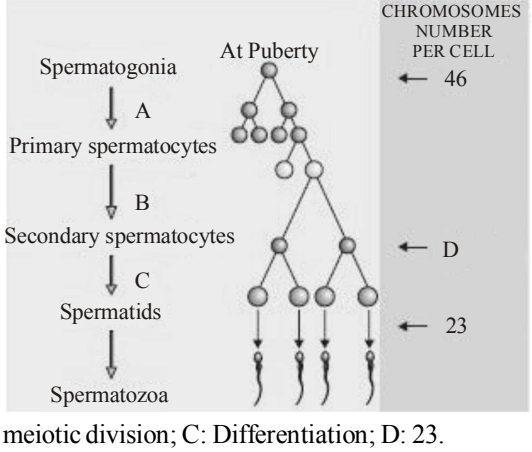
40. Which one of the following conditions correctly describes the manner of determining the sex in the given example?
(a) Homozygous sex chromosomes (ZZ) determine female sex in birds.
(b) XO type of sex chromosomes determine male sex in grasshopper
(c) XO condition in human as found in Turner syndrome, determines female sex.
(d) Homozygous sex chromosomes (XX) produce male in *Drosophila*.

41. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?
(a) Six (b) Eight (c) Seven (d) Five

42. Which of the following most appropriately describes haemophilia?
(a) Recessive gene disorder (b) X - linked recessive gene disorder
(c) Chromosomal disorder (d) Dominant gene disorder

43. In prokaryotes, gene regulation occurs at the level of
(a) transcription (b) translation (c) post-transcription (d) post-translation

44. The figure given below shows a flowchart on spermatogenesis. Identify the correct label marked as A, B, C and D.



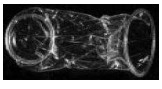
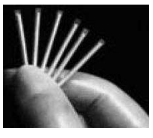
(a) A: Ist meiotic division; B: 2nd meiotic division; C: Differentiation; D: 23.
(b) A: 2nd meiotic division; B: Differentiation; C: Ist meiotic division; D: 46.
(c) A: Differentiation; B: 2nd meiotic division; C: Ist meiotic division; D: 46.
(d) A: Mitosis differentiation; B: Ist meiotic division; C: 2ndmeiotic division; D: 23.

45. The most common way of gene expression is regulated in both prokaryotes and eukaryotes is through the
(a) control of mRNA translation.
(b) breakdown of proteins formed by translation.
(c) prevention of DNA uncoiling prior to transcription.
(d) control of gene transcription.

46. What are the three major properties of genes that are explained by the structure of DNA?
(a) They contain information, direct the synthesis of proteins, and are contained in the cell nucleus.
(b) They contain nitrogenous bases, direct the synthesis of RNA, and are contained in the cell nucleus
(c) They encode the organisms phenotype, are passed on from one generation to the next, and contain nitrogenous bases.
(d) They contain information, replicate exactly, and change to produce a mutation.

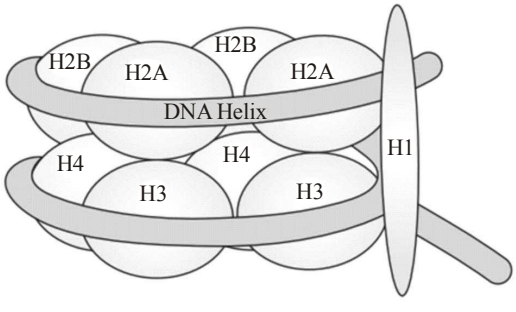
47. The process of transfer of genetic information from DNA to RNA/formation of RNA from DNA is
(a) transversion (b) transcription
(c) translation (d) translocation

48. Which of the following figure of contraceptives contains progesterone alone or in combination with estrogen and used as injection or implants by females?

(a) 
(b) 
(c) 
(d) 

SECTION-C

DIRECTION: *This section consists of one case followed by 6 questions linked to this case (Q.No.49 to 54). Besides this, 6 more questions are given. Attempt any 10 questions in this section. The first attempted 10 questions would be evaluated.*



49. What is the length of the DNA double helix, if the total number of bp (base pair) is 6.6×10^9?
(a) 2.2 m/bp (b) 2.5 m/bp
(c) 2.2 m (d) 2.5 m

50. What are the set of positively charged basic proteins called as?
(a) Histidine (b) DNA
(c) RNA (d) Histones

51. What are the thread-like stained structures present in the nucleus known as?
(a) Chromosome (b) Chromatid
(c) Chromatin (d) Chloroplast

52. When the negatively charged DNA combines with the positively charged histone octamer, which of the following is formed?
(a) Nucleus (b) Nucleoid
(c) Nucleosome (d) Nucleosome

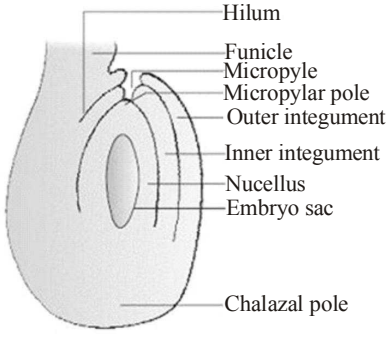
53. What is the typical distance between two base pairs in nm?
(a) 0.34 nm (b) 0.32 nm (c) 0.33 nm (d) 0.35nm

54. Which of the following chromatins are said to be transcriptionally active and inactive respectively?
(a) Euchromatin, Heterochromatin (b) Euchromatin, Prochromatin
(c) Prochromatin, Euchromatin (d) Heterochromatin, Euchromatin

55. In Down's syndrome, karyotyping has shown that the disorder is associated with trisomy of chromosome number 21 usually due to
(a) non-disjunction during egg formation.
(b) non-disjunction during sperm cell formation.
(c) addition of extrachromosome during cleavage of zygote.
(d) non-disjunction during egg cells production and sperm production.

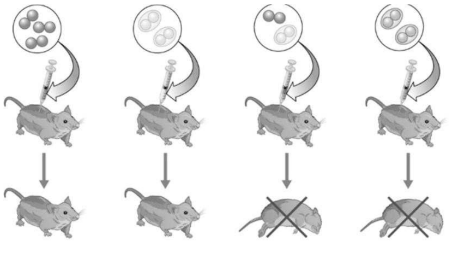
56. A gonadotropin hormone, "X" acts on interstitial cells and stimulates synthesis and secretion of "Y". Identify X and Y from the given option.
(a) X - LH; Y - Androgen
(b) X - FSH; Y - Testosterone
(c) X - TSH; Y - Progesterone
(d) X - GH; Y - Estrogen

57. Polygonum type of embryo sac is



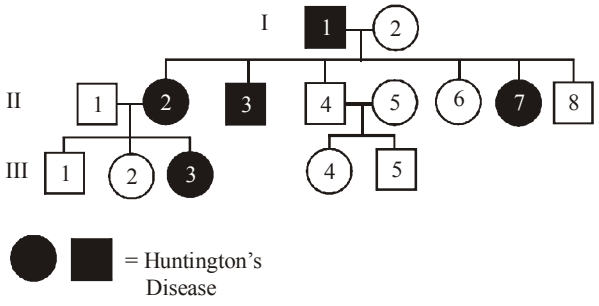
(a) 8 - nucleate, 7 - celled (b) 8 - nucleate, 8 - celled
(c) 7 - nucleate, 7 - celled (d) 4 - nucleate, 3 - celled

58. Frederick Griffith infected mice with a combination of dead R and live S bacterial strains. What was the outcome, and why did it occur?



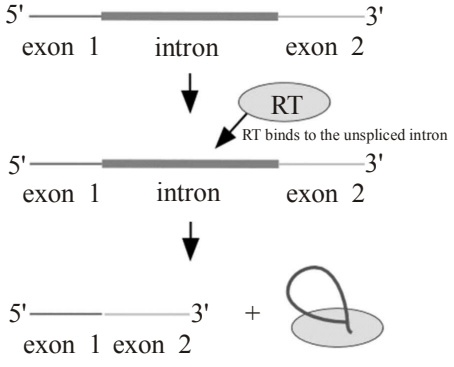
(a) The mice will live. Transformation was not required.
(b) The mice will die. Transformation of genetic material from R to S was required.
(c) The mice will live. Transformation of genetic material from S to R was required.
(d) The mice will die. Transformation was not required.

59. What pattern of inheritance is shown in the pedigree?



(a) Autosomal dominant (b) Autosomal recessive (c) Sex linked dominant (d) Sex linked recessive

60. The splice site is found in _____



(a) 3' end of exon (b) 5' end of intron (c) Within the exon (d) Within the intron

OMR ANSWER SHEET

Sample Paper No – 7

- ✶ Use Blue / Black Ball pen only.
- ✶ Please do not make any atray marks on the answer sheet.
- ✶ Rough work must not be done on the answer sheet.
- ✶ Darken one circle deeply for each question in the OMR Answer sheet, as faintly darkend / half darkened circle might by rejected.

Start time : _____ End time _____ Time taken _____

1. Name (in Block Letters)

2. Date of Exam

3. Candidate's Signature

SECTION-A

1.	a	b	c	d	9.	a	b	c	d	17.	a	b	c	d
2.	a	b	c	d	10.	a	b	c	d	18.	a	b	c	d
3.	a	b	c	d	11.	a	b	c	d	19.	a	b	c	d
4.	a	b	c	d	12.	a	b	c	d	20.	a	b	c	d
5.	a	b	c	d	13.	a	b	c	d	21.	a	b	c	d
6.	a	b	c	d	14.	a	b	c	d	22.	a	b	c	d
7.	a	b	c	d	15.	a	b	c	d	23.	a	b	c	d
8.	a	b	c	d	16.	a	b	c	d	24.	a	b	c	d

SECTION-B

25.	a	b	c	d	33.	a	b	c	d	41.	a	b	c	d
26.	a	b	c	d	34.	a	b	c	d	42.	a	b	c	d
27.	a	b	c	d	35.	a	b	c	d	43.	a	b	c	d
28.	a	b	c	d	36.	a	b	c	d	44.	a	b	c	d
29.	a	b	c	d	37.	a	b	c	d	45.	a	b	c	d
30.	a	b	c	d	38.	a	b	c	d	46.	a	b	c	d
31.	a	b	c	d	39.	a	b	c	d	47.	a	b	c	d
32.	a	b	c	d	40.	a	b	c	d	48.	a	b	c	d

SECTION-C

49.	a	b	c	d	53.	a	b	c	d	57.	a	b	c	d
50.	a	b	c	d	54.	a	b	c	d	58.	a	b	c	d
51.	a	b	c	d	55.	a	b	c	d	59.	a	b	c	d
52.	a	b	c	d	56.	a	b	c	d	60.	a	b	c	d

No. of Qns. Attempted		Correct		Incorrect		Marks	