

VERSION : A3 – ANSWER KEY

PLEASE ENSURE THAT THIS BOOKLET CONTAINS 120 QUESTIONS SERIALLY NUMBERED FROM 1 TO 120.

(Printed Pages : 15)

- 1. When ammonium chloride is added to ammonium hydroxide solution, the dissociation of ammonium hydroxide is supressed due to
 - (A) hydrolysis (B) oxidation
- (C) reduction(E) common ion effect

- (D) increase in dielectric constant ANSWER : E
- 2. The pK_a of a weak acid HA and pK_b of a weak base BOH are 4.60 and 4.80 respectively. The pH of 0. IM solution of the salt, BA, formed from the acid HA and base BOH is (A) 7.10 (B) 9.40 (C) 690 (D) 0.20 (E) 4.80 ANSWER : C
- 3. In which one of the following equilibria will the point of equilibrium shift to left when the pressure of the system is increased? ~

(A) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ (B) $2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$ (C) $C(s) + O_2(g) \rightleftharpoons CO_2(g)$ (D) $2H_2(g) + O_2(g) \rightleftharpoons 2H_2O(g)$ (D) $2H_2(g) + O_2(g) \rightleftharpoons 2H_2O(g)$ ANSWER : B

4. The experimental and calculated elevation in boiling points of an electrolyte AB in its aqueous solution at a given concentration are 0.81 K and 0.54 K respectively. The percentage ionization of the electrolyte at this concentration is

(A) 20 (B) 40 (C) 50 (D) 60 (E) 80 ANSWER : C

5. Which one of the following binary liquid mixtures exhibits negative deviation from Raoult's law?

(A) *n*-hexane-*n*-heptane
(B) Chloroform-acetone
(C) Carbondisulphide-acetone
(D) Bromoethane-chloroethene
(E) Benzene-toluene

ANSWER: B

6. An electrolyte (AB) is 100 % ionized in 10 % aqueous solution. What is the osmotic pressure (L-atm.) of a 10 % solution of the electrolyte at 300 K if molecular weight of AB is 200 g mol⁻¹? (R=0.082 L atm K⁻¹ mol⁻¹) (A) 200 (B) 100 (C) 246 (D) 24.6 (E) 2.46 ANSWER : D



ANSWER : B

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7. In the electrolysis of aqueous solution of copper sulphate using copper strips as anode and cathode, the anode reaction is A
(A) Cu²⁺ + 2e⁻→ Cu
(B) Cu→CU²⁺ + 2e⁻
(C) 2HO⁻→ H₂ + ¹/₂O₂+ 2e⁻

(h) $Cu^{-1} + 2e^{-1} + 2e^{-1}$ (b) $Cu^{-1} + 2e^{-1} + 2e^{-1}$ (c) $2HO^{-1} + 2e^{-1}$

8. 0.001 mole of strong electrolyte Zn(OH)₂ is present in 200 mL of an aqueous solution. The pH of this solution is
(1) 2
(2) 12
(3) 10
(4) 2

(A) 2 (B) 4 (C) 12 (D) 10 (E) 7 ANSWER : C

9. If the standard potential for Daniel cell is 1.1 V, then the potential of the Cell when $[Zn^2+] = 1.0M$ and $[Cu^{2+}] = 0.1 M$ at 298 K is $(\frac{2.303 \text{ RT}}{F} \text{ value at } 298 \text{ K} = 0.06 \text{ V})$ (A) 1.1295 V (B) 0.100 V (C) 1,07 V (D) 0.76 V (E) 1.1 V ANSWER: C

10. The $t_1/2$ for a zero order reaction at the initial concentration of 6×10^{-3} M is one minute at 27°C. The rate constant at 27°C in mol dm⁻³s⁻¹ is (A) 3×10^{-4} (B) 6×10^{-4} (C) 5×10^{-5} (D) 5×10^{-4} (E) 3×10^{-5} ANSWER : C

11. The inversion of cane sugar is first order in [sugar] and proceeds with half-life of 600 minutes at pH =4 for a given concentration of sugar. However, if pH = 5, the half-life changes to 60 minutes. The rate law expression for the sugar inversion can be written as

(A) rate = $k[sugar]^{1}[H^{+}]^{2}$ (B) rate = $k[sugar]^{1}[H^{+}]^{1}$ (C) rate = $k[sugar]^{1}[H^{+}]^{4}$ (D) rate = $k[sugar]^{1}[H^{+}]^{0}$ (E) rate = $k[sugar]^{1}[H^{+}]^{5}$ ANSWER : D

- In an attempt to compare the half-lives of two radioactive elements A and B, a scientist set aside 400 g of each. After 3 months, the scientist found 25 g of A and 200 g of B. Which one of the following statements is true?
 (A) Half-life of B is twice that of A
 (B) Half-life of B is four times that of A
 (C) Half-life of A is twice that of B
 (E) Half-life of B is eight times that of A
- 13. When molten magnesium oxide was electrolysed for a certain period, 150 mg of Mg was deposited on the cathode. The volume of oxygen gas in cm³ at STP conditions at the anode during the same period is (Atomic mass of Mg = 24 gmol⁻¹ (A) 140 (B) 280 (C) 70 (D) 120 (E) 240 ANSWER : C



14.

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Which one of the following is not explained by adsorption? (A) When acetic acid solution is shaken with Charcoal. the concentration of the acid decreases (B) The white precipitate of Mg(OH)₂ attains blue colour when precipitated in the presence of magneson reagent (C) The air becomes dry in the presence of silica gel (D) An aqueous solution of NaOH attains pink colour with a drop of phenolphthalein (E) When animal charcoal is shaken with coloured methylene blue solution, the solution turns colourless **ANSWER : D** 15. The hybridization of central metal ion in K₂[Ni(CN)₄] and K₂[NiCl₄] are respectively (B) sp^3 , sp^3 (C) dsp^2 , dsp^2 (A) dsp^2 , sp^3 (D) sp^{3} , $sp^{3}d^{2}$ (E) $sp^{3}d^{2}$, $d^{2}sp^{3}$ **ANSWER :** A Which of the following compounds show optical isomerism? 16. (i) cis- $[Co(NH_3)_4Cl_2]^+$ (ii) trans- $[Co(en)_2C1_2]^+$ (iii) cis- $[Co(en)_2Cl_2]^+$ (iv) $[Co(en)_3]^3$ Choose the correct answer codes given below (C) iii and iv (D) i, iii and iv (B) ii and iii (A) 1 and ii (E) i, ii, iii and iv **ANSWER : C** Camphor can be purified by 17. (A) distillation (B) vacuum distillation (C) sublimation (E) fractional crystallization (D) steam distillation **ANSWER : C** 18. Tropolone is an example of (A) benzenoid aromatic compound (B) non-benzenoid aromatic compound (C) alicyclic compound (D) acyelic compound (E) heterocyclic aromatic compound **ANSWER : B** Both sp^2 and sp^3 hybrid orbitals are involved in the formation of 19. (A) $CH_2 = CH - C \equiv C - H$. $(B) CH_3-CH_2-CH_2-CH_3$ (C) $CH_2 = CH - C \equiv N$ (D) $CH_2 = CH_2$ (E) $CH_2 = CH - CO - CH_3$ **ANSWER : E** 20. Arrange the following molecules in the correct order of decreasing C–C bond length: C_2H_6 , C_2H_4 , C_2H_2 , C_6H_6 (A) $C_2H_6 > C_6H_6 > C_2H_4$, C_2H_2 (B) $C_2H_6 > C_2H_4 > C_6H_6 > C_2H_2$ (C) $C_2H_4 > C_2H_2 > C_2H_4 > C_2H_6$ (D) $C_2H_2 > C_6H_6 > C_2H_4 > C_2H_6$ (E) $C_6H_6 > C_2H_4 > C_2H_6 > C_2H_2$ **ANSWER :** A

KERALA MEDICAL ENTRANCE EXAM – 2014 PAPER - I CHEMISTRY & PHYSICS VERSION : A3 – ANSWER KEY Williamson's synthesis of preparing dimethyl ether is a/an 21. (A) electrophilic substitution (B) S_NI reaction (C) electrophilic addition (D) $S_N 2$ reaction (E) free radical substitution **ANSWER : D** The effect that makes 2,3 -dimethyl-2-butenegmve stable than 2-butene is 22. (A) resonance (B) hyperconjugation (C) electromeric effect (D) inductive effect (E) steric effect **ANSWER: B** 23. In which of the following compounds only primary carbon atoms are present? CH₃ CH₃-CH-CH₃ CH3-CH-CH2-CH3 CH3-C-CH3 (A) (B) CH₃ CH_3 CH₃ (D) CH₃--CH₂--CH₃ (E) CH_3 – CH_3 **ANSWER: E** The organic compound with two asymmetric carbon atoms is 24. (A) 3,4-dimethylheptane (B) 3-methyl-l-pentene (C) 2-chloropentane (D) 5-cthyl-2,3 –dimethylheptane (E) 3-chlorohexane **ANSWER:** A Geometrical isomerism is not possible in 25. (A) 2,4-hexadiene (B) benzaldoxime (C) but-2-ene (D) 1,2-dichloroethene (E) benzophenone oxime **ANSWER: E** 26. The correct IUPAC name of the organic compound CH₃-CH-CH-CH₂-OH is Cl CH₃CH₃ (A) 4-chloro-2,3-dimethylpentaml -ol (B) 2-chloro-3,4-dimethylpentan-5-ol (C) 2,3-dimethyl-4-chloropentan-1 -ol (D) 2-chloro-3,4-dimethyl n-pentyl alcohol (E) 2,3-dimethyl-4-chloro n-pentyl alcohol **ANSWER:** A 27. Carbylamine test is not answered by (A) $C_6H_5NH_2$ (B) $(CH_{3})_{3}C - CH_{2} - NH_{2}$ (C) $C_6H_5CH_2NH_2$ (D) $(CH_3)_3N$ (E) CH_3NH_2 **ANSWER : D** 28. Which of the following represents Wurtz-Fittig reaction? (A) $C_6H_5I + 2Na + CH_3I \rightarrow C_6H_5CH_3 + 2 NaI$ (B) $2C_6H_5I + 2Na \rightarrow C_6H_5C_6H_5 + 2 NaI$ (C) $2CH_3CH_2I + 2Na \rightarrow CH_3CH_2CH_2CH_3 + 2 NaI$ (D) $C_2H_5ONa + C_2H_5I \rightarrow C_2H_5 - O - C_2H_5 + NaI$ (E) $CH_3Br + AgF \rightarrow CH_3F + AhBr$

ANSWER: A



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29.	Which of the following organic halogen compounds undergoes hydrolysis with –aqueous NaOH predominantly by S_N1 mechanism?			
	(A) ethyl iodide	(B) methyl chloride		
	(C) isopropyl chloride	(D) chlorobenzene		
	(E) benzyl chloride			
	ANSWER: E			
30.	The major product formed when 2-bromo-2-methyl butane is reflexed with ethanolic KOH is			
	(A) 2-methylbut-2-ene	(B) 2-methylbutan-1-ol		
	(C) 3-methylbutan-2-ol	(D) 2-methylbutan-2-o1		
	(E) 2-methylbut-l-ene			
	ANSWER : A			
31	In which of the following reactions	new carbon carbon bond is not formed?		
51.	(A) Cannizzaro reaction	(B) Wurtz reaction		
	(C) Aldol condensation	(D) Friedel-Craft reaction		
	(E) Kolbe's reaction			
	ANSWER : A			
		8.100		
32.	Which one of the following phenols	s has the highest pK _a value?		
	(A) 0-Nitrophenoi	(B) Phenol A		
	(C) m-Nitrophenol	(D) Picric acid		
	(E) p-Cresol			
	ANSWER. E			
33.	The reagent that is used to distinguish between secondary amine and tertiary amine is			
	(A) p-toluenesulphonyl chloride	(B) Lucas reagent		
	(C) CHCl ₃ and alc KOH	(D) Borsche's reagent		
	(E) Bromine water			
	ANSWER : A			
34.	Which one of the following isomen	c amines has the highest boiling point?		
	(A) CH ₃ –CH ₂ –CH ₂ –NH–CH ₃			
	(B) CH ₃ CH ₂ NHCH ₂ CH ₃			
	(C) (CH3) ₂ N–CH ₂ –CH ₃			
	(D) CH ₃ -CH ₂ -CH ₂ -CH ₂ -NH ₂			
	(E) $(CH_3)_2CH-NH-CH_3$			
	ANSWER : D			
35.	Which one of the following reagent will convert acetamide to ethanamine?			
	(A) Phosphorus pentoxide	(B) Lithium aluminium hydride		
	(C) Potassium cyanide	(D) Thionyl chloride		

(E) Bromine and sodium hydroxide

ANSWER : B



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Match the following 36. List-l List-II (a) Acetaldehyde, Vinylalcohol (i) Enantiomers (b) Eclipsed and staggered ethane (ii) Tautomers (c) (+)-2-Butanol, (-)-2-Butanol (iii) Chain isomers (d) Methyl-n-propylamine and Diethylamine -(iv) Conformational isomers (v) Metamers (A) (a)-(ii), (b)-(iv), (c)-(iii), (d) - (v)(B) (a)-(i), (b)-(ii), (c)-(iii), (d) - (iv) (C) (a)-(v), (b)-(i), (c)-(iv), (d) - (ii) (D) (a)- (v), (b)- (i), (0)-(iii), (d) - (ii) (E) (H)- (ii), CD)-(iv), (C)-(1), (d)-(v) **ANSWER : E** 37. Which one of the following is an example for biodegradable polyester? (B) PET (C) Nylon 6 (D) Bakelite (A) PHBV (E) Glyptal **ANSWER:** A 38. Which one of the following is an essential amino acid? (B) Tyrosine (C) Proline (D) Glycine, (E) Alanine (A) Methionine **ANSWER** :A 39. The one letter code for the amino acid tryptophan is (C) W (A) G (B) V (D) H (E) A **ANSWER : C** Cheilosis and digestive disorders are due to the deficiency of 40. (A) Vitamin A (B) Thiamine (C) Riboflavin (D) Ascorbic acid (E) Pyridoxine **ANSWER : C** Which one of the following is a bacteriostatic drug? 41. (A) Aminoglycosides (B) Penicillin-G (C) Ofloxacin (E) Tetracycline (D) Ampicillin **ANSWER : E** 42. Freon-12 is manufactured from tetrachloromethane by (A) Haloform reaction (B) Reimer-Tiemann reaction (C) Wurtz reaction (D) Swartz reaction (E) Gattermann reaction **ANSWER : D** 43. The ratio of de Broglie wavelengths of a deuterium atom to that of an a particle, with the velocity of the former is five time greater than that of the later, is (A) 4 (B) 0.2 (C) 2(D) 0.4 (E) 5 **ANSWER : D** 44. The Maximum number of electrons which can be held by sub shell with azimuthal quantum number '*l*' in an atom is given by

(A) (2l+1) (B)(2l+2) (C) 2 (2l+1) (D) 2 (2l+2) (E)2l ANSWER : C

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51. The partial pressure of nitrogen in air is 0.76 atm. and its Henry's law constant is 7.6 ×10⁴ atm at 300 K. What is the mole fraction of N₂ in the solution obtained when air is bubbled through water at 300 K?
(A) 1 × 10⁻⁴
(B) 2 × 10⁻⁴
(C) 1 × 10⁻⁵
(D) 2 × 10⁻⁵
(E) 1 × 10⁻⁶
ANSWER :

52. The type of attractive forces that operate between gaseous HCI and chlorine molecule is (A) dipole-dipole forces (B) London forces (C) induced dipole-induced dipole
(D) dipole-induced dipole forces (E) electrostatic forces
ANSWER : D

- 53. which one of the following statements is incorrect?
 - (A) Glass is an extremely viscous liquid
 - (B) Viscosity co-efficient of a liquid decreases with increase in temperature
 - (C) Laminar flow represents regular gradation of velocity in passing from one layer to another in liquids
 - (D) Liquids rise in capillary due to surface tension
 - (E) Gases can be liquefied at any temperature by applying sufficient pressure **ANSWER : E**

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ANSWER : B

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VERSION : A3 – ANSWER KEY The number of tetrahedral and octahedral voids in a ccp array of 100 atoms are respectively 54. (A) 200 and 100 (B) 100 and 200 (C) 200 and 200 (D) 100 and 100 (E) 50 and 50 **ANSWER :** A 55. Which of the following pairs contain metalloid elements in the periodic table? (A) Na and K (B) F and Cl (C) Ca and Mg 1 (D) As and Si (E) Cu and Ag **ANSWER : D** The atom/ion that has the highest number of unpaired electrons is 56. (C) N (D) O^{-2} $(A) Na^+$ (B) F (E) B **ANSWER : C** The inorganic compound obtained by the auto-oxidation of 2-ajkylmithrhquinol is 57. $(A) H_2O$ (B) H₂O₂ (C) H₂ (D) O_2 (E) H_2SO_4 **ANSWER : B** 58. The least stable carbonate of alkali metals is (H) CS_2CO_3 (B) Na_2CO_3 (C) K_2CO_3 (D) Rb_2CO_3 (E) Li_2CO_3 **ANSWER : E** 59. Sphalerite is concentrated by (B) froth floatation (A) gravity separation (C) magnetic separation (E) leaching (D) hydraulic washing **ANSWER : B** 60. The following set of reactions are used in refining zirconium. $Zr (impure) + 21_2 \xrightarrow{523K} ZrI_4 -$ 1800K \rightarrow Zr (pure) + 2I₂ This method is known as (A) Distillation (B) Liquation (C) Hall-Heroult method (E) Mond's process (D) Van Arkel method **ANSWER : D** 61. Which one of the following is used as a piezoelectric material? (A) Silicones (B) Graphite (C) Silica gel (D) Kieselghur (E) Quartz **ANSWER : E** The gaseous product formed when HOCl reacts with H₂O₂ in acidic medium is 62. (D) HCIO₂ (A) H₂ (B) $C1_2$ $(C) O_2$ (E) HClO₃ **ANSWER : C** Three centre two electron bond is present in 63. $(A) NH_3$ (C) BCI_3 (B) B_2H_6 (D) $AlCl_3$ (E) BF₃

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64.	Which one of the following is used for the production of UF_6 in the enrichment of U^{235} ?				
	(A) CIF_3 (B) KF (C) KHF_2 (D) HF (E) PF_3				
	ANSWER : A				
65.	Zeigler-Natta catalyst is				
	(A) $ZnCl_2$ (B) $Et_3Al + TiCl_4$ (C) $Cu/ZnO-Cr_2O_3$ (D) Pt (E) V_2O_5				
	ANSWER : B				
66	Among the 3d series of transition metals the one that has positive M^{2+}/M standard electrode				
00.	notential is				
	(A) Cr (B) Mn (C) Zn (D) Ni (E) Cu				
	ANSWER : E				
67.	Which one of the following transition metal ions is colourless in aqueous solution?				
	(A) Ti^{4+} (B) V^{4+} (C) Mn^{2+} (D) Fe^{3+} (E) Ni^{2+}				
	ANSWER : A				
68.	The magnetic moment of Ni ²⁺ ion (At. No. of Ni. is 28) in BM unit is				
	(A) 1.73 (B) 4.81 (C) 5.96 (D) 2.84 (E) 3.86				
	ANSWER : D				
60	The anthelms of formation of $CU(\alpha)$ U $O(1)$ and $CO(\alpha)$ are respectively 74.8 mol ⁻¹				
09.	The enthalpy of formation of CH4(g), $H_2O(1)$ and $CO_2(g)$ are respectively -74.8 mol , 285.8 ki mol ⁻¹ and -393.5 kI mol ⁻¹ . Then the standard enthalpy of combustion of CH4(g) is				
	(A) +8903 kI mol ⁻¹ (B) -604 5 kI mol ⁻¹ (C) -754 1 kI mol ⁻¹				
	(D) +6045 kJ mol ⁻¹ (E) -890.3 kJ mol ⁻¹				
	ANSWER : E				
70.	In the following reaction, $4NO_2(g) + O_2(g) \rightarrow 2N_2O_5(g)$; $\Delta H = -110 \text{ kJ}$ if $N_2O_5(s)$ is formed				
	instead of $N_2O_5(g)$ in the reaction, the enthalpy change (in kJ) would be (enthalpy of				
	sublimation of $N_2O_5(s)$ is +53 kJ mol ⁻¹)				
	(A) -216 (B) -162 (C) $+103$ (D) $+216$ (E) $+162$				
	ANSWER : A				

Spirant

- 71. For the reaction $ZA_3 \rightleftharpoons 3A_2$ the equilibrium constant and the ΔG° values at a certain temperature are respectively 1×10^{30} and -172.4 kJ mol⁻¹. The equilibrium temperature in °C is about (2.303 R = 19.15 JK⁻¹ mol⁻¹) (A) 300 (13) 27 (C) 273 (D) 298 (E) 270 ANSWER : B
- 72. The equilibrium constant (K_C) for the reaction $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ at 800 K is 0.0625. What is the K_C value for the following reaction at 800 K? $NO(g) \rightleftharpoons \frac{1}{2} N_2(g) + \frac{1}{2} O_2(g)$ (A) 0.4 (B) 0.375 (C) 4 (D) 40 (E) 0.20 ANSWER :C



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- 73. A toroid having carries a current of 1 A. The average radius of the toroid is 10 cm. The magnetic field at any point in the open space inside the toroid is (A) 4×10^{-3} T (B) zero (C) 0.5×10^{-3} T (D) 3×10^{-3} T (E) 2×10^{-3} T ANSWER :B
- 74. Transformer is used to
 (A) convert ac to dc voltage (B) convert dc to ac voltage (C) obtain desired dc power
 (D) obtain desired ac voltage and current (E) obtain desired dc voltage and current
 - ANSWER : D
- 75. If an LCR series circuit is connected to an ac source, then at resonance the voltage across (A) R is zero
 (B) R equals the applied voltage
 (C) C is zero
 (D) L equals the applied voltage
 (E) L is zero
 ANSWER : B
- 76. A dynamo converts

 (A) mechanical energy into thermal energy
 (B) electrical energy into thermal energy
 (C) thermal energy into electrical energy
 (E) electrical energy into mechanical energy
 (D) mechanical energy into electrical energy
 (D) mechanical energy into electrical energy
- 77. The electromagnetic waves detected using a thermopile and used in physical therapy are (A) gamma radiations (B) X-rays A (C) ultra-violet radiations
 (D) infra-red radiations (E) micro-wave radiations
 ANSWER : D
- 78. Two lenses of power 15 and -3 dioptre are placed in contact. The focal length of the combination is
 (A) 10 Cm
 (B) 15 Cm
 (C) 12cm
 (D) 18 Cm
 (E) 8.33 Cm
- 79. The speed of light in an isotropic medium depends on
 (A) the nature of the source (B) its wavelength (C) its direction of propagation
 (D) its intensity (E) the motion of the source relative to the medium
 ANSWER : B
- 80. Astigmatism is corrected using

 (A) cylindrical lens
 (B) plano-convex lens
 (C) plano-concave lens

 (D) convex lens
 (E) concave lens
- 81. If the wavelength of incident light falling an a photosensitive material decreases, then
 (A) photoelectric current increases
 (B) stopping potential decreases
 (C) stopping potential remains constant
 (E) stopping potential increases
 ANSWER : E

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VERSION : A3 – ANSWER KEY Alter 300 days, the activity of a radioactive sample is 5000 dps (disintegrations per sec). The 82. activity becomes 2500 dps after another 150 days. The initial activity of the sample in dps is (A) 20,000 (B) 10,000 (C) 7,000 (D) 25,000 (E) 15,000 **ANSWER:** A 83. The control rods used in a nuclear reactor can be made up of (A) Graphite (B) Cadmium (C) Uranium (D) Barium (E) Lead **ANSWER : B** 84. The fusion reaction in the sun is a multi-step process in which the (A) helium is burned into deuterons (B) helium is burned into hydrogen (D) hydro gen is burned into helium (C) deuteron is burned into hydrogen (E) helium is burned into neutrons **ANSWER : D** 85. Identify the wrong statement (A) In conductors, the valence and conduction bands overlap (B) Substances with energy gap of the order of 10 eV are insulators (C) The resistivity of semiconductors is lower than metals (D) The conductivity of metals is high (E) The resistivity of a semiconductor is lower than that of an insulator **ANSWER : C** 86. Identify the wrong statement with reference to a solar cell (A) It is a p-n junction diode with no external bias (B) It uses materials of high optical absorption (C) It uses materials with band gap of 5 eV (D) It converts light energy into electrical energy (E) It uses materials such as GaAs, Si **ANSWER**: 87. The minimum number of NAND gates used to construct an OR gate is (D) 3 (A) 4 (B) 6 (C) 5 (E) 2 **ANSWER : D** 88. An AM radio station operating at 630 kHz is permitted to broadcast audio frequencies up to 6 kHz. The band pass filter in its modulation circuit can retain the frequencies (A) 636 kHz, 630 kHz (B) 12 kHz, 6 kHz (C) 1260 kHz, 6 kHz (D) 1260 kHz, 630 kHz (E) 6 kHz, 630 kHz **ANSWER :** A 89. A transducer, in communication system is a device that (A) is a part of the antenna (B) is a combination of a receiver and a transmitter (C) converts audio signals into video signals (D) detects the incoming signal (E) converts physical variable into corresponding variations in the electrical signal **ANSWER : E**

7	FOR ENGG & MED ASPIRANTS	PAPER - I CHEMI VERSION : A3 – ANSW	STRY & PHYSICS ER KEY		
90.	Theediinerisrairsafmobnity of charge C	Gamers are			
	(A) $M^{-2}T^{2}A$ (B) $M^{-1}T^{2}A$ ANSWER · B	$(C) M^{-2}T^3A$	(D) $M^{-1}T^{3}A$ (E) $M^{-1}T^{2}A^{-1}$		
91.	1. The acceleration of a moving body is found from the				
	(A) area under velocity - time graph	(B) area under	displacement - time graph		
	(C) slope of distance - time graph	(D) slope of v	elocity - time graph		
	(E) area under acceleration - time grap	h			
	ANSWER : D				
92.	A ball thrown vertically upwards after reaching a maximum height h, returns to the starting				
	point after a time of 10 s. Its displacem	ent is			
	(A) h (B) 2 h	(C) 10 <i>h</i>	(D) $20 h$ (E) zero		
	ANSWER : E				
02					
93.	If the angles of projection of a project	the with same initial v	relocity exceed or fall short of 45°		
	by equal amounts α , then the ratio of h	norizontal ranges is	MED.		
	(A) $1:2$ (B) $1:3$ (C) $1:4$	4 (D) 1:1	(E) $1:\sqrt{2}$		
	ANSWER : D				
0.4	164 . 1		fite (in the set of bis manufactor		
94.	If the length of seconds hand of a close (A) 2 (B) 0.5 (C) 1.5	(D) 2	of its up (in cm s ^{-1}) is nearly (T) 1		
	(A) 2 (B) 0.3 (C) 1.3	(D) 5			
	ANSWER : E				
95	The retrading acceleration of 7.35 m s ⁻² due to frictional force stops the car of mass 400 kg				
<i>.</i>	travelling in a road. The coefficient of	friction between the t	vre of the car and the road is		
	(A) 0.55 (B) 0.75 (C) 0.76	(D) 0.65	(E) 0.80		
	ANSWER : B				
96.	A hammer weighing 3 kg strikes the	head of a nail with a	speed of 2 ms ^{-1} drives it by 1 cm		
	into the wall. The impulse imparted to	the wall is	-		
	(A) 6Ns (B) 3Ns (C) 2Ns	s (D) 12 Ns	(E) 8 Ns		
	ANSWER : A				
97.	If two persons A and B take 2 seconds and 4 seconds respectively to lift an object to the same				
	height <i>h</i> , then the ratio of their powers	is			
	(A)1:2 (B)1:1 (C)2:	1 (D) 1 : 3	(E) 3 : 1		
	ANSWER : C				
08	If a machine oun fires n bullets per second each with kinetic energy K, then the power of the				
90.	in a machine gun mes nouners per second each with kinetic energy K, then the power of the				
			n		
	(A) nK^2 (B) $\frac{n}{n}$	(C) n^2 K (D) n K	$(E) \frac{1}{\kappa}$		
	ANSWER : D				

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99. The moment of inertia of the rectangular plate ABCD, (AB = 2 BC) 1S minimum along the axis $B_{\text{B}} = \frac{E}{C}$

(A) GH (B) EF (C) BC (D) AC (E) AB ANSWER : B



- 100. The position of centre of mass of a system of particles does not depend upon the
 (A) mass of particles
 (B) symmetry of the body
 (C) position of the particles
 (D) relative distance between the particles
 (E) nature of particles
 ANSWER : E
- 101. The relation between escape velocity (V_e) from the surface of the earth and the orbital velocity (V_0) is

(A) $\sqrt{2}V_e = V_o$ (B) $V_e = \sqrt{2}V_o$ (C) $V_e = 2V_o$ (D) $4V_e = 3V_o$ (E) $V_e = \sqrt{3}V_o$ ANSWER : B

- 102. The time period of an earth's satellite revolving at a height of 35,800 km is
 (A) 24 hours
 (B) 100 minutes
 (C) 12 hours
 (D) 48 hours
 (E) 52 hours
- 103. A solid ball of volume V experiences a viscous force F when falling with a speed v in a liquid. If another ball of volume 8 V with the same velocity v is allowed to fall in the same liquid, it experiences a force

 (A) F
 (B) 16 F
 (C) 4 F
 (D) 8 F
 (E) 2 F
- 104. For most of the materials, Young's modulus (Y) and rigidity modulus (G) are related as (A) G=3Y
 (B) $G = \frac{Y}{3}$ (C) $G = \frac{3}{2}$ Y
 (D) $G = \frac{Y}{8}$ (E) 10 G = 3Y ANSWER : B
- 105. The pressure on an object of bulk modulus B undergoing hydraulic compression due to a stress exerted by surrounding fluid having volume strain $\left(\frac{\Delta V}{V}\right)^2$ is

(A)
$$B^2\left(\frac{\Delta V}{V}\right)$$
 (B) $B\left(\frac{\Delta V}{V}\right)^2$ (C) $\frac{1}{B}\left(\frac{\Delta V}{V}\right)$ (D) $\frac{1}{B^2}\left(\frac{\Delta V}{V}\right)$ (E) $B\left(\frac{\Delta V}{V}\right)$
ANSWER : E



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106. If d is the average diameter of the molecule, then the mean free path of the molecules between two successive collisions is proportional to

(A)
$$d$$
 (B) d^2 (C) $\frac{1}{d}$ (D) $\frac{1}{d^2}$ (E) $\frac{1}{d^3}$

ANSWER : D

- 107. Which one of the following is a wrong Statement in kinetic theory of gases?
 - (A) The gas molecules are in random motion
 - (B) The gas molecules are perfect elastic spheres
 - (C) The volume occupied by the molecules of a gas is negligible
 - (D) The force of attraction between the molecules is negligible
 - (E) The collision between molecules are inelastic

ANSWER : E

- 108. The change in internal energy of a thermodynamical system which has absorbed 2 kcal of heat and done 400 J of work is (1 cal = 4.2 J)
 (A) 2 kJ
 (B) 8 kJ
 (C) 3.5 kJ
 (D) 5.5 kJ
 (E) 4 2 kJ
- 109. When the displacement of a particle executing simple harmonic motion is half its amplitude, the ratio of its kinetic) energy to potential energy is `

 (A)1:3
 (B) 2:1
 (C) 3:1
 (D) 1:2
 (E) 2:3

110. A body oscillates with SHM according to the equation (in SI units), $x = 5\cos\left(2\pi t\frac{\pi}{4}\right)$.

Its instantaneous displacement at t = 1 second is

(A)
$$\frac{\sqrt{2}}{5}$$
 m (B) $\frac{1}{\sqrt{3}}$ m (C) $\frac{5}{\sqrt{2}}$ m (D) $\frac{1}{2}$ m (E) $\frac{5}{\sqrt{2}}$ m
ANSWER : E

- 111. Identify the correct statement
 - (A) Transverse wave can propagate in gases.
 - (B) Transverse wave consists of compressions and rarefactions.
 - (C) Longitudinal wave can propagate in solids, liquids and gases.
 - (D) In a longitudinal wave, particles of the medium vibrate perpendicular to the direction of propagation.
 - (E) In a longitudinal wave, the higher density corresponds to rarefactions. **ANSWER : C**
- 112. The speed of sound in air
 - (A) decreases with temperature
 (B) increases with pressure
 (C) increases with humidity
 (E) increases with density



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- 113. The bulk modulus of a spherical object is B. If it is subjected to uniform pressure p, the fractional decrease in radius is
 - (A) $\frac{p}{B}$ (B) $\frac{p}{3B}$ (C) $\frac{3p}{B}$ (D) $\frac{B}{3p}$ (E) $\frac{3B}{p}$

ANSWER : B

- 114. An electric dipole of dipole moment \vec{p} is placed in a uniform external electric field \vec{E} . Then the
 - (A) torque experienced by the dipole is $\vec{E} \times \vec{p}$
 - (B) torque is zero if \vec{p} is perpendicular to \vec{E}
 - (C) torque is maximum if \vec{p} is perpendicular to \vec{E}
 - (D) potential energy is maximum if \vec{p} is parallel to \vec{E}

(E) potential energy is maximum if \vec{p} is perpendicular to \vec{E} ANSWER : C

115. Electric field at a point of distance r from a uniformly charged wire of infinite length having linear charge density X is directly proportional to

(A) r^{-1} (B) r (C) r^{2} (D) r^{-2} (E) \sqrt{r} ANSWER : A

- 116. When 4 ampere current flows for 2 minutes in an electroplating experiment, m gram of silver is deposited. Then the amount (in gram) of silver deposited by 6 ampere current flowing for 40 seconds is
 - (A) 4m (B) $\frac{m}{2}$ (C) 2m (D) $\frac{m}{4}$ (E) $\frac{3m}{4}$ ANSWER : b
- 117. A uniform wire of resistance 9 Ω is Joined end-to-end to form a circle. Then the resistance of the circular wire between any two diametrically opposite points is

(A) 6Ω (B) 3Ω (C) $\frac{9}{4} \Omega$ (D) $\frac{3}{2} \Omega$ (E) 1Ω ANSWER : C

- 118. The temperature coefficient of resistance of an alloy used for making resistors is
 - (A) small and positive
 (B) small and negative
 (C) large and positive
 (D) large and negative
 (E) zero
 ANSWER : A



- 119. The deflection in a moving coil galvanometer is
 - (A) directly proportional to the torsional constant of the spring
 - (B) independent of the torsional constant of the spring ig
 - (C) inversely proportional to the area of the coil
 - (D) inversely proportional to the current flowing through it
 - (E) directly proportional to the number of turns in the coil

ANSWER : E

- 120. When a magnetic field is applied on a stationary electron, it
 - (A) remains stationary (B) spins about its own axis
 - (C) moves in the direction of the field
 - (D) moves perpendicular to the direction of the field
 - (E) moves opposite to the direction of the field

ANSWER : A