

Sample Paper

2

Time : 90 Minutes

Max. Marks : 50

General Instructions

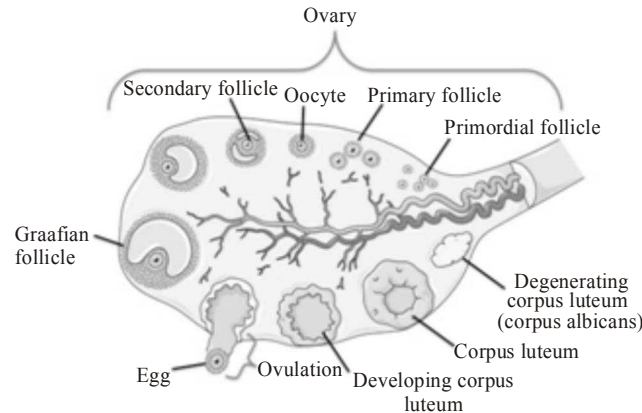
1. The Question Paper contains three sections.
2. **Section A** has 24 questions. Attempt any 20 questions.
3. **Section B** has 24 questions. Attempt any 20 questions.
4. **Section C** has 12 questions. Attempt any 10 questions.
5. All questions carry equal marks.
6. There is no negative marking

SECTION-A

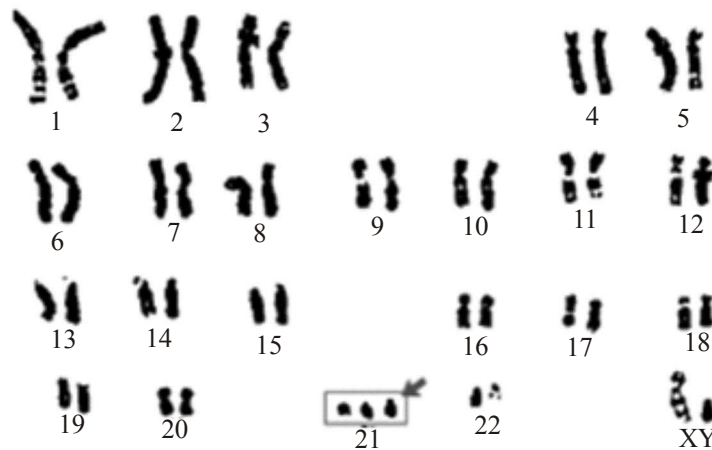
DIRECTION: This section consists of 24 questions. Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

1. 'Saheli' a new oral contraceptive developed by
 - (a) All Indian Institute of Medical Science
 - (b) Central Drug Research Institute
 - (c) Health Care Pvt. Ltd.
 - (d) Bharat Immunologicals & Biologicals corp. Ltd.
2. Frederick Griffith made his important observations about "transformation" while attempting to develop a vaccine against which pathogenic organism?
 - (a) E. coli
 - (b) Bacteriophage
 - (c) HIV
 - (d) S. Pneumoniae
3. What does the filiform apparatus do at the entrance into ovule?
 - (a) It helps in the entry of pollen tube into a synergid.
 - (b) It prevents entry of more than one pollen tube into the embryo sac.
 - (c) It brings about opening of the pollen tube.
 - (d) It guides pollen tube from a synergid to egg.
4. Product of sexual reproduction generally generates:
 - (a) Prolonged dormancy
 - (b) New genetic combination leading to variation
 - (c) Large biomass
 - (d) Longer viability of seeds
5. Spermatogenesis is promoted by:
 - (a) Estrogens
 - (b) Progesterone
 - (c) Testosterone
 - (d) Oxytocin
6. Vasa efferentia are the ductules leading from
 - (a) testicular lobules to rete testis
 - (b) rete testis to vas deferens
 - (c) vas deferens to epididymis
 - (d) epididymis to urethra

7. Corpus luteum is the source of secretion of

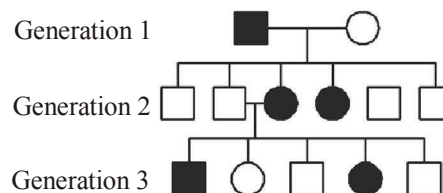


- (a) LH (b) Estradiol (c) Estrogen (d) Progesterone
8. In vitro fertilisation is a technique that involves transfer of which one of the following into the fallopian tube?
- (a) Embryo only, upto 8 cell stage
 (b) Either zygote or early embryo upto 8 cell stage
 (c) Embryo of 32 cell stage
 (d) Zygote only
9. The correct sequence of spermatogenetic stages leading to the formation of sperms in a mature human testes is:
- (a) spermatogonia - spermatocyte - spermatid- sperms
 (b) spermatid - spermatocyte - spermatogonia- sperms
 (c) spermatogonia - spermatid - spermatocyte- sperms
 (d) spermatocyte - spermatogonia - spermatid- sperms
10. Down's syndrome is characterised by



- (a) 19 trisomy
 (b) 21 trisomy
 (c) only one X chromosome
 (d) two X and one Y chromosome
11. 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.
12. Lack of independent assortment of two genes A and B in fruit fly *Drosophila* is due to
- (a) repulsion (b) recombination
 (c) linkage (d) crossing over
13. The two polynucleotide chains in DNA are
- (a) discontinuous (b) antiparallel
 (c) semi-conservative (d) parallel

14. Alleles are
 (a) true breeding homozygotes
 (b) different molecular forms of a gene
 (c) heterozygotes
 (d) different phenotype
15. A pleiotropic gene:
 (a) is a gene evolved during Pliocene.
 (b) controls a trait only in combination with another gene
 (c) controls multiple traits in an individual.
 (d) is expressed only in primitive plants
16. A common test to find the genotype of a hybrid is by
 (a) crossing of one F_2 progeny with female parent
 (b) studying the sexual behaviour of F_1 progenies
 (c) crossing of one F_1 progeny with male parent
 (d) crossing of one F_2 progeny with male parent.
17. Point mutation involves:
 (a) change in single base pair
 (b) duplication
 (c) deletion
 (d) insertion
18. Which one of the following is an example of polygenic inheritance ?
 (a) Production of male honey bee
 (b) Pod shape in garden pea
 (c) Skin colour in humans
 (d) Flower colour in *Mirabilis jalapa*
19. Infectious proteins are present in:
 (a) Gemini viruses
 (b) Prions
 (c) Viroids
 (d) Satellite viruses
20. In a mutational event, when adenine is replaced by guanine, it is a case of
 (a) frameshift mutation
 (b) transcription
 (c) transition
 (d) transversion
21. The key finding of the Hershey and Chase experiments on the mechanism of viral replication was that
 (a) protein, not DNA, is the hereditary material.
 (b) DNA, not protein, is the hereditary material.
 (c) protein and DNA play an equal role in determining inheritance.
 (d) neither protein nor DNA play a role in determining inheritance.
22. The lagging daughter strand of DNA is synthesized in what appears to be the “wrong” direction. This synthesis is accomplished by
 (a) ligating (connecting) short Okazaki fragments that are synthesized in short spurts in the “right” direction.
 (b) primase.
 (c) using multiple primers and DNA polymerase I.
 (d) Both (a) and (b)
23. Given below is a pedigree chart showing the inheritance of a certain sex-linked trait in humans



- The trait traced in the above pedigree chart is
 (a) Dominant X-linked
 (b) Recessive X-linked
 (c) Dominant Y-linked
 (d) Recessive Y-linked
24. During transcription, the DNA site at which RNA polymerase binds is called
 (a) enhancer
 (b) promoter
 (c) regulator
 (d) receptor

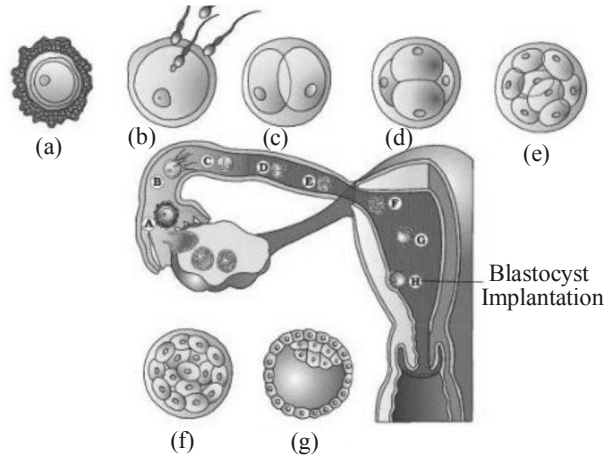
SECTION-B

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.

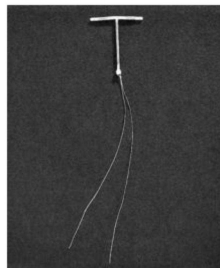
Question No. 25 to 28: Consist of two statements Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (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 Mendalian factors are also called unit factor which are known as genes.
Reason: Chemically, a gene is a linear segment of DNA called cistron.
26. **Assertion:** The percentage of crossing over between two genes is directly proportional to their distance.
Reason: The unit of crossing over has been termed as Haldone as Centi Morgan (CM).
27. **Assertion:** Grasshopper is an example of XO type of sex determination in which the males have only one x-chromosome besides the autosomes, whereas females have a pair of x-chromosomes.
Reason: In a number of insects and mammals including man XY type of sex determination is seen where both male and female have same number of chromosome.
28. **Assertion :** DNA is an acidic substance present in nucleus was first identified by Friedrich Meischer in 1869 and he named it as nuclein'.
Reason : In 1953, James Watson and Francis Crick based on the X-ray diffraction data produced by Maurice Wilkins and Rosalind Franklin, proposed a very simple but famous Double Heli model for the structure of DNA.
29. 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) 2.2m (d) 2.5m
30. Menstrual flow occurs due to lack of
 (a) FSH (b) Oxytocin (c) Vasopressin (d) Progesterone
31. Exine of pollen grain is made up of
 (a) Pectocellulose (b) Lignocellulose (c) Sporopollenin (d) Pollen kit
32. Fertilization in humans is practically feasible only if
 (a) the sperms are transported into vagina just after the release of ovum in fallopian tube
 (b) the ovum and sperms are transported simultaneously to ampullary isthmic junction of the fallopian tube
 (c) the ovum and sperms are transported simultaneously to ampullary - isthmic junction of the cervix
 (d) the sperms are transported into cervix within 48 hrs of release of ovum in uterus
33. Action of contraceptive is
 (a) to prevent the ovulation only.
 (b) prevention of ovulation and fertilization only.
 (c) prevention of ovulation, fertilization and implantation only.
 (d) prevent the rapid passing of eggs in oviduct.
34. Oral contraceptive pills are composed of
 (a) progestrogens only
 (b) progestrogen and estrogen combination
 (c) progestrogen-testosterone combination
 (d) None of them
35. Function of filiform apparatus is to:
 (a) Recognize the suitable pollen at stigma
 (b) Stimulate division of generative cell
 (c) Produce nectar
 (d) Guide the entry of pollen tube
36. A gene is said to be dominant if
 (a) it expresses its effect only in homozygous state
 (b) it expresses its effect only in heterozygous condition
 (c) it expresses its effect both in homozygous and heterozygous condition
 (d) it never expresses its effect in any conditions

37. In *Drosophila*, the sex is determined by
 (a) whether the egg is fertilized or develops parthenogenetically
 (b) the ratio of number of X-chromosomes to the sets of autosomes
 (c) X and Y chromosomes
 (d) the ratio of pairs of X-chromosomes to the pairs of autosomes
38. The genes controlling the seven pea characters studied by Mendel are now known to be located on how many different chromosomes ?
 (a) Four (b) Seven (c) Six (d) Five
39. Three germ layers are formed during which stage of Embryonic development.

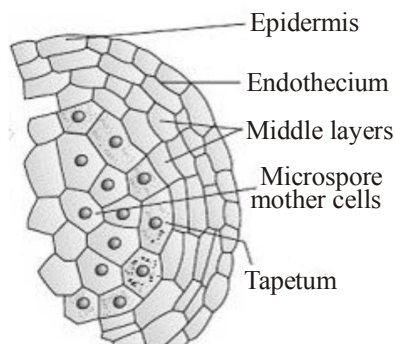


- (a) Morula (b) Blastula (c) Gastrula (d) In any two stages
40. F₂ generation in a Mendelian cross showed that both genotypic and phenotypic ratios are same as 1 : 2 : 1. It represents a case of :
 (a) Co-dominance
 (b) Dihybrid cross
 (c) Monohybrid cross with complete dominance
 (d) Monohybrid cross with incomplete dominance
41. In sickle-cell anaemia glutamic acid is replaced by valine. Which one of the following triplet codes for valine ?
 (a) GGG (b) AAG (c) GAA (d) GUG
42. In our society women are blamed for producing female children. Choose the correct answer for the sex-determination in humans
 (a) Due to some defect in the women
 (b) Due to some defect like aspermia in man
 (c) Due to the genetic make up of the particular sperm which fertilizes the egg
 (d) Due to the genetic make up of the egg
43. Which of the following mechanisms of gene regulation operates after mRNA transcription but before translation of mRNA into protein?
 (a) mRNA splicing (b) DNA packing
 (c) Repressors and activators (d) Protein degradation
44. What is the function of copper-T



- (a) stops obliteration of blastocoel (b) checks mutation
 (c) stops fertilization (d) stops zygote formation

45. Position of a gene on chromosome is called
 (a) locus (b) factor (c) cistron (d) nucleosome
46. DNA replication is an _____ process and _____ energy.
 (a) exergonic; does not require (b) endothermic; does require
 (c) endergonic; does require (d) endothermic; does not require
47. Which Mendelian idea is depicted by a cross in which the F_1 generation resembles both the parents?
 (a) Law of dominance (b) Inheritance of one gene
 (c) Co-dominance (d) Incomplete dominance
48. Which layer of microsporangium provides nutrition to the developing pollen grains:

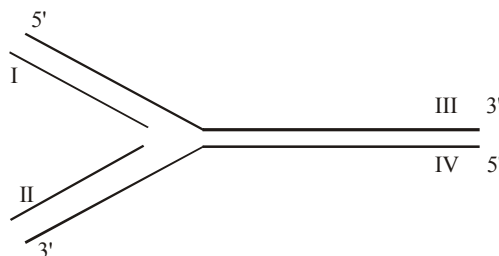


- (a) Epidermis (b) Endothecium (c) Tapetum (d) None of them

SECTION-C

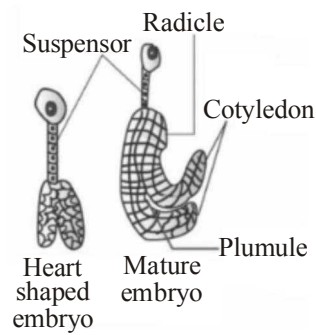
DIRECTION: This section consists of one case followed by 6 questions linked to this case (Q.No.49 to 54). Besides this, 6 more questions are given. Attempt any 10 questions in this section. The first attempted 10 questions would be evaluated.

The mechanism of DNA replication is studied in an E. coli replication fork.

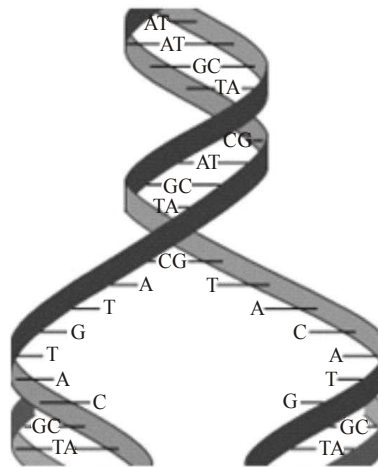


49. Which is a characteristic of this replication fork?
 (a) Strands I and II have base sequences that are identical to each other.
 (b) Strands II and IV have an antiparallel orientation as the fork moves to the right.
 (c) Strands I and III will be covalently bonded to each other when replication is completed.
 (d) Strands III and IV will be H-bonded to each other when replication is completed.
50. Which is a characteristic of this replication fork?
 (a) Strand I is replicated continuously while strand II is replicated discontinuously.
 (b) Strand III is a lagging strand template while strand IV is a leading strand template.
 (c) The double-helix containing strands I and III must be denatured in order for replication to continue.
 (d) The double-helix containing strands II and IV will form base-pairs using phosphodiester bonds.
51. Which is a property of Okazaki pieces in an E. coli replication fork?
 (a) Okazaki pieces are joined together by DNA polymerase I to form a long chain.
 (b) Okazaki pieces are polymerized in the 3' → 5' direction by DNA polymerase III.
 (c) An Okazaki piece for the leading strand is polymerized to a length of 1000-2000 nucleotides.
 (d) An Okazaki piece for the lagging strand has a base sequence complementary to its template.
52. Which is a property of RNA primers in an E. coli replication fork?
 (a) RNA primers are synthesized using a DNA template and NDPs.
 (b) Each RNA primer is joined to an Okazaki piece through a non-covalent bond.
 (c) Each RNA primer is both polymerized and degraded in the 5' → 3' direction.
 (d) RNA primers are synthesized and proof-read by the primase enzyme.

53. When will this fork stop replicating DNA?
 (a) when its movement is halted by a Ter sequence
 (b) when it is denatured by the Tus protein
 (c) when it reaches the OriC region
 (d) when a topoisomerase removes supercoils
54. Which is a characteristic of an E. coli replication fork and a eukaryotic replication fork?
 (a) Both forks contain a leading strand and a lagging strand.
 (b) Polymerization occurs more rapidly in eukaryotes.
 (c) Okazaki pieces are smaller in prokaryotes.
 (d) Both forks can synthesize DNA only during S phase.
55. Suspensor is made up of



- (a) 20 to 25 cells (b) 2 to 4 cells (c) 8 to 16 cells (d) None of above
56. The given diagram called as

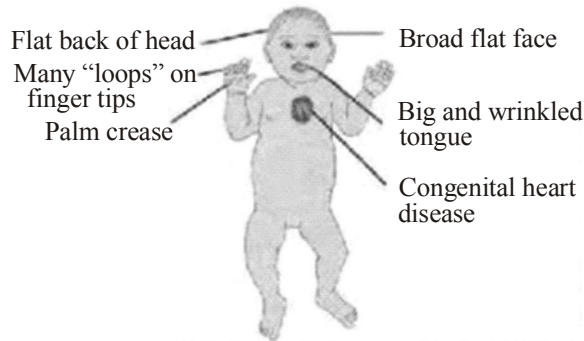


- (a) Meselson and Stahl's model (b) Hershey-Chase model
 (c) Watson and Crick model (d) None of them
57. Which of the given figure represents Turner's syndrome?



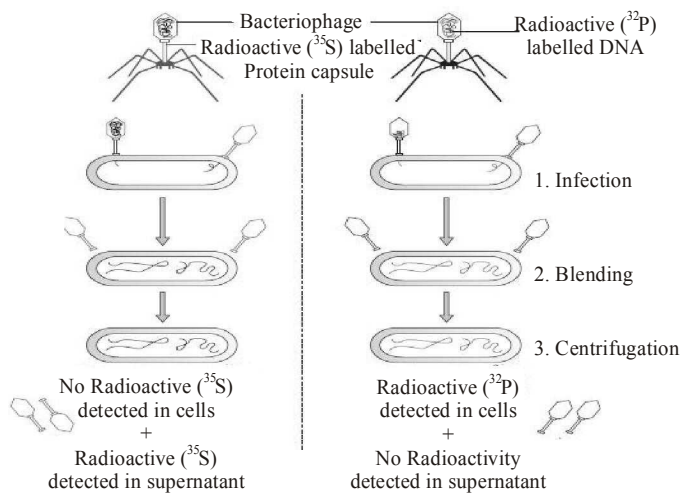
- (a) Figure (A) (b) Figure (B) (c) Figures (A) and (B) (d) None of them

58. The characteristics are mentioned in the figure. These are the characteristics of



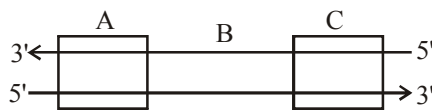
(a) Turner's syndrome (b) Down's syndrome (c) Klinefelter's syndrome (d) All of them

59. Which of the following experiment is represented by the given figure?



(a) Meselson and Stahl's experiment (b) Hershey-chase experiment
(c) Both (a) and (b) (d) None of them

60. In the given diagram, A, B and C represent respectively.



(a) A – Structural gene, B – Terminator, C – Promoter
(b) A – Promoter, B – Terminator, C – Structural gene
(c) A – Promoter, B – Structural gene, C – Terminator
(d) A – Terminator, B – Promoter, C – Structural gene

OMR ANSWER SHEET

Sample Paper No – 2

- ★ 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

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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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