

Sample Paper

10

Time : 90 Minutes

Max. Marks : 35

General Instructions

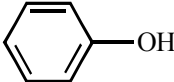
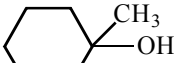
1. The Question Paper contains three sections.
2. Section A has 25 questions. Attempt any 20 questions.
3. Section B has 24 questions. Attempt any 20 questions.
4. Section C has 6 questions. Attempt any 5 questions.
5. All questions carry equal marks.
6. There is no negative marking.

SECTION-A

This section consists of 25 multiple choice questions with overall choice to attempt **any 20** questions. In case more than desirable number of questions are attempted, **ONLY** first 20 will be considered for evaluation.

1. Which one of the following is not an allylic halide?
(a) 4-Bromopent-2-ene (b) 3-Bromo-2-methylbut-1-ene
(c) 1-Bromobut-2-ene (d) 4-Bromobut-1-ene
2. Which of the following is most acidic?
(a) Benzyl alcohol (b) Cyclohexanol (c) Phenol (d) *m*-chlorophenol
3. What is the normality of a 1 M solution of H_3PO_4 ?
(a) 0.5 N (b) 1.0 N (c) 2.0 N (d) 3.0 N
4. Which of the following alkyl halides will undergo $\text{S}_{\text{N}}1$ reaction most readily?
(a) $(\text{CH}_3)_3\text{C}-\text{F}$ (b) $(\text{CH}_3)_3\text{C}-\text{Cl}$ (c) $(\text{CH}_3)_3\text{C}-\text{Br}$ (d) $(\text{CH}_3)_3\text{C}-\text{I}$
5. The couplings between base units of DNA is through
(a) hydrogen bonding (b) electrostatic bonding (c) covalent bonding (d) van der Waal's forces
6. The radius of a calcium ion is 94 pm and of the oxide ion is 146 pm. The possible crystal structure of calcium oxide will be
(a) tetrahedral (b) trigonal (c) octahedral (d) pyramidal
7. Which is the correct IUPAC name for
$$\text{CH}_3 - \underset{\substack{| \\ \text{C}_2\text{H}_5}}{\text{CH}} - \text{CH}_2 - \text{Br} ?$$

(a) 1-bromo-2-ethylpropane (b) 1-bromo-2-ethyl-2-methylethane
(c) 1-bromo-2-methylbutane (d) 2-methyl-1-bromobutane
8. How many "nearest" and "next nearest" neighbours, respectively, does potassium have in bcc lattice?
(a) 8, 8 (b) 8, 6 (c) 6, 8 (d) 6, 6
9. Among the following, the essential amino acid is :
(a) Alanine (b) Valine (c) Aspartic acid (d) Serine
10. Which of the following compounds is oxidised to prepare methyl ethyl ketone?
(a) 2-Propanol (b) 1-Butanol (c) 2-Butanol (d) *t*-Butyl alcohol
11. What should be the correct IUPAC name for diethylbromomethane
(a) 1-bromo-1, 1-diethylmethane (b) 3-bromopentane
(c) 1-bromo-1-ethylpropane (d) 1-bromopentane

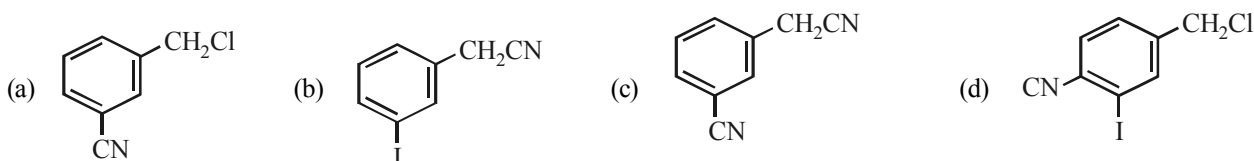
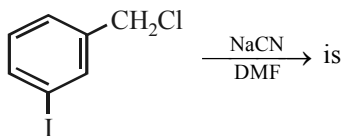
12. 12 g of a non-volatile solute dissolved in 108 g of water produces the relative lowering of vapour pressure of 0.1. The molecular mass of the solute is
 (a) 80 (b) 60 (c) 20 (d) 40
13. Which of the following on thermal decomposition gives oxygen gas?
 (a) Ag_2O (b) Pb_3O_4 (c) PbO_2 (d) All of these
14. In which of the following crystals alternate tetrahedral voids are occupied?
 (a) NaCl (b) ZnS (c) CaF_2 (d) Na_2O
15. Equal masses of methane and oxygen are mixed in an empty container at 25°C . The fraction of the total pressure exerted by oxygen is
 (a) $1/2$ (b) $2/3$ (c) $\frac{1}{3} \times \frac{273}{298}$ (d) $1/3$
16. Sodium metal crystallizes in a body centred cubic lattice with a unit cell edge of 4.29\AA . The radius of sodium atom is approximately:
 (a) 5.72\AA (b) 0.93\AA (c) 1.86\AA (d) 3.22\AA
17. Molecules whose mirror image is non – superimposable over them are known as chiral. Which of the following molecule is chiral in nature?
 (a) 2 - bromobutane (b) 1 - bromobutane (c) 2 - bromopropane (d) 2 -bromopropan - 2 - ol
18. Observation of "Ruhemann's purple" is a confirmatory test for the presence of :
 (a) Starch (b) Reducing sugar (c) Protein (d) Cupric ion
19. The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with
 (a) PCl_5 (b) dry HCl in the presence of anhydrous ZnCl_2
 (c) SOCl_2 in presence of pyridine (d) None of these
20. Which one of the following halide does not hydrolyse
 (a) SbCl_3 (b) AsCl_3 (c) PCl_3 (d) NF_3
21. IUPAC name of *m*-cresol is
 (a) 3-methylphenol (b) 3-chlorophenol (c) 3-methoxyphenol (d) benzene-1,3-diol
22. In a solid 'AB' having the NaCl structure, 'A' atoms occupy the corners of the cubic unit cell. If all the face-centered atoms along one of the axes are removed, then the resultant stoichiometry of the solid is
 (a) AB_2 (b) A_2B (c) A_4B_3 (d) A_3B_4
23. Methylated spirit is
 (a) methanol (b) methanol + ethanol (c) methanoic acid (d) methanamide
24. Which is an application of Henry's law?
 (a) Spray paint (b) Bottled water (c) Filling up tyre (d) Soft drinks (soda)
25. Which is oxidized most easily?
 (a) $\text{CH}_3 - \text{CHOH} - \text{CH}_3$ (b) 
 (c) $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_2 - \text{CH}_3$ (d) 

SECTION-B

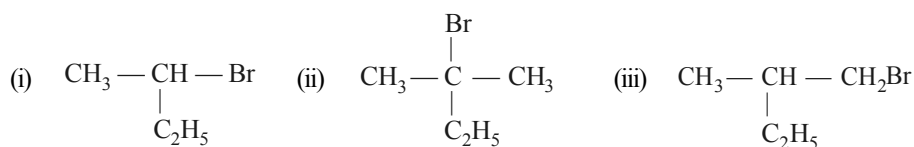
This section consists of 24 multiple choice questions with overall choice to attempt **any 20** questions. In case more than desirable number of questions are attempted, **ONLY first 20** will be considered for evaluation.

26. The three important oxidation states of phosphorus are
 (a) $-3, +3$ and $+5$ (b) $-3, +3$ and -5 (c) $-3, +3$ and $+2$ (d) $-3, +3$ and $+4$
27. Which of the following reactions of glucose can be explained only by its cyclic structure?
 (a) Glucose forms pentaacetate
 (b) Glucose reacts with hydroxylamine to form an oxime
 (c) Pentaacetate of glucose does not react with hydroxyl amine
 (d) Glucose is oxidised by nitric acid to gluconic acid

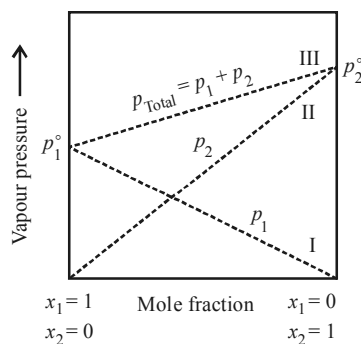
28. The structure of the major product formed in the following reaction



29. Which of the following compounds will give racemic mixture on nucleophilic substitution by OH^- ion?

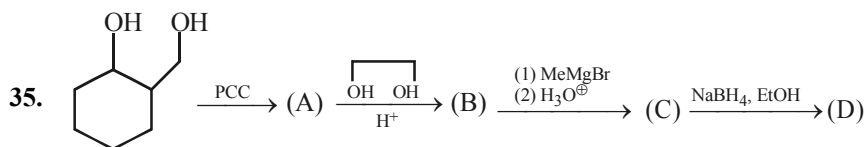


- (a) (i) (b) (i), (ii) and (iii) (c) (ii) and (iii) (d) (i) and (iii)
30. The number of P – O – P bonds in cyclic metaphosphoric acid is
 (a) zero (b) two (c) three (d) four
31. A plot of p_1 and p_2 vs the mole fractions x_1 and x_2 is given as.



In this figure, lines I and II intersect through the point for which.

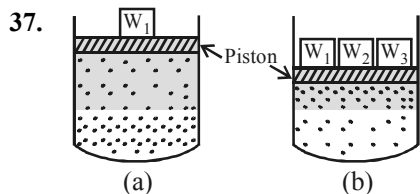
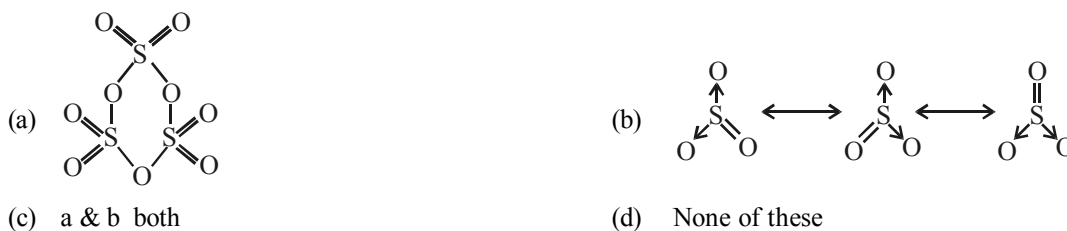
- (a) $x_1 \neq 1; x_2 = 1$ (b) $x_1 = x_2 \neq 1$ (c) $x_1 = 1; x_2 \neq 1$ (d) $x_1 = x_2 = \frac{1}{2}$
32. Which of the statements given below is incorrect?
 (a) Cl_2O_7 is an anhydride of perchloric acid (b) O_3 molecule is bent
 (c) ONF is isoelectronic with O_2N^- (d) OF_2 is an oxide of fluorine
33. Which of the following statement(s) is/are correct?
 (i) Information regarding the sequence of nucleotides in the chain of a nucleic acid is called its primary structure.
 (ii) In secondary structure of DNA adenine forms hydrogen bonds with guanine whereas cytosine forms hydrogen bonds with thymine.
 (iii) RNA molecules are of three types m-RNA, r-RNA and t-RNA and they all perform different functions.
 (a) (ii) only (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) only
34. XeO_4 molecule is tetrahedral having :
 (a) Two $p\pi - d\pi$ bonds (b) One $p\pi - d\pi$ bonds (c) Four $p\pi - d\pi$ bonds (d) Three $p\pi - d\pi$ bonds



Product (D) in above reaction is:

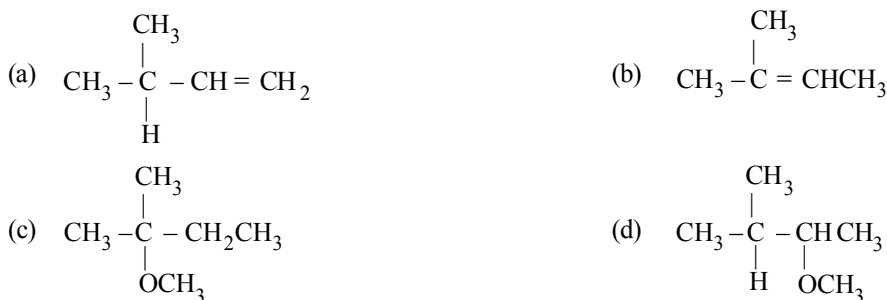
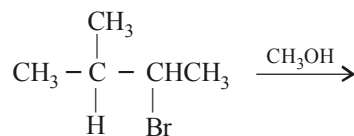


36. In the solid state, SO_3 may have structure



On the basis of the figure given above, which of the following is not true?

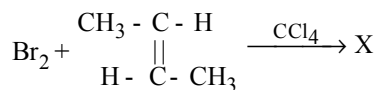
- (a) In figure (a), assuming the state of dynamic equilibrium, rate of gaseous particles entering and leaving the solution phase is same.
 (b) In figure (b), on compressing the gas, number of gaseous particles per unit volume over the solution increases.
 (c) Rate at which gaseous particles are striking the solution to enter it, decreases.
 (d) Rate at which gaseous particles are striking the solution to enter it, increases.
38. Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures will show a positive deviation from Raoult's law?
 (a) Methanol and acetone (b) Chloroform and acetone
 (c) Nitric acid and water (d) Phenol and aniline
39. The major product of the following reaction is



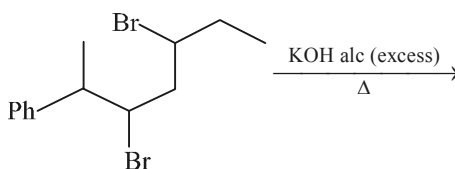
40. Which of the following statements regarding DNA fingerprinting is incorrect?

- (a) It is used in forensic laboratories for identification of criminals.
 (b) It cannot be altered by surgery.
 (c) It is different for every cell and cannot be altered by any known treatment.
 (d) It is used to determine paternity of an individual.

41. X in the following reaction is –



- (a) (+) 2, 3-Dibromobutane (b) (–) 2, 3-Dibromobutane
 (c) Rac. 2, 3-Dibromobutane (d) Meso-2, 3-Dibromobutane
42. An inorganic compound reacts with SO_2 in aqueous medium, produces (A). (A) on reaction with Na_2CO_3 gives the compound (B) which with sulphur give a substance (C) used in photography. The compound (C) is
 (a) $\text{Na}_2\text{S}_2\text{O}_3$ (b) Na_2SO_4 (c) Na_2S (d) $\text{Na}_2\text{S}_2\text{O}_7$
43. An element having an atomic radius of 0.14 nm crystallizes in an *fcc* unit cell. What is the length of a side of the cell?
 (a) 0.56 nm (b) 0.24 nm (c) 0.96 nm (d) 0.4 nm
44. The major product of the following reaction is:



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

Given below are two statements labelled as Assertion (A) and Reason (R). Select the most appropriate answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false and R is also false.

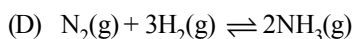
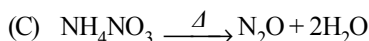
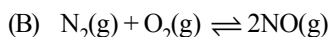
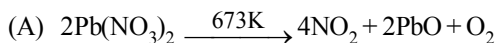
45. **Assertion:** Chromium do not dissolve in concentrated nitric acid
Reason: Due to inertness of chromium, it does not dissolve in nitric acid.
46. **Assertion:** interhalogen compounds are more reactive than halogens(except F)
Reason: bond strength in interhalogen compounds is weaker than halogen molecule except F–F.
47. **Assertion:** People living at high attitudes often reported with a problem of feeling weak and inability to think clearly.
Reason: at high altitudes the partial pressure of oxygen is less than at the ground level.
48. **Assertion :** *p*-nitrophenol is more acidic than phenol.
Reason : Nitro group helps in the stabilisation of the phenoxide ion by dispersal of negative charge due to resonance.
49. **Assertion:** ClF_3 is used for the production of UF_6 in the enrichment of U_{235} .
Reason: ClF_3 is hypergolic in nature.

SECTION-C

This section consists of 6 multiple choice questions with an overall choice to attempt **any 5**. In case more than desirable number of questions are attempted, **ONLY first 5** will be considered for evaluation.

50. Match the columns

Column-I



(a) A – (r, s), B – (q), C – (s), D – (p)

(c) A – (q), B – (s), C – (r, s), D – (p)

Column-II

(p) High pressure favours the formation of product

(q) Product formed is acidic brown gas

(r) This reaction occurs at a high temperature about 2000 K

(s) Product formed is a neutral colourless gas

(b) A – (q), B – (r,s), C – (s), D – (p)

(d) A – (q), B – (r, s), C – (p), D – (s)

51. Which of the following analogies is correct?

(a) NaCl : Schottky defect : : ZnS : Frenkel defect

(c) AgCl : Schottky defect : : KCl : Frenkel defect

(b) AgCl : Schottky defect : : ZnS : Frenkel defect

(d) AgI : Schottky defect : : KCl : Frenkel defect

52. Which of the following analogies is correct?

(a) Methanol : Positive Iodoform : : Ethanol : Positive Iodoform

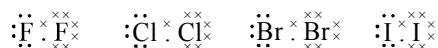
(b) Ethanol : Positive Iodoform : : Propanol : Positive Iodoform

(c) Ethanol : Positive Iodoform : : Ethanal : Positive Iodoform

(d) Propanol : Positive Iodoform : : Propanone : Positive Iodoform

Case Study : Read the following paragraph and answers the questions.

The discovery and preparation of several of the interhalogen compounds followed shortly after the discovery of the elements themselves. Since the halogens are all relatively strongly electronegative elements, each lacking one electron to complete its outer shell, they form diatomic molecules with a shared electron-pair bond between them:



In a very similar manner, interhalogen molecules are formed, the simplest type being represented by CIF, BrCl, IBr, etc., whose physical properties are intermediate between those of the two elements involved. However, these properties are not necessarily the average of those of the two parent elements.

Of the six possible uni-univalent halogen halides, five, all except iodine fluoride, are known to exist; the latter is probably too unstable, since in the known iodine-fluorine compounds, iodine always has a valence greater than 1.

Considerably more interest from a structural standpoint are the interhalogen compounds in which one of the halogens has a valence greater than 1. Three such series exist: AB₃, AB₅ and AB₇. No compounds are known where an even number of atoms of one halogen combine with an odd number of another; such a molecule would have an unpaired electron.

53. Interhalogen compounds are more reactive than the individual halogen because

(a) two halogens are present in place of one

(b) they are more ionic

(c) their bond energy is less than the bond energy of the halogen molecule

(d) they carry more energy

54. Which of the following statements are correct?

(i) Among halogens, radius ratio between iodine and fluorine is maximum.

(ii) Leaving F—F bond, all halogens have weaker X—X bond than X—X' bond in interhalogens.

(iii) Among interhalogen compounds maximum number of atoms are present in iodine fluoride.

(iv) Interhalogen compounds are more reactive than halogen compounds.

(a) (i) and (ii)

(b) (i), (ii) and (iii)

(c) (ii) and (iii)

(d) (i), (ii) and (iv)

55. Which of the following is not the characteristic of interhalogen compounds ?

(a) They are more reactive than halogens

(b) They are quite unstable but none of them is explosive

(c) They are covalent in nature

(d) They have low boiling points and are highly volatile.

OMR ANSWER SHEET

Sample Paper No –10

- ★ 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.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	9.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	18.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
2.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	10.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	19.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
3.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	11.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	20.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
4.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	12.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	21.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
5.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	13.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	22.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
6.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	14.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	23.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
7.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	15.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	24.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
8.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	16.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	25.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
9.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	17.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d					

SECTION-B

26.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	34.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	42.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
27.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	35.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	43.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
28.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	36.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	44.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
29.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	37.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	45.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
30.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	38.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	46.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
31.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	39.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	47.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
32.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	40.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	48.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
33.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	41.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	49.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

SECTION-C

50.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	52.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	54.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
51.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	53.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	55.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d

No. of Qns. Attempted	<input type="text"/>	Correct	<input type="text"/>	Incorrect	<input type="text"/>	Marks	<input type="text"/>
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