

Sr. No

[SET-V]
Ph.D. Programme (Odd Semester)
CHEMISTRY

Marks: 100

Time: 2 hours

| | |
|-----------------|--------------------|
| Roll No.: _____ | Date: _____ |
| Time: _____ | Centre Name: _____ |

| INSTRUCTIONS FOR THE CANDIDATES | |
|--|---|
| 1. | Please do not open (Break the seal) of the question booklet before time |
| 2. | An OMR answer sheet is being provided separately along with this question booklet. Please fill up all relevant entries like Roll number, Centre code, Paper Number etc. in the spaces provided on the OMR answer sheet and put your signature in the box provided for this purpose. |
| 3. | There are 100 questions in this booklet. Against each question four alternative choices (A), (B), (C) and (D) are given, out of which only one is correct. Indicate your choice of answer by Darkening the suitable circle with Black/Blue Ball Pen in the OMR answer sheet supplied to you separately. |
| 4. | Each question carries one mark. There will be 1/4th negative marking. |
| 5. | Read and follow the instructions given on the backside of the OMR answer sheet carefully. |
| 6. | Do not write your name/Roll number or give any identification mark at any place on the OMR sheet. |
| 7. | Keep all your belongings outside the examination hall. Do not retain any paper except the ADMIT CARD. |
| 8. | Do not talk to each other. Do not borrow anything from other candidates. |
| 9. | Use of CALCULATOR (except programmable calculator) is allowed. |
| 10. | Any body found involved in malpractices, will be disqualified from appearing in the entrance test. |
| 11. | At the start of the examination, please ensure that all pages of your booklet are properly printed; your question booklet is not damaged in any manner and contains 100 questions. In case of any discrepancy, report to the invigilator immediately. No claim in this regard will be entertained at the later stage. |

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For Rough Work

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[SET-V]
CHEMISTRY

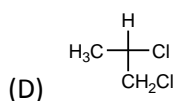
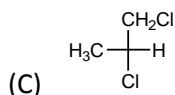
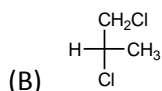
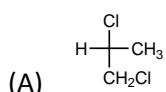
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NOTE:

- (i) Attempt all questions. Each question carries one mark. There will be $1/4^{\text{th}}$ negative marking.
 (ii) **There are 100 questions in this booklet.** Against each question four alternative choices (A), (B), (C) and (D) are given, out of which only one is correct. Indicate your choice of answer by Darkening the suitable circle with **Black/Blue Ball Pen** in the OMR answer sheet supplied to you separately.

1. Which of the following compounds has an S configuration?



- (A) 2S, 3R
 (B) 3R, 3S
 (C) 2S, 3S
 (D) 2R, 3R

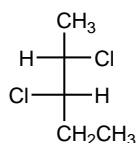
2. Which of the following is not true of enantiomers?

- (A) They have the same melting points
 (B) They have the same boiling points
 (C) They have the same reactivity with non-chiral reagents
 (D) They have the same specific rotation

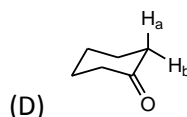
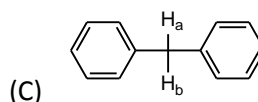
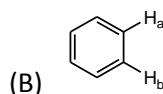
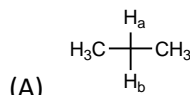
3. The specific rotation of a pure substance is 1.68° . What is the specific rotation of a mixture containing 75% of this isomer and 25% of the (-) isomer?

- (A) $+1.68^\circ$
 (B) 0°
 (C) $+1.26^\circ$
 (D) $+0.84^\circ$

4. What is the configuration of the following compound?



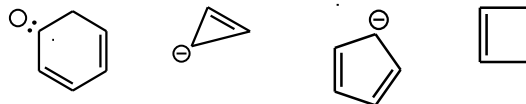
5. Which of the following compound contain hydrogens labeled H_a and H_b that are enantiotopic?



6. What is the best method for the preparation of p-chlorotoluene in high yields?

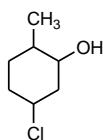
- (A) Start with benzene; methylate; chlorinate
 (B) Start with benzene; chlorinate; methylate
 (C) Start with toluene; chlorinate
 (D) Start with p-aminotoluene; NaNO_2/HCl , 0°C ; CuCl

7. Which of the following is aromatic?



- I II III IV
- (A) I
(B) II
(C) III
(D) IV
8. What is the best method for the preparation of m-dibromobenzene from benzene?
- (A) Nitrate; Sn/HCl; NaNO₂/HCl, 0°C; brominate twice
(B) Nitrate; Sn/HCl; NaNO₂/HCl, 0°C; H₃PO₂; brominate twice
(C) Nitrate; brominate; Sn/HCl; NaNO₂/HCl, 0°C; CuBr
(D) Brominate twice
9. Which of the following compound reacts most rapidly with HNO₃/H₂SO₄?
- (A) Toluene
(B) Anisole
(C) Nitrobenzene
(D) Benzonitrile
10. Why do aldehydes undergo nucleophilic addition reactions while esters undergo nucleophilic acyl substitution reactions?
- (A) The carbonyl carbon of an ester is more electrophilic than that of an aldehyde
(B) Once the nucleophile adds to an aldehyde, the tetrahedral intermediate is too sterically hindered to eliminate one of the attached groups.
(C) The ester carbonyl carbon is sp³ hybridised while the aldehyde carbon is sp² hybridised
(D) Once the nucleophile adds to the aldehyde, neither H- nor R- can be eliminated since they are strongly basic
11. Which of the following species is most stable?
- (A) p-O₂N-C₆H₄-CH₂⁺
(B) C₆H₅-CH₂⁺
(C) p-Cl-C₆H₄-CH₂⁺
(D) p-CH₃O-C₆H₄-CH₂⁺
12. Which of the following statement is wrong:
- (A) Cannizzaro reaction of benzaldehyde with hydroxide ions in aqueous methanol follows third order kinetics
(B) Reaction of furfural / formaldehyde under Cannizzaro conditions follows third order kinetics
(C) Before discovery of LiAlH₄, Cannizzaro reaction was one of the few reliable ways to reduce aldehydes and so was of some use in synthesis
(D) When Cannizzaro reaction is carried out with benzaldehyde in an ESR spectrometer, a radical is detected
13. Which statement is wrong about Benzoin condensation:
- (A) is catalysed by hydroxide ion / bases
(B) Electron attracting substituents inhibit the benzoin condensation
(C) Electron donating substituents retard benzoin condensation
(D) Kinetics in benzoin condensation is 3rd order
14. The compound CH₃OCH₂CH₂CH₂Br undergoes a solvolysis reaction in aqueous ethanol solution. Which of the following is evidence that a neighbouring group effect is occurring?
- (A) CH₃CH₂CH₂CH₂Br reacts more slowly than CH₃OCH₂CH₂CH₂Br does
(B) The reaction is faster when the concentration of water is higher
(C) The reaction is first order
(D) HBr is a product of the reaction
15. What does the model termed "lock-and-key" stand for?
- (A) The hydrogen bonds in the α-helix fit each other like a key fits a lock
(B) The amino acids in the peptide chain fit each other like a key fits a lock
(C) The substrate fits the active site of the enzyme like a key fits a lock
(D) The N-terminal and C-terminal ends of a protein fit each other like a key fits a lock
16. How do enzymes differ from nonbiological catalysts?
- (A) They have specificity for the substrate
(B) They have lower molecular weights than nonbiological catalysts
(C) They require higher pressure to be functional
(D) They require lower pH to be functional

17. Give the IUPAC name for the following structure:



- (A) 3-Chloro-2-methylcyclohexanol
 (B) 2-Methyl-5-chlorocyclohexanol
 (C) 5-Chloro-2-methylcyclohexanol
 (D) 1-Chloro-4-methylcyclohexanol
18. Which of the following m/z values is the base peak for benzyl alcohol?
 (A) 77
 (B) 108
 (C) 91
 (D) 17
19. Which of the following compounds exhibits the pattern of m/z values shown below?
41, 43, 57, 87, 101, 116
 (A) propyl bromide
 (B) isopropyl bromide
 (C) sec-butyl isopropyl ether
 (D) 2-hexanol
20. Which of the following are considered to be in-plane-bending vibrations?
 (A) Scissoring and wagging
 (B) Scissoring and twisting
 (C) Rocking and wagging
 (D) Scissoring and rocking
21. Which of the following wavenumbers corresponds to the $\text{C}\equiv\text{C}$ bond?
 (A) 1650 cm^{-1}
 (B) 2100 cm^{-1}
 (C) 1100 cm^{-1}
 (D) 2850 cm^{-1}
22. Which compound would be expected to show intense IR absorption at 3300 cm^{-1} ?
 (A) $\text{CH}_3\text{C}\equiv\text{CCH}_3$
 (B) butane
 (C) 1-butene
 (D) $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$

23. Which of the following protons gives an NMR signal with the lowest chemical shift value?



1 2 3 4 5

- (A) 1
 (B) 2
 (C) 3
 (D) 5
24. An unknown compound, C_9H_{12} , gave the following NMR spectrum:

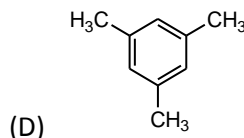
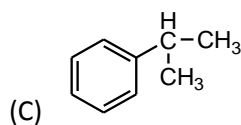
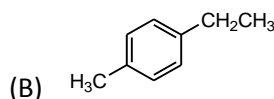
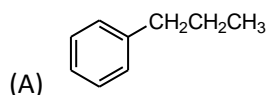
Triplet at 1.21 ppm (3H)

Singlet at 2.30 ppm (3H)

Quartet at 2.60 ppm (2H)

Singlet at 7.04 ppm (4H)

What is the structure of the compound?



25. The point group symmetries of a square and a rectangle respectively, are
 (A) D_{4h} and D_{2h}
 (B) C_{4h} and C_{2h}
 (C) D_{4h} and C_{2h}
 (D) C_{4h} and D_{2h}
26. The number of irreducible representation of group is equal to:
 (A) no. of classes
 (B) order of group
 (C) identity
 (D) sub-group
27. Supra-molecular chemistry has been defined as...
 (A) Chemistry beyond the molecule
 (B) The study of large molecules
 (C) The study of covalent bonds
 (D) Chemistry of atoms

28. Using the appropriate supramolecular host, it is possible to bind which of these guests?
- Neutral species
 - Anions
 - Cations
 - All of these
29. Which compound would you expect to give a strong IR absorbance at 1715 cm^{-1}
- 1-hexene
 - $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$
 - $\text{CH}_3\text{CH}_2\text{COOH}$
 - 2-methylhexane
30. Orgel diagram for the complex $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ show _____ electronic transition(s)
- 1
 - 2
 - 3
 - 0
31. A complex of Ni(II) was found to have magnetic moment of zero. Identify the correct geometry of the complex.
- octahedral
 - tetrahedral
 - square planar
 - linear
32. Identify the correct statement about the complexes, $\text{Ni}(\text{CO})_4$ and $[\text{Ni}(\text{CN})_4]^{2-}$, from the following.
- Both the complexes will be paramagnetic, with same value of magnetic moment
 - Both the complexes will be diamagnetic
 - $\text{Ni}(\text{CO})_4$ is paramagnetic and $[\text{Ni}(\text{CN})_4]^{2-}$ is diamagnetic
 - Both the complexes will be paramagnetic, with different value of magnetic moment
33. The lowest lattice energy among the following crystals is
- NaCl
 - KCl
 - RbCl
 - CsCl
34. According to Fajan's rule covalent bond is favored by
- large cation and small anion
 - large cation and large anion
 - small cation and small anion
 - small cation and large anion
35. Which of the following species is capable of function both as a Bronsted acid and Bronsted base?
- F^-
 - CO_3^{2-}
 - HS^-
 - S^{2-}
36. Jahn-Teller distortion would be found in
- $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$
 - $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$
 - $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$
 - $[\text{MnCl}_4]^{2-}$
37. Identify the ion that will show only optical isomerism.
- $[\text{Co}(\text{en})_3]^{3+}$
 - $[\text{Co}(\text{en})_2\text{Cl}_2]^+$
 - $[\text{Co}(\text{en})_2\text{ClH}_2\text{O}]^{2+}$
 - $[\text{Co}(\text{NH}_3)_6]^{3+}$
38. Identify the metal present in Vitamin B₁₂
- Co
 - Fe
 - Mn
 - Cu
39. The molecule used as shift reagent in NMR spectroscopy is having metal ion of
- lanthanide
 - actinide
 - d-block
 - p-block
40. The hybridization involved in diamond, graphite and fullerene, respectively are
- sp^3 , sp^2 and sp
 - sp^3 , sp^2 and sp^2
 - sp^3 , sp and sp^2
 - sp^3 , sp^2 and sp^3

41. The average distance of electron from the nucleus in an atom is of the order of
 (A) 10^{-8} cm
 (B) 10^{-8} m
 (C) 10^{-8} nm
 (D) 10^{-8} pm
42. What is total angular momentum of an electron moving in the s orbital?
 (A) 1
 (B) 0
 (C) $\frac{1}{2}$
 (D) 2
43. According to variation theorem, the approximate energy corresponding to the approximate wave function Ψ ----- the true energy
 (A) is lesser than
 (B) is greater than
 (C) is equal to
 (D) has no connection with
44. When $\int \Psi \Psi^* d\tau = 0$, the eigen functions are
 (A) Orthogonal
 (B) Diagonal
 (C) Normalized
 (D) Arbitrary
45. Mathematically, Heisenberg's uncertainty principle can best be represented by
 (A) $\Delta x \geq \Delta P_x / 4\pi h$
 (B) $\Delta x \times \Delta P_x \geq h/\pi$
 (C) $\Delta x \times \Delta P_x \geq h/4\pi$
 (D) $\Delta x \times h \geq \Delta P_x / 4\pi$
46. The Schrödinger wave function Ψ represents
 (A) Probability density
 (B) Probability amplitude
 (C) Probability distribution
 (D) Radial probability
47. In a system when the chemical potential of each component is same for all the phases, the equilibrium is said to be -----
 (A) Metastable equilibrium
 (B) Thermal equilibrium
 (C) Composition equilibrium
 (D) Mechanical equilibrium A
48. Intrinsic properties are properties that:
 (A) Do not depend on the amount of material present
 (B) depend on the amount of material present
 (C) Cannot be measured without performing a chemical reaction
 (D) depend on nature of the material present
49. Which of the following is used in dating archaeological findings?
 (A) ${}_{92}\text{U}^{235}$
 (B) ${}_{6}\text{C}^{14}$
 (C) ${}_{1}\text{H}^1$
 (D) ${}_{26}\text{Fe}^{55}$
50. Determine the number of components, number of phases and the degree of freedom for the following system-
 $\text{H}_2\text{O}(\text{s}) \rightleftharpoons \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{H}_2\text{O}(\text{g})$
 (A) 1,3,0
 (B) 2,2,0
 (C) 1,2,2
 (D) 2,1,1
51. When $\int \Psi^2 d\tau = 1$, the eigen functions are
 (A) Orthogonal
 (B) Diagonal
 (C) Normalized
 (D) Arbitrary
52. The metal present in carbonic anhydrase, haemocyanin and peroxidases, respectively are
 (A) Cu, Zn and Fe
 (B) Zn, Fe and Cu
 (C) Fe, Zn and Cu
 (D) Zn, Cu and Fe
53. The photon of wavelength 400 nm corresponds to
 (A) $20,000 \text{ cm}^{-1}$
 (B) $25,000 \text{ cm}^{-1}$
 (C) 400 cm^{-1}
 (D) $10,000 \text{ cm}^{-1}$
54. In the Born-Oppenheimer approximation which is true?
 (A) $E_{\text{el}} > E_{\text{vib}} > E_{\text{rot}} > E_{\text{tr}}$
 (B) $E_{\text{el}} = E_{\text{vib}} = E_{\text{rot}} = E_{\text{tr}}$
 (C) $E_{\text{vib}} > E_{\text{el}} > E_{\text{rot}} > E_{\text{tr}}$
 (D) $E_{\text{tr}} > E_{\text{vib}} > E_{\text{rot}} > E_{\text{el}}$

55. **Hot band transition in vibrational spectra occurs at**
 (A) room temperature
 (B) at zero degree K
 (C) above room temperature
 (D) at liquid nitrogen temperature
56. **In Raman spectroscopy, using mercury vapour lamp**
 (A) the Stokes and anti-Stokes lines are equally intense
 (B) the Stokes line is more intense than anti-Stokes line
 (C) the anti-Stokes line is more intense than Stokes line
 (D) the Stokes and anti-Stokes lines are less intense
57. **If for a reaction, the plot of $\ln k$ versus $1/T$ gives straight line, then**
 (A) $E_a = -\text{slope} \times R$
 (B) $E_a = \text{slope} \times R$
 (C) $\text{slope} = E_a \times R$
 (D) $E_a = 0$
58. **Eyring equation represents the rate constant for which system?**
 (A) bimolecular gaseous reaction
 (B) uni-molecular reaction
 (C) ionic reaction
 (D) second order reaction
59. **The relation between the dielectric constant of solvent and the rate constant is**
 (A) directly proportional
 (B) inversely proportional
 (C) exponential
 (D) no relation
60. **ZnO turns yellow upon heating because of**
 (A) metal excess defect
 (B) metal deficiency defect
 (C) frenkel defect
 (D) lattice defects
61. **The incorrect statement related to schottky defect is**
 (A) it is a stiochiometric point defect
 (B) equal number of cations and anions are missing from their lattice points
 (C) shown by strongly ionic crystals with high co-ordination number
 (D) density and covalent nature are increased
62. **Surface Plasmon absorption bands are observed in**
 (A) coinage metals
 (B) alkali metals
 (C) rare-earth elements
 (D) inert gase
63. **The size range of the quantum size particles is**
 (A) 1-10 μm
 (B) 1-100 μm
 (C) 100-1000 nm
 (D) 1-10 nm
64. **A crystal which possesses no element of symmetry is**
 (A) KNO_3
 (B) NaCl
 (C) $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$
 (D) CsCl
65. **No Bragg-reflection of X-rays from a crystal will be observed if d_{hkl} is smaller than**
 (A) $\lambda/4$
 (B) $\lambda/3$
 (C) $\lambda/2$
 (D) λ
66. **The surface to volume ratio of spherical particles highly decreases with the**
 (A) increasing size
 (B) decreasing size
 (C) decreasing density
 (D) increasing density
67. **Gold number is a measure of the**
 (A) protective action of a colloidal system
 (B) concentration of the colloidal system
 (C) critical misceller concentration
 (D) density of the colloidal system
68. **Which parameter can be known from the Gibbs adsorption isotherm?**
 (A) surface excess concentration
 (B) surface tension
 (C) viscosity
 (D) concentration of a solution

69. Which oxide is more acidic?

- (A) Al_2O_3
 (B) Cl_2O_7
 (C) MgO
 (D) SiO_2

70. Which is isoelectronic series?

- (A) Li, Na, K
 (B) F, Cl, Br
 (C) Li, Be, B
 (D) N^{3-} , O^{2-} , F^-

71. Which will have a lower CO stretching frequency in IR Spectrum?

- (A) $[\text{Mn}(\text{CO})_6]^+$
 (B) $[\text{Cr}(\text{CO})_6]$
 (C) $[\text{V}(\text{CO})_6]^-$
 (D) $[\text{Ti}(\text{CO})_6]^{2-}$

72. The correct structural formula of Zeise's salt is?

- (A) $\text{K}[\text{PtCl}_3(\text{C}_2\text{H}_4)]$
 (B) $\text{K}[\text{PtCl}_2(\text{C}_2\text{H}_4)]\text{Cl}$
 (C) $\text{K}_2[\text{PtCl}_3-\eta^-(\text{C}_2\text{H}_4)]$
 (D) $\text{K}[\text{PtCl}_3-\eta^2-(\text{C}_2\text{H}_4)]$

73. Ziegler-Natta catalyst is TiCl_3 dissolved in?

- (A) Ether
 (B) Triethyl aluminum
 (C) Water
 (D) Ammonia

74. Using of 18-electron rule, find out the Mo-Mo bond order in $[\text{CpMo}(\text{CO})_2]_2$?

- (A) One
 (B) two
 (C) three
 (D) Four

75. NQR spectroscopy is observed in

- (A) Microwave region
 (B) Radio frequency region
 (C) Visible region
 (D) Infra-red region

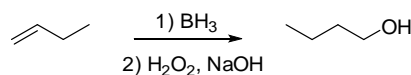
76. Identify the complex having highest crystal field splitting (Δ_o) value:

- (A) $[\text{Mn}(\text{NH}_3)_6]^{2+}$
 (B) $[\text{Fe}(\text{NH}_3)_6]^{2+}$
 (C) $[\text{Ru}(\text{NH}_3)_6]^{2+}$
 (D) $[\text{Os}(\text{NH}_3)_6]^{2+}$

77. The basic element present in alkaloids

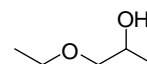
- (A) fluorine
 (B) chlorine
 (C) xenon
 (D) nitrogen

78. Which type of selectivity is present in the following example:



- (A) Regioselectivity
 (B) stereoselective
 (C) stereospecific
 (D) chemoselective

79. IUPAC name of following is:



- (A) 1-Ethoxypropan-2-ol
 (B) 3-Ethoxypropan-2-ol
 (C) Ethoxy propane
 (D) 2-hydroxy ethyl propyl ether

80. Which of these historical works of art contain nanotechnology?

- (A) Lycurgus cup
 (B) Medieval stained glass windows in churches
 (C) Damascus steel swords
 (D) All of the above

81. There are 10 lamps in a hall. Each one of them can be switched on independently. The number of ways in which hall can be illuminated is

- (A) 10^2
 (B) 1023
 (C) 2^{10}
 (D) 10!

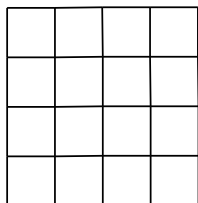
82. What is (?) in the following table?

| | | |
|----|----|----|
| 8 | 54 | 27 |
| 9 | 71 | ? |
| 10 | 90 | 45 |

- (A) 39
 (B) 37
 (C) 35.5
 (D) 34.5

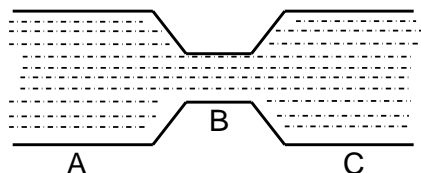
83. If 'THIS MAN IS GOOD' is coded as 153. What will be the code for 'THAT MAN IS NOT GOOD'?
- (A) 200
(B) 195
(C) 190
(D) 180
84. A earned Rs 84000. One third of it went to taxes. The rest was invested and appreciated by one half. Two third of that went into business. Additional tax was paid equal to $\frac{2}{3}$ of the remaining amount. How much money was left with A?
- (A) 8790
(B) 8777
(C) 9000
(D) 9333
85. If Aneesh is paternal first cousin of Rahul, how is their father's mother is related to them?
- (A) Mother
(B) Grandmother
(C) Paternal aunt
(D) Maternal aunt
86. I got my first job on May 22, 1983. Which day of the week it was?
- (A) Monday
(B) Tuesday
(C) Friday
(D) Sunday
87. A petrol dealer adds 20% kerosene oil to petrol. If purchase price of petrol is Rs. 60 per litre and that of kerosene is Rs. 20 per litre, and sale price of the petrol is Rs. 61 per litre, what is his percentage profit?
- (A) 14.25
(B) 14.37
(C) 14.50
(D) 14.70
88. Anant parked his motorcycle at 9th place from the left and 28th from the right. How many motorcycles are parked in the row?
- (A) 37
(B) 36
(C) 35
(D) 34
89. In an imaginary language digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are substituted by t, d, j, o, r, m, u, x, b and z. 10 is written as dt and so on. Use the above information and find the value of expression given below:
- $$\{(or - dj) \times u\} \div dj$$
- (A) 9
(B) 10
(C) 11
(D) 12
90. Seven friends meet at their college reunion, shake hand with each other once. How many hand shake will be there altogether?
- (A) 21
(B) 42
(C) 27
(D) 49
91. Ms Anandita starts at left and moves 8 Kms. She then turns right and moves 4 Kms. Then she turns right again for 8 Kms. How far is she from the initial position?
- (A) 20 Kms
(B) 10 Kms
(C) 08 Kms
(D) 04 Kms
92. Lunch-dinner pattern of a person for 'm' days is given below. He has a choice of VEG or NON-VEG meal for his lunch/dinner.
- (i) If he takes a NON-VEG lunch, he will have only VEG dinner
(ii) He takes NON-VEG dinner for 9 days
(iii) He takes VEG lunch for 11 days
(iv) He takes a total of 14 NON-VEG meals
- What is 'm'?
- (A) 18
(B) 20
(C) 24
(D) 38
93. 20% students of a particular course get jobs within one year of passing. 20% of the remaining students get jobs by end of the second year of passing. If 16 students are still jobless, how many students had passed the course?
- (A) 25
(B) 50
(C) 62
(D) 84

94. How many rectangles (which are not squares) in the following figure?



- (A) 56
(B) 70
(C) 80
(D) 96

95. Water is flowing through a tube as shown below:



The cross-sectional area of A and C are equal and greater than the cross-sectional area of B. If the flow of water is steady, than the pressure on the walls at B is

- (A) less than that at A and that at C
(B) more than that at A and that at C
(C) same as that at A and that at C
(D) more than that at A but less than that at C

96. Processor IC chip was developed by?

- (A) AMD
(B) Intel
(C) DIX
(D) Both (A) and (B)

97. If $5472 = 9$, $6342 = 6$, $7584 = 6$. What is 9236?

- (A) 2
(B) 3
(C) 4
(D) 5

98. Chipko movement was started by?

- (A) Arundhati Roy
(B) Medha Patkar
(C) Ila Bhatt
(D) Sunder lal Bahuguna

99. What is the following is not a natural hazard?

- (A) Earthquake
(B) Tsunami
(C) Flash floods
(D) Nuclear accident

100. Which of the following team won the 9th IPL cricket T-20 tournament?

- (A) Kolkata Knight Riders
(B) Sun Risers Hyderabad
(C) Mumbai Indians
(D) Royal Challengers Bangalore