

Sample Paper

9

Time : 90 Minutes

Max. Marks : 50

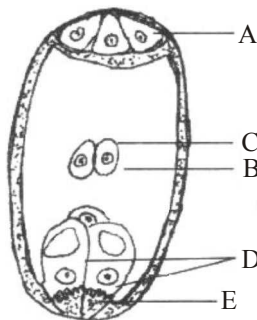
General Instructions

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

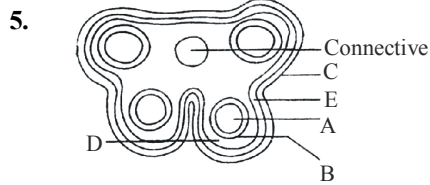
SECTION-A

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

1. The advantage of cross-fertilization in plants is
 - (a) increased genetic recombination.
 - (b) that meiosis can occur.
 - (c) greater efficiency of pollination.
 - (d) that no flowering is needed.
2. Identify A, B, C, D and E respectively-

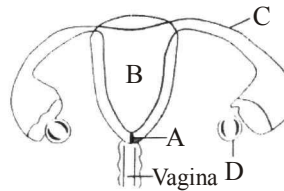


- | A | B | C | D | E |
|---------------------|------------------------|--------------|-----------------|--------------------|
| (a) Antipodal cells | Central cell | Polar nuclei | Synergids | Acrosome |
| (b) Antipodal cells | Central cell | Polar nuclei | Synergids | Filiform apparatus |
| (c) Synergids | Central cell | Polar nuclei | Antipodal cells | Filiform apparatus |
| (d) Synergids | Mega-spore mother cell | Polar nuclei | Synergids | Filiform apparatus |
3. Megaspores are produced from the megaspore mother cells after
 - (a) Meiotic division
 - (b) Mitotic division
 - (c) Formation of a thick wall
 - (d) Differentiation
 4. Transfer of pollen grain from anther to stigma of another flower of the same plant is called as
 - (a) geitonogamy
 - (b) xenogamy
 - (c) cleistogamy
 - (d) chasmogamy

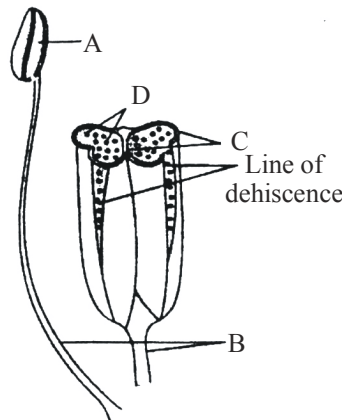


The above diagram refers to a T. S. of anther. Identify A to E respectively-

- (a) Sporogenous tissue, tapetum, epidermis, middle layer, endothecium
 - (b) Sporogenous tissue, epidermis, tapetum, middle layer, endothecium
 - (c) Sporogenous tissue, epidermis, middle layer, tapetum, endothecium
 - (d) Sporogenous tissue, tapetum, middle layer, epidermis, endothecium
6. The fertilization in human occurs at the junction of
- (a) Infundibulum and ampulla
 - (b) Isthmus and fundus
 - (c) Ampulla and isthmus
 - (d) cervix and fundus
7. Identify the parts as A, B, C and D in the given diagram.



- (a) A-Oviduct, B-Uterus, C-Outduct, D-Ovary
 - (b) A-Cervix, B-Uterus, C-Ovary, D-Tumour
 - (c) A-Uterus, B-Uterine cavity, C-Oviducal funnel, D-Ovary
 - (d) A-Cervix, B-Uterine cavity, C-Fallopian tube, D-Ovary
8. Morula is a developmental stage
- (a) between the zygote and blastocyst
 - (b) between the blastocyst and gastrula
 - (c) after the implanation
 - (d) between implanation and parturition
9. The LH surge from the anterior pituitary gland
- (a) occurs just prior to ovulation.
 - (b) occurs just prior to menstruation.
 - (c) stimulates an estrogen surge from the ovaries.
 - (d) is responsible for follicle development in the uterus.
10. Identify A to D respectively-



- (a) Anther, Petiole, Pollen sac and Megaspore
- (b) Anther, Petiole, Megasporangium and Pollen grains
- (c) Anther, Pedicel, Megasporangium and Pollen grains
- (d) Anther, Filament, Pollen sac and Pollen grains

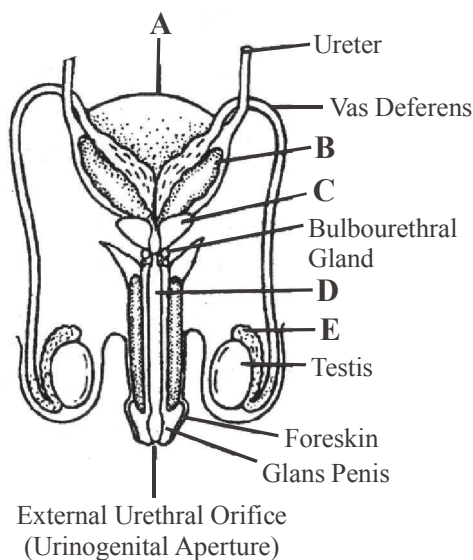
11. A cutting of rose plant is thoroughly waxed and planted in the soil normally, it will form
(a) new rose plant.
(b) a dead piece of rose stem after some time.
(c) a rose plant of improved variety.
(d) None of these
12. Christmas disease is another name for
(a) sleeping sickness (b) haemophilia (c) hepatitis B (d) Down's syndrome
13. The recessive genes located on X-chromosome in humans are always
(a) lethal (b) sub-lethal (c) expressed in males (d) expressed in females
14. Which one of the followings is correctly matched with their chromosomal condition?
(a) Sickle cell anaemia – Heterozygous condition of Hbs gene
(b) Down's syndrome – Trisomy of chromosome 22
(c) Turner's syndrome – XO condition
(d) Klinefelter's syndrome – failure of cytokinesis after telophase
15. After a mutation at a genetic locus the character of an organism changes due to the change in
(a) protein structure (b) DNA replication
(c) protein synthesis pattern (d) RNA transcription pattern
16. If a trait passes from father to all his daughters but none of his sons, the trait is
(a) Autosomal dominant (b) Autosomal recessive
(c) Sex linked dominant (d) Sex linked recessive
17. If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group, 'AB' blood group, 'B' blood group in 1: 2: 1 ratio. Modern technique of protein electrophoresis reveals the presence of both 'A' and 'B' type proteins in 'AB' blood group individuals. This is an example of:
(a) Codominance (b) Incomplete dominance
(c) Partial dominance (d) Complete dominance
18. Prokaryotic chromosomes
(a) are circular and contain origin and terminator sequences.
(b) are linear and have origins and telomeres.
(c) contain coding and non-coding sequences.
(d) Both (b) and (c)
19. The okazaki fragments in DNA chain growth
(a) polymerize in the 3' - to - 5' direction and forms replication fork
(b) prove semi-conservative nature of DNA replication
(c) polymerize in the 5' - to - 3' direction and explain 3' - to - 5' DNA replication
(d) result in transcription.
20. Which one of the following makes use of RNA as a template to synthesize DNA?
(a) DNA polymerase (b) RNA polymerase
(c) Reverse transcriptase (d) DNA dependant RNA polymerase
21. In the DNA molecule
(a) the total amount of purine nucleotides and pyrimidine nucleotides is not always equal
(b) there are two strands which run parallel in the 5'→3' direction
(c) the proportion of adenine in relation to thymine varies with the organism
(d) there are two strands which run anti-parallel one in 5'→3' direction and other in 3'→5'
22. In *E.coli* the lac operon gets switched on when
(a) lactose is present and it binds to the repressor
(b) repressor binds to operator
(c) RNA polymerase binds to the operator
(d) lactose is present and it binds to RNA polymerase
23. Which correctly describes eukaryotic histones in a nucleosome structure?
(a) a core histone octamer plus a linker histone
(b) a core histone octamer plus 2 linker histone
(c) a core histone plus a linker histone octamer
(d) A core histone nonamer.
24. Variable part of DNA molecule is
(a) phosphate (b) sugar (c) nitrogen base (d) All of these

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.

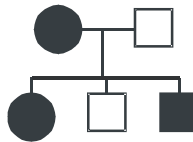
Question No. 25 to 28: Consist of two statements Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (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:** India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal.
Reason: The family planning programmes were initiated in 1991.
26. **Assertion:** Statutory raising of marriageable age of the female to 21 years and that of males to 18 years and incentives given to couples with small families are two of the other measures taken to tackle this problem.
Reason: India's population growth rate is about 1.4 percent a year and china's 2 percent a year.
27. **Assertion:** The male reproductive system is located in the pelvic region and it includes a pair of testes along with accessory ducts, glands and external genitalia.
Reason: The testes of human males are situated inside the abdominal cavity within a pouch called rectum.
28. **Assertion:** Pleiotropy should not be confused with polygenic traits.
Reason: In polygenic traits, multiple genes result in a single phenotype.
29. Given below is the diagram of a male reproductive system. In which one of the options all the five parts, A, B, C, D and E are correct?



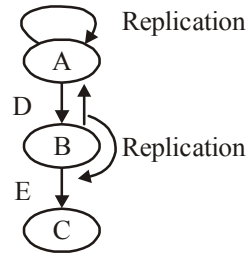
- (a) A-Rectum, B-Seminal Vesicle, C-Prostate, D-Urethra, E-Epididymis
 (b) A-Urinary bladder, B-Seminal Vesicle, C-Prostate, D-Urethra, E-Epididymis
 (c) A-Urinary bladder, B-Prostate, C-Seminal Vesicle, D-Urethra, E-Epididymis
 (d) A-Urinary bladder, B-Seminal Vesicle, C-Prostate, D-Epididymis, E-Urethra
30. Cleavage is a succession of rapid cell divisions that follows fertilisation. During cleavage
 (a) number of cells increase and embryo enlarge
 (b) number of cells increase and size of cells decrease
 (c) number of cells decrease and embryo does not enlarge
 (d) number of cells neither increase nor decrease but forms blastomeres.
31. The most common type of pollination is –
 (a) entomophily (b) ornithophily
 (c) malacophily (by snails) (d) chiropterophily (by bats)
32. A sperm cell moving from the lumen of the seminiferous tubule to the exterior of the body passes through all of the following structures EXCEPT the
 (a) seminal vesicle (b) epididymis (c) ductus deferens (d) urethra

33. Reproductive health in society can be improved by –
1. Introduction of sex education in schools.
 2. Increased medical assistance.
 3. Awareness about contraception and STDs.
 4. Equal opportunities to male and female child.
 5. Ban on aminocentesis.
 6. Encouraging myths and misconceptions.
- (a) All of these (b) 1, 2, 4 and 6
(c) 1, 2, 3, 4 and 5 (d) 2 and 5
34. Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?
- (a) Eight weeks (b) Twelve weeks
(c) Eighteen weeks (d) Six weeks
35. Starting from the innermost part, the correct sequence of parts in an ovule are
- (a) egg, nucellus, embryo sac, integument
(b) egg, embryo sac, nucellus, integument
(c) embryo sac, nucellus, integument, egg
(d) egg, integument, embryo sac, nucellus
36. Haemophilia is more commonly seen in human males than in human females because:
- (a) a greater proportion of girls die in infancy
(b) this disease is due to a Y-linked recessive mutation
(c) this disease is due to an X-linked recessive mutation
(d) this disease is due to an X-linked dominant mutation
37. Down's syndrome is caused by non-disjunction of
- (a) X-chromosome (b) Y-chromosome
(c) autosome (d) 42nd chromosome of *Drosophila*
38. The term 'linkage' was coined by :
- (a) T. Boveri (b) G. Mendel
(c) W. Sutton (d) T.H. Morgan
39. Given pedigree shows that the trait is inherited as autosomal dominant. Trace the genotype of Mother and Father

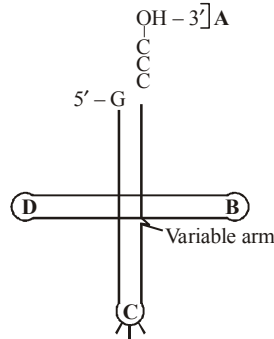


- (a) Father AA, Mother aa (b) Father AA, Mother Aa
(c) Father aa, Mother AA (d) Father aa, Mother Aa
40. Which one is the incorrect statement with regards to the importance of pedigree analysis?
- (a) It helps to trace the inheritance of a specific trait
(b) It confirms that DNA is the carrier of genetic information
(c) It helps to understand whether the trait in question is dominant or recessive
(d) It confirms that the trait is linked to one of the autosomes
41. Right handedness is dominant over left handedness. Most probable gene types with 2 right handed parents having left handed child is
- (a) $RR \times rr$ (b) $Rr \times RR$
(c) $RR \times Rr$ (d) $Rr \times Rr$
42. Protein synthesis occurs
- (a) on ribosomes present in cytosol as well as in mitochondria
(b) only on ribosomes attached to the nuclear envelope and endoplasmic reticulum
(c) only on the ribosomes present in cytosol
(d) on ribosomes present in the nucleolus as well as cytoplasm
43. The following ratio is generally constant for a given species:
- (a) $\frac{A+G}{C+T}$ (b) $\frac{T+C}{G+A}$
(c) $\frac{G+C}{A+T}$ (d) $\frac{A+C}{T+G}$

44. What does the given flow diagram indicate?



- (a) unidirectional flow of information
 - (b) bidirectional flow of information
 - (c) both (a) and (b)
 - (d) sometimes (a) or (b)
45. In a certain plant, red fruit (R) is dominant over yellow fruit (r) and tallness (T) is dominant over shortness (t). If a plant with RRTt genotype is crossed with a plant rrtt genotype, what will be the percentage of tall plants with red fruits in the progeny?
- (a) 50%
 - (b) 100%
 - (c) 75%
 - (d) 25%
46. Information flow or central dogma of modern biology is
- (a) RNA : Proteins : DNA
 - (b) DNA : RNA : Proteins
 - (c) RNA : DNA : Proteins
 - (d) DNA : RNA : Proteins
47. DNA is acidic due to
- (a) sugar
 - (b) purine
 - (c) phosphoric acid
 - (d) pyrimidine
48. Identify the labels A, B, C & D in the given structure of tRNA & select the correct option.

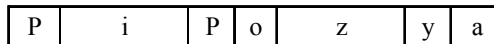


- | | | | |
|----------------|-----------------------|-----------------------|-----------------------|
| A | B | C | D |
| (a) Anticodon | T _ψ C loop | AA binding | DHU loop site |
| (b) AA binding | T _ψ C loop | Anticodon | DHU loop site |
| (c) AA binding | DHU loop site | Anticodon | T _ψ C loop |
| (d) AA binding | DHU loop site | T _ψ C loop | Anticodon |

SECTION-C

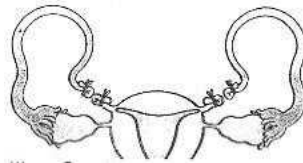
DIRECTION: This section consists of one case followed by 6 questions linked to this case (Q.No.49 to 54). Besides this, 6 more questions are given. Attempt any 10 questions in this section. The first attempted 10 questions would be evaluated.

Observe the diagram given below and answer the questions that follows



49. Lac operon is an example of
- (a) only positive regulation
 - (b) only negative regulation
 - (c) both positive and negative regulation
 - (d) sometimes positive sometimes negative
50. Which of these acts as an inducer of the lac operon?
- (a) Allolactose
 - (b) lactose
 - (c) Galactose
 - (d) Glucose
51. The sequence of the structural gene in the lac operon is
- (a) Lac Z – Lac Z – Lac Y
 - (b) Lac Z – Lac Y – Lac A
 - (c) Lac Z – Lac A – Lac Y
 - (d) Lac A – Lac Y – Lac Z

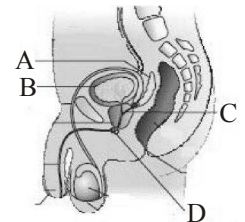
52. Lac operon will be turned on when
 (a) Lactose is less than glucose
 (b) Lactose is less in the medium
 (c) Lactose is more than glucose
 (d) Glucose is enough in the medium
53. In Lac operon, the gene product of Lac A gene is
 (a) Beta – galactoside permease
 (b) Beta – galactosidase trans acetylase
 (c) beta galactosidase
 (d) Beta – galactosidase isomerase.
54. Which of the following is the necessary condition for the entry of lactose into the cell?
 (a) High level expression of lac operon
 (b) Low level expression of lac operon
 (c) Absence of lac operon in the cell
 (d) Absence of proteins in the cells
55. The process done in the given figure



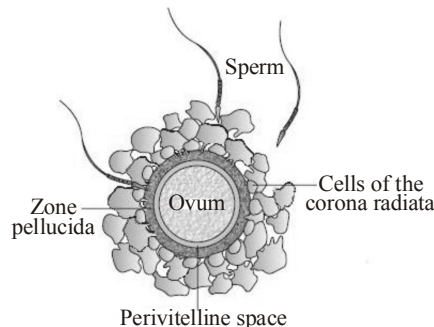
- (a) Prevents egg from reaching the uterus for implantation.
 (b) Avoid insemination
 (c) Inhibits ovulation
 (d) Increases contraceptive efficiency
56. Refer the following statement and answer the question.
 "Inability of an individual to inseminate the female or due to very low sperm counts in ejaculates leads to "A". It could be corrected by "B". In "B" the "C" is collected and artificially introduced either into the vagina or into the "D" (IUI - intra-uterine insemination) of the female."
 Identify A to D.

	A	B	C	D
(a)	STD	Embryo transfer	Urine	Fallopian tube
(b)	MTP	GIFT	Ovum	Uterus
(c)	Infertility	Artificial technique	Semen	Uterus
(d)	Infertility	ZIFT	Sperm	Fallopian tube

57. The given figure shows the male reproductive system. Some structures are marked as A, B, C, and D. Identify the structure whose removal will cause the sperm to be reacted with acidic urine in the urethra.
- (a) A
 (b) B
 (c) C
 (d) D

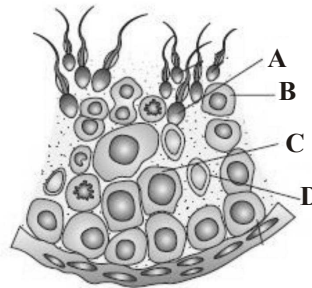


58. Study the given figure and conclude the correct explanation from the options given below:



- (a) All the sperm attaches with ovum.
 (b) Transport of sperm towards the ovum.
 (c) Ovum and surrounded sperms were going to take part in fertilization.
 (d) Sperm induces changes in the cells of corona radiata and blocks the entry of other additional sperms.

59. The figure given below shows the sectional view of seminiferous tubule.



Which marked structure (A to D) undergoes second meiotic division to produce four equal haploid cells (called spermatids)?

- (a) A (b) B (c) C (4) D
60. A complex of ribosomes attached to a single strand of RNA is known as
- (a) Polysome (b) Polymer (c) Polypeptide (d) Okazaki fragment

OMR ANSWER SHEET

Sample Paper No – 9

- ★ Use Blue / Black Ball pen only.
- ★ Please do not make any stray 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 darkened / half darkened circle might be rejected.

Start time : _____ End time _____ Time taken _____

1. Name (in Block Letters)

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2. Date of Exam

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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	
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