

# Sample Paper

4

Time : 90 Minutes

Max. Marks : 50

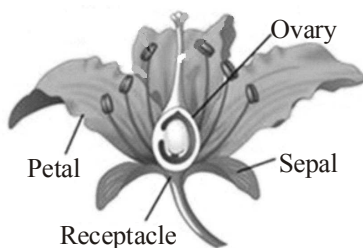
## General Instructions

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

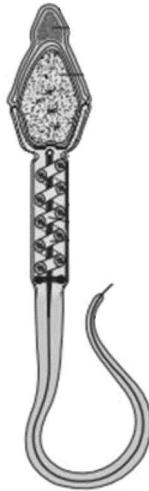
**DIRECTION:** This section consists of 24 questions. Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

1. The outermost and innermost wall layers of microsporangium in an anther are respectively.  
(a) Endothecium and tapetum (b) Epidermis and endodermis  
(c) Epidermis and middle layer (d) Epidermis and tapetum
2. The structure ruptures when "water breaks" in pregnancy  
(a) placenta (b) amniotic fluid  
(c) chorionic sac (d) amniochorionic membrane
3. From among the sets of terms given below, identify those that are associated with the gynoecium.  
(a) Stigma, ovule, embryo sac, placenta  
(b) Thalamus, pistil, style, ovule  
(c) Ovule, ovary, embryo sac, tapetum  
(d) Ovule, stamen, ovary, embryo sac
4. The phenomenon wherein, the ovary develops into a fruit without fertilisation is called  
(a) parthenocarpy (b) apomixis  
(c) asexual reproduction (d) sexual reproduction
5. Flower with all the four type of floral organs is

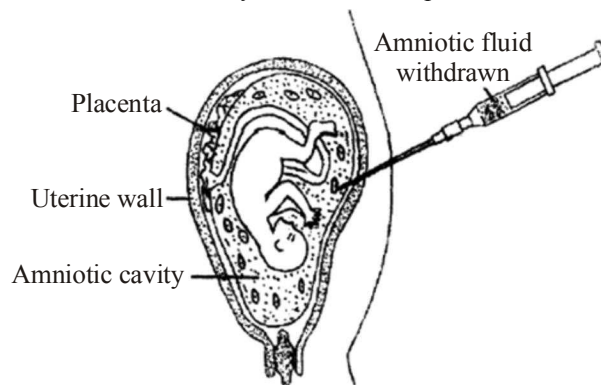


6. Flower with all the four type of floral organs is  
(a) Regular (b) Irregular (c) Complete (d) Perfect
6. Egg is liberated from ovary in  
(a) Secondary oocyte stage (b) Primary oocyte stage  
(c) Oogonial stage (d) Mature ovum stage

7. \_\_\_\_\_ provides energy to the sperm for its movement.

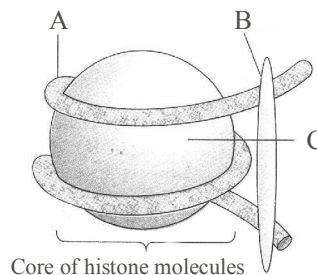


- (a) Tail                                      (b) Middle piece                                      (c) Head                                      (d) Acrosome
8. Which one is a primary sex organ?  
 (a) Testis                                      (b) Scrotum                                      (c) Prostate                                      (d) Penis
9. Seminal plasma in human males is rich in :  
 (a) fructose and calcium                                      (b) glucose and calcium  
 (c) DNA and testosterone                                      (d) ribose and potassium
10. Which of the following tests cannot be examined by Amniocentesis procedure?



- (a) Chromosome analysis                                      (b) Detecting genetic defects  
 (c) Maturity of fetal lungs                                      (d) None of these
11. Tapetum is  
 (a) parietal in origin usually the inner most layer of anther wall.  
 (b) modified endothecium of anther wall.  
 (c) modified outer most layer of sporogenous tissue.  
 (d) parietal in origin and is the inner most layer of ovule wall.
12. All genes located on the same chromosome  
 (a) Form different groups depending upon their relative distance  
 (b) Form one linkage group  
 (c) Will not form any linkage group  
 (d) Form interactive group that affect the phenotype
13. Mendel's law of independent assortment holds good for genes situated on the  
 (a) non - homologous chromosomes  
 (b) homologous chromosomes  
 (c) extra nuclear genetic element  
 (d) Same chromosome

14. The incorrect statement with regard to Haemophilia is :
- It is a recessive disease
  - It is a dominant disease
  - A single protein involved in the clotting of blood is affected
  - It is a sex-linked disease
15. Genetic variation in a population arises due to
- Mutations only
  - Recombination only
  - Mutations as well as recombination
  - Reproductive isolation and selection
16. Mutations can be induced with :
- infra red radiations
  - IAA
  - ethylene
  - gamma radiations
17. Across between parents with A and AB blood groups results in the offspring with which of the following blood groups?
- only A
  - only B
  - A, B and AB
  - only O
18. Which one from those given below is the period for Mendel's hybridization experiments?
- 1840 - 1850
  - 1857 - 1869
  - 1870 - 1877
  - 1856 - 1863
19. Transcription in prokaryotic cell is :
- initiated at a promoter using one of three RNA polymerases (RNA polymerase II).
  - initiated at a start codon with the help of initiation factors and the small subunit of the ribosome.
  - initiated at a promoter and uses only one strand of DNA, the template strand, to synthesize a complementary RNA strand.
  - is terminated at stop codons.
20. Chargaff's rules of base pairing states that
- the ratio of purines to pyrimidines is roughly equal in all tested organisms.
  - the ratio of A to T is roughly equal in all tested organisms.
  - the ratio of A + T and G + C is roughly equal in all tested organisms.
  - Both (a) and (c)
21. One of the most frequently used techniques in DNA fingerprinting is
- AFLP
  - VNTR
  - SSCP
  - SCAR
22. Which of the following is not a property of the genetic code?
- Universal
  - Non-overlapping
  - Ambiguous
  - Degeneracy
23. Given diagram is labelled as A, B and C. Label B indicates



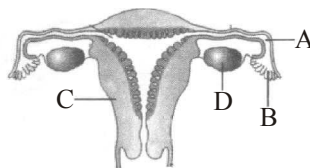
- DNA
  - Histone octamer
  - H1 histone
  - None of them
24. Uridine, present only in RNA is a
- Pyrimidine
  - Nucleoside
  - Nucleotide
  - Purine

## 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.

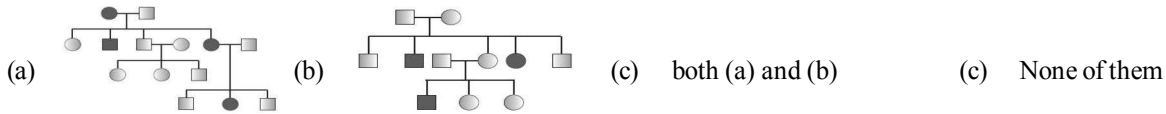
**Question No. 25 to 28:** Consist of two statements Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (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:** In very rare cases, a surrogate mother may have to be used to bring up in vitro fertilised ovum to maturity.  
**Reason:** Success rate of test tube baby is more than 90%.
26. **Assertion:** Spermatogenesis starts at the age of puberty due to significant increase in the secretion of gonadotropin releasing hormone (GnRH).  
**Reason:** The increased levels of GnRH then acts at the anterior pituitary gland and stimulate secretion of two gonadotropins –LH and FSH.
27. **Assertion:** Spermatogenesis requires 72-74 days to get completed.  
**Reason:** Sperms reach the epididymis and stay there for 2-3 days for maturation i.e., to become motile.
28. **Assertion:** The sperm head contains an elongated haploid nucleus, the anterior portion of which is covered by a cap-like structure, acrosome.  
**Reason:** The acrosome is formed by the Golgi complex of the spermatid.
29. Refer to the given diagram and select the option that correctly identifies the labelled part along with its characteristic.

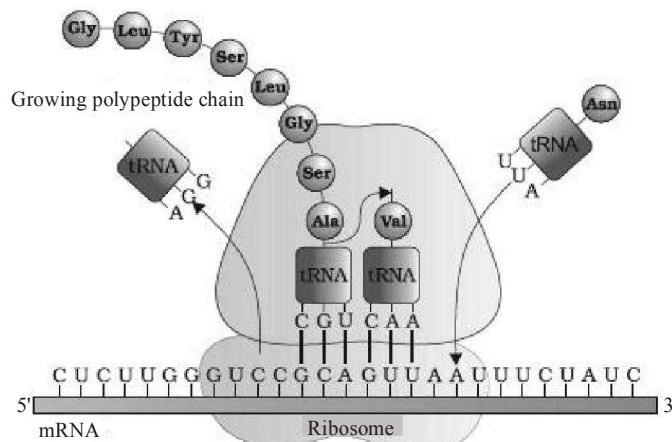


- (a) A-Ampulla – Site of blastocyst implantation  
 (b) B-Fimbriae – Collect ova  
 (c) C-Myometrium – Shed during menstrual bleeding  
 (d) D-Ovary – Secrete hCG
30. Which of the following options is correct?
- | <b>Haploid</b>             | <b>Diploid</b>         |
|----------------------------|------------------------|
| (a) Secondary oocyte       | Primary spermatocyte   |
| (b) Secondary spermatocyte | Secondary oocyte       |
| (c) Primary oocyte         | Secondary spermatocyte |
| (d) Ovum                   | Spermatid              |
31. Which of the following pair has haploid structures?
- (a) Nucellus and antipodal cells  
 (b) Antipodal cells and egg cell  
 (c) Antipodal cells and megaspore mother cell  
 (d) Nucellus and primary endosperm nucleus
32. Choose the correct sequence of events that occur in human reproduction.
- (a) Gametogenesis → insemination → fertilisation → implantation → gestation → parturition  
 (b) Gametogenesis → gestation → insemination → fertilisation → implantation → parturition  
 (c) GestatIO n → gametogenesis → insemination → implantation → fertilisation → parturition  
 (d) Gametogenesis → insemination → gestation → implantation → fertilisation → parturition
33. MTP is practised mainly to –
- (a) get rid of unwanted female child legally.  
 (b) get rid of unwanted pregnancies due to failure of contraception of rapes.  
 (c) both (a) and (b).  
 (d) decrease population size.

34. Action of vaginal diaphragm is –  
 (a) prevent the ova to come in the uterus  
 (b) prevent the sperm to come in contact with ova  
 (c) spermicidal  
 (d) anti-implantational
35. The study of formation, growth and development of new individual from an egg is called  
 (a) embryology (b) embryogenesis (c) morphogenesis (d) embryolysis
36. A mutation at a single locus causes a change in many different characters. This is an example of a  
 (a) polygene effect (b) epigenetic effect (c) cytoplasmic effect (d) pleiotropic effect
37. The genotypes of a husband and Wife are  $I^A I^B$  and  $I^A i$ .  
 Among the blood types of their children, how many different genotypes and phenotypes are possible?  
 (a) 3 genotypes ; 4 phenotypes (b) 4 genotypes ; 3 phenotypes  
 (c) 4 genotypes ; 4 phenotypes (d) 3 genotypes ; 3 phenotypes
38. 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
39. Which of the above diagram shows autosomal dominant trait?

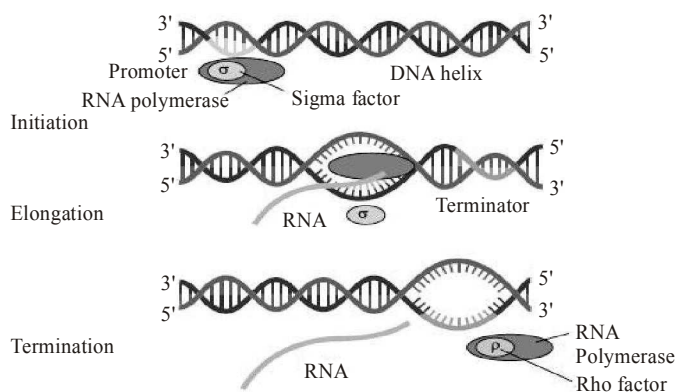


40. Occasionally, a single gene may express more than one effect. The phenomenon is called  
 (a) multiple allelism (b) mosaicism (c) pleiotropy (d) polygeny
41. A colour blind man marries a woman with normal sight who has no history of colour blindness in her family.  
 What is the probability of their grandson being colour blind?  
 (a) 1 (b) Nil (c) 0.25 (d) 0.5
42. The length of DNA molecule greatly exceeds the dimensions of the nucleus in eukaryotic cells. How is this DNA accommodated?  
 (a) super-coiling in nucleosomes  
 (b) DNase digestion  
 (c) through elimination of repetitive DNA  
 (d) deletion of non-essential genes
43. The net electric charge on DNA and histones is  
 (a) both positive (b) both negative (c) both (a) and (b) (d) zero
44. The given diagram represents the process of



- (a) Replication (b) Transcription (c) Translation (d) All of them

45. A disease caused by an autosomal primary non-disjunction is  
 (a) Klinefelter's Syndrome (b) Turner's Syndrome  
 (c) Sickle Cell Anemia (d) Down's Syndrome
46. Which one of the following cannot be explained on the basis of Mendel's Law of Dominance?  
 (a) The discrete unit controlling a particular character is called a factor  
 (b) Out of one pair of factors one is dominant, and the other recessive  
 (c) Alleles do not show any blending and both the characters recover as such in F<sub>2</sub> generation.  
 (d) Factors occur in pairs
47. Thirty percent of the bases in a sample of DNA extracted from eukaryotic cells is adenine. What percentage of cytosine is present in this DNA?  
 (a) 10% (b) 20% (c) 30% (d) 40%
48. The given diagram represents the process of transcription in eukaryotes or prokaryotes.

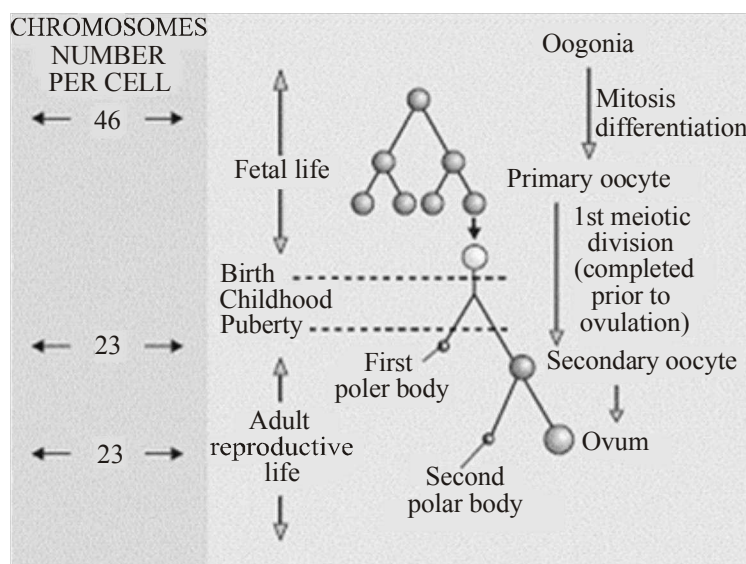


- (a) Eukaryotes (b) Prokaryotes (c) Both of them (d) None of them

**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.

**Case:** Refer to the below mention diagram and answer the questions that follows-

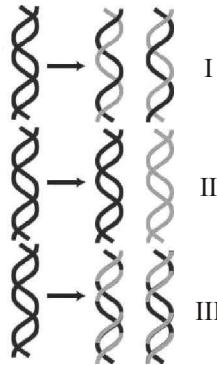


49. What is the process of the formation of a mature female gamete called?  
 (a) Menstruation (b) Spermatogenesis (c) Oogenesis (d) Ovulation
50. The onset of oogenesis occurs during \_\_\_\_\_  
 (a) puberty (b) birth (c) adulthood (d) embryonic development

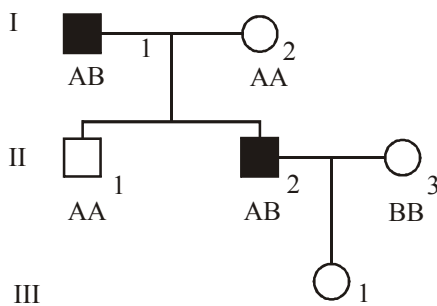
51. What is the stage of the cell cycle at which primary oocytes are arrested?  
 (a) Prophase I (b) Metaphase I (c) Prophase II (d) Metaphase II
52. A person with tetraploidy will have \_\_\_\_\_ set of chromosomes in their first polar body.  
 (a) haploid (b) triploid (c) diploid (d) polyploid
53. The division of primary oocyte into the secondary oocyte and first polar body is an example of \_\_\_\_\_  
 (a) symmetric division (b) asymmetric division  
 (c) Cell death (d) asexual reproduction
54. Which of the following is the correct set of ploidy and cell type?  
 (a) Primary oocyte: Diploid; Secondary oocyte: Haploid; Ovum: Haploid  
 (b) Primary oocyte: Haploid; Secondary oocyte: Haploid; Ovum: Haploid  
 (c) Oogonium: Diploid; Primary oocyte: Diploid; Secondary oocyte: Diploid  
 (d) Oogonium: Diploid; Primary oocyte: Haploid; Secondary oocyte: Haploid
55. What does the structure of DNA resemble?



- (a) A triple chain (b) A twisted ladder (c) Blueprints (d) A twisted ball
56. Which of the following figure represents the conservative replication of DNA?

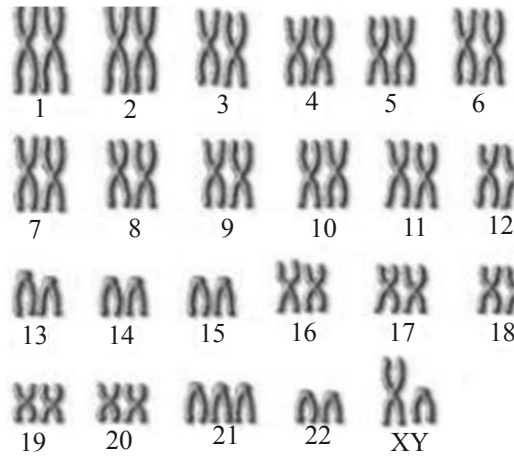


- (a) Figure I (b) Figure III (c) Figure II (d) None of them
57. In this pedigree A and B represent alleles at a marker locus closely linked to the disease locus. Affected individuals are shown as shaded. The disease status in III 1 is unknown. Which of the following is correct?

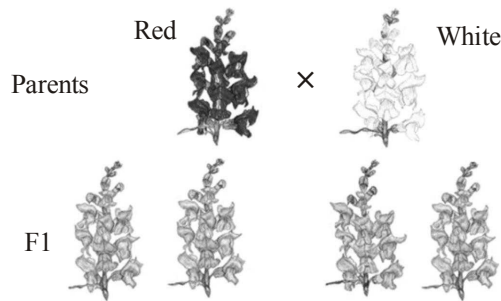


- (a) The probable pattern of inheritance shown by the disease in this family is autosomal recessive.  
 (b) If recombination does not occur the probability that III 1 will be affected if she has an AB marker genotype is 1.  
 (c) If recombination does not occur, the probability that III 1 will be affected if she has a BB marker genotype is 1.  
 (d) If the recombination fraction between the disease and marker loci equals 0.04, the probability that III 1 will be affected if she inherits an AB marker genotype equals 0.9

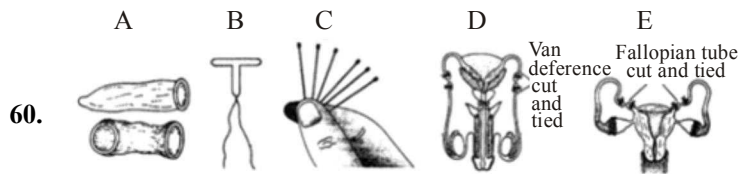
58. The figure below displays the karyotype of a person suffering from a genetic disorder. Identify the disorder:



- (a) Down's syndrome
  - (b) Klinefelter's syndrome
  - (c) Turner's syndrome
  - (d) Cri du chat syndrome
59. If snapdragons demonstrate incomplete dominance in flower color, what would be the result of a cross between a red-flowered snapdragon with a white-flowered snapdragon?



- (a) All the offspring will have white flowers
- (b) All the offspring will have pink flowers.
- (c) All the offspring will have red flowers.
- (d) Three-fourths of the offspring will have red flowers and one-fourth will have white flowers.



- I. Tubectomy
  - II. Vasectomy
  - III. Implants
  - IV. Condoms
  - V. Copper T
  - V. Cervical caps
- (a) A – VI; B – V; C – III; D – II; E – I
  - (b) A – III; B – V; C – IV; D – I; E – II
  - (c) A – IV; B – V; C – III; D – II; E – I
  - (d) A – VI; B – V; C – IV; D – I; E – II



# OMR ANSWER SHEET

## Sample Paper No – 4

- ★ 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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