TEST-7

TOPIC COVERED :

PHYSICS: Solid and Fluid, Heat & Thermodynamics

CHEMISTRY: Chemical Equilibrium and s-Block Elements

MATHEMATICS: Hyperbola & Binomial Theorem

PHYSICS

1. A solid copper sphere (density ρ and specific heat *c*) of radius *r* at initial temperature 100 K is suspended inside a chamber whose walls are at almost 0 K. Initial rate of cooling of the sphere is (σ is stefan's constant) $\frac{dT}{dt} = \frac{A\sigma}{\rho rc} \times 10^8$ k/sec, where A is

(a) 1 (b) 3 (c) 2 (d) 4

2. The power radiated by a black body is P and it radiates maximum energy around the wavelength λ_0. If the temperature of the black body is now changed so that it radiates maximum energy around a wavelength $3\lambda_0/4$, the power radiated by it will increase by a factor of

(a) $\frac{4}{7}$ (b) $\frac{16}{4}$ (c) $\frac{64}{27}$ (d) $\frac{256}{81}$

3. The specific heat of a metal at low temperatures varies according to $S = aT^3$, where *a* is a constant and T is absolute temperature. The heat energy needed to raise unit mass of the metal from temperature T = 1K to T = 2K is

(a) $3a$ (b) $\frac{15a}{4}$ (c) $\frac{2a}{3}$ (d) $\frac{13a}{4}$

4. During an experiment, an ideal gas is found to obey an additional law VP^2 = constant. The gas is initially at temperature T and has volume V. When it expands to a volume 2V, the temperature becomes.

(a) $\sqrt{2}\,T$ (b) $T/2$ (c) $\sqrt{3}\,T$ (d) $2T$

5. Let $\bar{v}$, v_{rms} and v_p respectively denote the mean speed, root mean square speed and most probable speed of the molecules in an ideal monoatomic gas at temperature T. If *m* is mass of the molecule, then

(a) $v_p < \bar{v} < v_{rms}$

(b) no molecule can have a speed greater than $\sqrt{2}\,v_{rms}$

(c) no molecule can have speed less than $v_p/\sqrt{2}$

(d) the average kinetic energy of a molecule is $\frac{1}{4}m v_p^2$

6. The ratio of specific heat of a gas at constant pressure to that at constant volume is γ. The change in internal energy of one mole of gas when volume changes from V to 2 V at constant pressure *p* is

(a) $\frac{R}{(\gamma-1)}$ (b) pV (c) $\frac{pV}{(\gamma-1)}$ (d) $\frac{\gamma pV}{\gamma-1}$

7. Two rods are of same material and having same length and area. If heat ΔQ flows through them for 12 min when they are joined side by side. If now both the rods are joined in parallel, then the same amount of heat ΔQ will flow in

(a) 24 min (b) 3 min (c) 12 min (d) 6 min

8. A liquid of density ρ comes out with a velocity *v* from a horizontal tube of are of cross-section A. The reaction force exerted by the liquid on the tube is *F*.

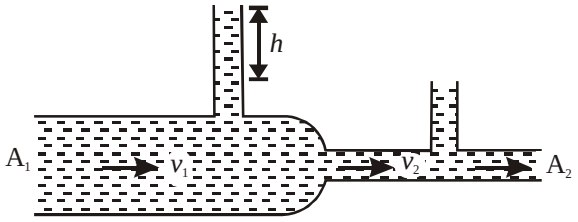
(a) $F \propto v$ (b) $F \propto v^2$ (c) $F \propto 1/A$ (d) $F \propto 1/\rho$

9. A liquid flows through a horizontal tube. The velocities of the liquid in two sections, which have areas of cross-section A_1 and A_2 and v_1 and v_2 respectively. The difference in levels of the liquid in two vertical tubes is *h*. Then which of the option is incorrect?

(a) The volume of the liquid flowing through the tube in unit time is A_1v_1

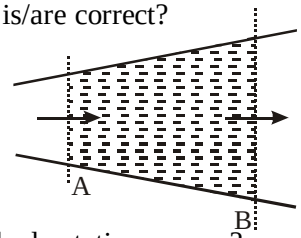
(b) $v_2 - v_1 = (2gh)$

(c) $v_2^2 - v_1^2 = 2\,gh$



(d) The energy per unit mass of the liquid is the same in both sections of the tube

10. A non-viscous liquid is flowing through a non-uniform pipe from section A to section B as shown in figure. Cross-section area of pipe at A is less than that at B. Which of the following statements is/are correct?



(a) The pressure at A greater than that at B

(b) Velocity at A is greater than that at B

(c) Total energy per unit volume of the liquid is greater at A than at B

(d) Axis of the pipe cannot be horizontal

11. If the system is not in free fall, which of the following statements are false about hydrostatic pressure?

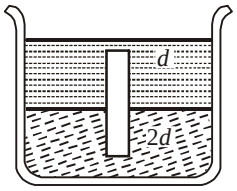
(a) In a liquid, points at different depths can never be at same pressure.

(b) In a liquid, points at different depths may be at same pressure.

(c) In different liquds, points at different depths can be at the same pressure.

(d) In different liquids, points at the same depth can never be at same pressure.

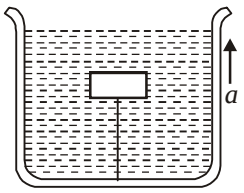
12. A homogeneous solid cylinder of length L (L < H/2), cross-sectional area A/5 is immersed such that it floats with its axis vertical at the liquid-liquid interface with length L/4 in the denser liquid as shown in the figure. The lower density liquid is open to atmosphere having pressure P_0. Then, density D of solid is given by



(a) $\frac{5}{4}d$ (b) $\frac{4}{5}d$

(c) $4d$ (d) $\frac{d}{5}$

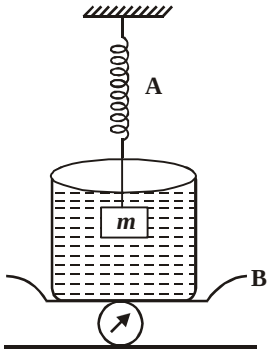
13. A string has a tension T when it is holding a solid block below the surface of a liquid (liquid having density greater than that of solid) and the system is at rest. The tension in the string when the system has an acceleration a in upward direction is



(a) $T\left(1+\frac{g}{a}\right)$ (b) $T\left(1-\frac{g}{a}\right)$

(c) $T\left(1+\frac{a}{g}\right)$ (d) $T\left(1-\frac{a}{g}\right)$

14. The spring balance A reads 2 kg with a block of mass *m* suspended from it. When a beaker with a liquid is put on the pan B of the balance, it reads 5 kg. The two balances are now so arranged that the hanging mass is inside the liquid in the beaker as shown in the figure. In this situation,



(a) the balance A will read more than 2 kg.

(b) the balance B will read less than 5 kg.

(c) the balance A will read less than 2 kg and B will read more than 5 kg.

(d) the balance A and B will read 2 kg and 5 kg respectively.

15. A liquid is flowing steadily through a cylindrical tube of radius 2 cm. If the velocity of the liquid along the axis of the tube is 2 cm s^{-1}, then

(a) rate of flow is $6\pi \times 10^{-6}$ m^3/s

(b) rate of flow is $4\pi \times 10^{-6}$ m^3/s

(c) the velocity of the liquid layer in contact with the wall of the tube is 1/2 cm s^{-1}

(d) the velocity of the liquid layer in contact with the wall of the tube is 2 m s^{-1}

16. A light rod of length 200 cm is suspended from the ceiling horizontally by means of two vertical wires of equal length tied to its ends. One of the wires is made of steel and is of cross section $0.1\ cm^2$ and the other of brass of cross-section $0.2\ cm^2$. Along the rod, at what distance a weight may be hung to produce equal stresses in both the wires ?

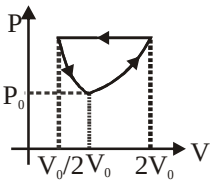
(a) 4/3 m from steel wire (b) 4/3 m from brass wire

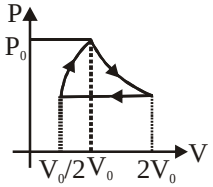
(c) 1 m from steel wire (d) 1/4 m from brass wire

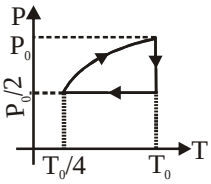
17. A gas mixture constants of 2 moles of oxygen and 4 moles of argon at temperature T. Neglecting all vibrational modes, the total internal energy of the system is

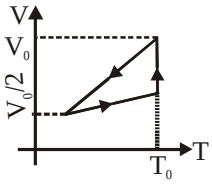
(a) 4 RT (b) 5 RT (c) 15 RT (d) 11 RT

18. One mole of an ideal gas at pressure P_0 and temperature T_0 is expanded isothermally to twice its volume and then compressed at constant pressure to $(V_0/2)$ and the gas is brought back to original state by a process in which $P \propto V$ (Pressure is directly proportional to volume). The correct representation of process is

(a) 

(b) 

(c) 

(d) 

19. On an X temperature scale, water freezes at –125.0° X and boils at 375.0° X. On a Y temperature scale, water freezes at – 70.0°Y and boils at – 30.0° Y. The value of temperature on X-scale equal to the temperature of 50.0°Y on Y-scale is

(a) 455.0° X (b) – 125.0° X (c) 1375.0° X (d) 1500.0° X

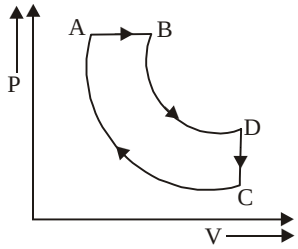
20. During an experiment, an ideal gas is found to obey an additional law VP^2 = constant. The gas is initially at a temperature T and volume V. When it expands to a volume 2V, the temperature becomes.....

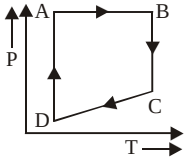
(a) $T\sqrt{2}$ (b) T (c) $\frac{T}{\sqrt{2}}$ (d) $\frac{T}{2}$

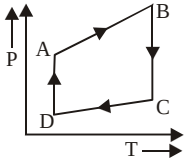
21. A piece of metal floats on mercury. The coefficients of volume expansion of the metal and mercury are γ_1 and γ_2 respectively. If the temperature of both mercury and metal are increased by an amount ΔT, the fraction of the volume of the metal submerged in mercury changes by the factor .....

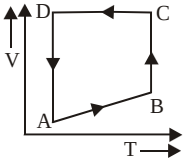
(a) $(\gamma_1 + \gamma_2)\Delta T$ (b) $2(\gamma_1 + \gamma_2)\Delta T$ (c) $\left(\frac{\gamma_2 - \gamma_1}{2}\right)\Delta T$ (d) $(\gamma_1 - \gamma_2)\Delta T$

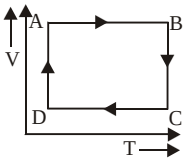
22. The P–V diagram of a cyclic process is shown which of the following graphs represent the same process?



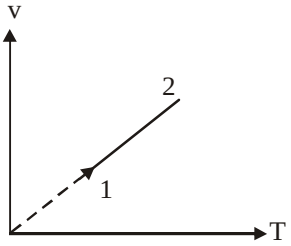
(a) 

(b) 

(c) 

(d) 

23. An ideal gas undergone through the process $1 \rightarrow 2$ as shown in the figure, the heat supplied and work done in the process is ΔQ and ΔW respectively. The ratio $\Delta Q : \Delta W$ is



(a) $\gamma - 1$

(b) γ

(c) $\gamma : \gamma - 1$

(d) $\gamma - 1/\gamma$

24. If 70 cals heat is required to raise the temperature of 2 moles of an ideal gas at constant pressure from 30°C to 35°C, then the amount of heat required to raise the temperature of same gas through same range at constant volume is

(a) 50 cals (b) 70 cals (c) 60 cals (d) 56 cals

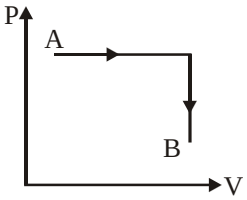
25. In below figure, two indicator diagrams are shown. If the amounts of work done in the two cases are W_1 and W_2 respectively, then

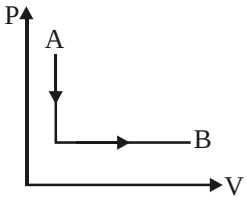
(a) $W_1 = W_2$

(b) $W_1 > W_2$

(c) $W_1 < W_2$

(d) cannot say





26. A lead ball moving with a velocity V strikes a wall and stops. If 50% of its energy is converted into heat, then what will be the increase in temperature? Specific heat of lead is S.

(a) $\frac{2V^2}{JS}$ (b) $\frac{V^2}{4JS}$ (c) $\frac{V^2S}{J}$ (d) $\frac{V^2S}{2J}$

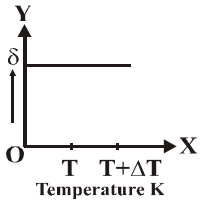
27. A metal ball immersed in alcohol weighs W_1 at 0°C and W_2 at 59°C. The coefficient of cubical expansion of the metal is less than that of alcohol. Assuming that the density of the metal is large compared to that of alcohol, it can be shown that

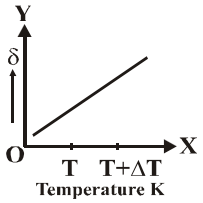
(a) $W_1 > W_2$ (b) $W_1 = W_2$ (c) $W_1 < W_2$ (d) $W_2 = (W_1/2)$

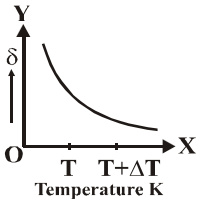
28. A vessel contains 1 mole of O_2 gas (molar mass 32) at a temperature T. The pressure of the gas is P. An identical vessel containing one mole of He gas (molar mass 4) at temperature 2T has a pressure of

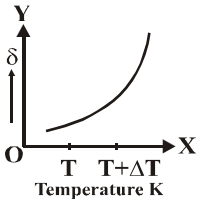
(a) P/8 (b) P (c) 2P (d) 8P

29. An ideal gas is initially at temperature T and volume V. Its volume is increased by ΔV due to an increase in temperature ΔT, pressure remaining constant. The quantity $\delta = \frac{\Delta V}{V \Delta T}$ varies with temperature as

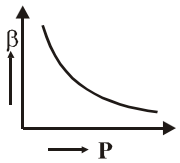
(a) 

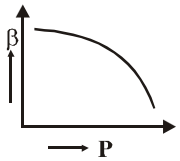
(b) 

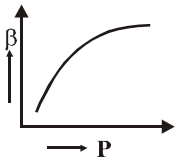
(c) 

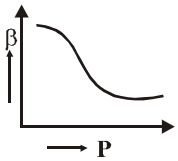
(d) 

30. Which of the following graphs correctly represents the variation of $\beta = -(dV/dP)/V$ with P for an ideal gas at constant temperature?

(a) 

(b) 

(c) 

(d) 

CHEMISTRY

31. Which of the following reaction produces hydrogen?

(a) $H_2S_2O_8 + H_2O$ (b) $BaO + HCl$ (c) $Mg + H_2O$ (d) $Na_2O_2 + 2HCl$

32. Which of the following pairs of ions make the water hard?

(a) NH_4^+, Cl^- (b) Ca^{+2}, HCO_3^- (c) Ca^{2+}, NO_3^- (d) Na^+, SO_4^{2-}

33. Which of the following does not illustrate the anomalous properties of lithium?

(a) Li is much softer than the outer group I metals

(b) The m.p. and b.p. of Li are comparatively high

(c) Li forms a nitride Li_3N unlike group I metals

(d) The ion of Li and its compounds are more heavily hydrated than those of the rest of the group

34. The alkali metal that reacts with nitrogen directly to form nitride is

(a) Li (b) K (c) Na (d) Rb

35. If Na is heated in presence of air, it forms:

(a) Na_2O_2 (b) Na_2CO_3 (c) Na_2O (d) both (a) and (b)

36. The right order of the solubility of sulphates of alkaline earth metals in water is

(a) Be > Ca > Mg > Ba > Sr (b) Mg > Be > Ba > Ca > Sr

(c) Be > Mg > Ca > Sr > Ba (d) Mg > Ca > Ba > Be > Sr

37. Which of the following hydroxide is insoluble in water?

(a) $Ba(OH)_2$ (b) $Ca(OH)_2$ (c) $Be(OH)_2$ (d) $Mg(OH)_2$

38. Mg burns in CO to produce

(a) MgO + CO (b) MgO_2 (c) MgO + C (d) $MgCO_3$

39. Permutit is the technical name given to

(a) aluminates of calcium and sodium (b) hydrated silicate of aluminium and sodium

(c) silicates of calcium and magnesium (d) silicates of calcium and sodium

40. When sodium chloride solution is electrolysed, the gas that is liberated at the cathode is

(a) oxygen (b) chlorine (c) hydrogen (d) air

41. For a general reaction A(g) + B(g) ⇌ C(g) + D(g), the specific rate constant is $k_{(forward)} = 2.0 \times 10^{-3}\ mol^{-1}\ Ls^{-1}$ at a certain temperature. Reaction starts with equimolar amounts of A and B. Reaching at equilibrium, it is observed that A is twice that of C. The specific rate constant for the backward reaction is

(a) $1.5 \times 10^{2}\ mol^{-1}Ls^{-1}$ (b) $5.0 \times 10^{-4}\ mol^{-1}Ls^{-1}$

(c) $8.0 \times 10^{-3}\ mol^{-1}Ls^{-1}$ (d) none of these

42. $N_2(g) + 3H_2 \rightleftharpoons 2NH_3(g)$. This is a gaseous phase reaction taking place in 1 L flask at 127°C. Starting with 1 mole of N_2 and 3 mole of H_2, the equilibrium mixture requires 500 mL of 1.0 M H_2SO_4 for neutralisation. Which of the following is the most appropriate K_c?

(a) 0.03 (b) 0.59 (c) 0.27 (d) 0.11

43. H_3BO_3 + Glycerine $\rightleftharpoons$ H_3BO_3 - Glycerine complex. Equilibrium constant for the reaction is 0.90. Which of the following is correct concentration of glycerine, which on treatment with 0.10 M H_3BO_3 solution, 80% of the H_3BO_3 gets converted into complex?

(a) 4.4 (b) 1.21 (c) 1.7 (d) 3.3

44. $I_2(aq) + I^- \rightleftharpoons I_3^-$ A saturated solution of iodine in water contains 0.330 g I_2/L. In KI more than this can be dissolved. A 0.100 M KI solution actually dissolves 12.5 g of iodine/L, most of which is converted to I_3^-. If it is assumed that the concentration of I_2 in all saturated solutions is the same, the equilibrium constant for the above reaction is

(a) 2×10^{-2} (b) 7.07×10^{2} (c) 1.76×10^{-2} (d) 5.21×10^{1}

45. $2NOBr(g) \rightleftharpoons 2NO(g) + Br_2(g)$. If nitrosyl bromide is 34% dissociated at 25°C and a total pressure of 0.25 atm, K_p for the dissociation at this temperature is

(a) 1.37×10^{-3} (b) 9.78×10^{-3} (c) 2.16×10^{-2} (d) 5.67×10^{-3}

46. For the equilibrium $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$, vapour density is found to be 100 when 1 mole of PCl_5 is taken in 10 L flask at 27°C. The equilibrium pressure is

(a) 1.11 atm (b) 2.89 atm (c) 2.57 atm (d) 1.92 atm

47. 0.1 M solution of three sodium salts NaX, NaY and NaZ have pH 7.0, 9.0 and 11.0, respectively. Which of the following is correct order of increasing acidic strength for acids HX, HY and HZ?

(a) HX < HY < HZ (b) HZ < HY < HX (c) HX = HY = HZ (d) HY < HX < HZ

48. Which of the following equilibrium can be described as an acid-base reaction using the Lewis acid-base definition, but not using bronsted-Lowry definition?

(a) $NH_3 + CH_3COOH \rightleftharpoons CH_3COO^- + NH_4^+$

(b) $H_2O + CH_3COOH \rightleftharpoons H_3O^+ + CH_3COO^-$

(c) $4NH_3 + [Cu(H_2O)_4]^{2+} \rightleftharpoons [Cu(NH_3)_4]^{2+} + 4H_2O$

(d) $2NH_3 + H_2SO_4 \rightleftharpoons 2NH_4^+ + SO_4^{2-}$. The pH of 10^{-7} M HCl is

49. $CN^- + HAc \rightleftharpoons HCN = Ac^-$ which of the following is correct equilibrium constant for the reaction? (Given $K_a(HCN) = 4.9 \times 10^{-10}$, $K_a\ (CH_3COOH) = 1.8 \times 10^{-5}$)

(a) 6.326×10^{-7} (b) 7.84×10^{-15} (c) 3.674×10^{4} (d) 5.16×10^{3}

50. 1.0 M acetic acid is mixed with 0.01 mol L^{-1} HCl. The pH of the resultant solution is
($K_a\ (CH_3COOH) = 1.8 \times 10^{-5}$)

(a) 1.937 (b) 1.54 (c) 2.36 (d) 2.79

51. For the indicator thymol blue, the value of pH is 2.0 when half of the indicator is present in the unionised form. Which of the following is the percentage of the indicator in the unionised form in a solution of 4.0×10^{-3} MH^+ concentration?

(a) 15.5 (b) 28.5 (c) 27.3 (d) 36.1

52. $H_2O + H_3PO_4 \rightleftharpoons H_3O^+ + HPO_4^{2-}$ $pK_2 = 7.80$, pH of NaH_2PO_4 is

(a) 9.35 (b) 4.975 (c) 7 (d) 5.5

53. A certain weak monobasic acid HA has dissociation constant, $K_a = 1 \times 10^{-4}$ at 25°C. Value of equilibrium constant when it reacts with strong base is

(a) 10^{-4} (b) 10^{4} (c) 10^{-10} (d) 10^{10}

54. The solubility of $Mg(OH)_2$ is increased by addition of NH_4^+ ion $Mg(OH)_2 + 2NH_4^+ \rightleftharpoons 2NH_3+2H_2O+Mg^{2+}$. If $K_{sp}(MgOH)_2 = 1 \times 10^{-11}$ and K_b for $NH_4OH = 1.8\times10^{-5}$, then K_c for the reaction is

(a) 3.08×10^{-2} (b) 2.71×10^{-2} (c) 5.10×10^{-3} (d) 5.77×10^{-2}

55. In order to prepare a buffer of pH 8.26, the amount of $(NH_4)_2SO_4$ required to be mixed with 1 L of 0.1 M NH_3 is [$pK_b = 4.74$]

(a) 1.0 mol (b) 10.0 mol (c) 0.50 mol (d) 5 mol

56. Which of the following buffer of 10 mL of 1.0 M HCl?

(a) 100 mL having 0.15 M NH_3 and NH_4Cl each (b) 100 mL having 0.2 M NH_3 and NH_4Cl each

(c) 100 mL having 0.05 M NH_3 and NH_4 Cl each (d) 100 mL having 0.2 M NH_3 and 0.1 M NH_4Cl each

57. During titration of a weak monoacid base BOH with a strong monobase acid, one equilibrium appears $B^+ + 2H_2O \rightleftharpoons BOH + H_3O^+$. That is concerned equilibrium

(a) at the start of titration (b) before the equivalence point

(c) at the equivalence point (d) beyond the equivalence point

Direction for Question 58 to 60: Read the following questions and choose

A. Both **Statement-1** and **Statement-2** are true and **Statement-2** is correct explanation of **Statement-1.**

B. Both **Statement-1** and **2** are true but **Statement-2** is not a correct explanation of **Statement-1.**

C. **Statement-1** is true and **Statement-2** is false.

D. **Statement-1** is false but **Statement-2** is true.

58. Statement-1: Cesium is used in photoelectric cells.
Statement-2: Cesium is most electropositive element.

59. Statement-1: Superoxides of alkali metals are paramagnetic.
Statement-2: Superoxides contain the ion O_2^- which has one unpaired electron.

60. Statement-1: When CO_2 is passed through lime water, it first turns milky and then the solution becomes clear when the passage of CO_2 is continued.
Statement-2: The milkiness is due to the formation of insoluble $CaCO_3$ which then changes to soluble $Ca(HCO_3)_2$ when excess of CO_2 is present.

MATHEMATICS

61 The length of transverse axis of the hyperbola $9x^2 - 4y^2 = 25$ is

(a) 5/3 (b) 10/3 (c) 5/2 (d) none of these

62. If the sum of the odd-numbered terms in the expansion of $(x + a)^n$ is A, and the sum of the even-numbered terms is B, then the value of $(x^2 - a^2)^n$ is

(a) $A^2 - B^2$ (b) $A^2 + B^2$ (c) $4AB$ (d) none of these

63. If in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$, x^{-17} occurs in the r^{th} term, then

(a) $r = 10$ (b) $r = 11$ (c) $r = 12$ (d) $r = 13$

64. The value of $C_0 + 3C_1 + 5C_2 + 7C_3 + \cdots + (2n + 1)C_n$ is equal to

(a) 2^n (b) $2^n + n \cdot 2^{n-1}$ (c) $2^n(n + 1)$ (d) none of these

65. The term independent of x in $\left(\sqrt{\frac{x}{3}} + \sqrt{\frac{3}{2x^2}}\right)^{10}$ is

(a) non-existent (b) ${}^{10}C_1$ (c) $\frac{5}{12}$ (d) 1

66. In the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$, the coefficient of x^{39} is

(a) 1365 (b) –1365 (c) 455 (d) –455

67. The coefficient of x^{-3} in the expansion of $\left(x - \frac{m}{x}\right)^{11}$ is

(a) $-924\,m^7$ (b) $-792\,m^6$ (c) $-330\,m^7$ (d) $-792\,m^5$

68. $C_1 + 4C_2 + 7C_3 + \cdots + (3n-2)C_n =$

(a) $(3n-4)\cdot 2^{n+1}$ (b) $(3n-4)\cdot 2^{n+1} + 2$ (c) $(3n-4)\cdot 2^{n}$ (d) $(3n-4)\cdot 2^{n-1} + 1$

69. The term independent of x in the expansion of $\left(2x + \frac{1}{3x}\right)^6$ is

(a) $\frac{160}{9}$ (b) $\frac{80}{9}$ (c) $\frac{160}{27}$ (d) $\frac{80}{3}$

70. The coefficient of x^6 in the expansion of $(1 + x + x^2 + x^3)^{-3}$ is

(a) 6 (b) 9 (c) 5 (d) 4

71. The number of subsets of a set containing n distinct objects is

(a) ${}^nC_1 + {}^nC_2 + {}^nC_3 + \cdots + {}^nC_n$ (b) ${}^nC_0 + {}^nC_1 + {}^nC_2 + \cdots + {}^nC_n$

(c) $2^n - 1$ (d) $2^n + 1$

72. The integral part of $(\sqrt{2} + 1)^6$ is

(a) 198 (b) 197 (c) 196 (d) 163

73. If the second, third and fourth terms in the expansion of $(x + a)^n$ are 240, 720 and 1080 respectively, then the value of n is

(a) 15 (b) 20 (c) 10 (d) 5

74. The coefficient of x^5 in the expansion of $(x + 3)^6$ is

(a) 18 (b) 6 (c) 12 (d) none of these

75. $\binom{50}{0}^2 + \binom{50}{1}^2 + \binom{50}{2}^2 + \cdots + \binom{50}{50}^2 =$

(a) 2^{50} (b) 2^{100} (c) $(50)^{60}$ (d) $\binom{100}{50}$

76. The coefficient of x^r in $(1 - x)^{-3}$, for $|x| < 1$, is

(a) ${}^{r+2}C_2$ (b) ${}^{r+1}C_2$ (c) ${}^rC_2$ (d) ${}^{r+1}C_r$

77. If ${}^{n+1}C_4 = 9\ {}^nC_2$, then $n =$

(a) 10 (b) 9 (c) 12 (d) 11

78. If the coefficients of the $(2r + 1)^{st}$ term and $(r + 2)^{nd}$ term in the expansion of $(1 + x)^{43}$ are equal, then the value of r is

(a) 2 (b) 13 (c) 15 (d) 14

79. If the coefficients of the 5^{th}, 6^{th} and 7^{th} terms in the expansion of $(1 + x)^n$ are in A.P., then n is equal to

(a) 5 (b) 6 (c) 7 (d) 7 or 14

80. If $(1 + ax)^m = 1 + 8x + 24x^2 + \cdots$, then the values of a and m respectively are

(a) 4, 2 (b) 2, 4 (c) 1, 8 (d) none of these

81. The term independent of x in the expansion of $\left(2x - \frac{3}{x}\right)^6$ is

(a) 4320 (b) 216 (c) –216 (d) –4320

82. The number $\underbrace{111...1}_{91 \text{ times}}$ is

(a) not a prime (b) an even number (c) not an odd number (d) none of these

83. If x^m occurs in the expansion of $\left(x + \frac{1}{x^2}\right)^{2n}$, then the coefficient of x^m is

(a) $\frac{(2n)!}{n!(2n-m)!}$ (b) $\frac{(2n)!\ 3!\ 3!}{(2n-m)!}$

(c) $\frac{(2n)!}{\left(\frac{2n-m}{3}\right)!\left(\frac{4n+m}{3}\right)!}$ (d) none of these

84. The term independent of x in the expansion of $\left(x^2 - \frac{1}{3x}\right)^9$ is equal to

(a) $\frac{28}{81}$ (b) $\frac{28}{243}$ (c) $-\frac{28}{243}$ (d) $-\frac{28}{81}$

85. Equation of the hyperbola with vertices $(\pm 6, 0)$ and directerix $x - 4 = 0$ is

(a) $\frac{x^2}{44} - \frac{y^2}{16} = 1$ (b) $\frac{x^2}{25} - \frac{y^2}{16} = 1$ (c) $\frac{x^2}{36} - \frac{y^2}{45} = 1$ (d) none of these

86. If e and e^- are the eccentricities of the hyperbolas $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{x^2}{b^2} - \frac{y^2}{a^2} = 1$ respectively, then the point $\left(\frac{1}{e}, \frac{1}{e'}\right)$ lies on the curve

(a) $x^2 + y^2 = 1$ (b) $x^2 - y^2 = 1$ (c) $xy = 1$ (d) none of these

87. If the line $x\cos\alpha + y\sin\alpha = p$ touches the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ then,

(a) $p^2 = a^2\cos^2\alpha + \sin^2\alpha$ (b) $b^2 = a^2\cos^2\alpha - p^2\sin^2\alpha$

(c) $a^2\cos^2\alpha - b^2\sin^2\alpha = p^2$ (d) none of these

88. Equation of the tangents to the hyperbola $3x^2 - 4y^2 = 12$ which make equal interapts an axes, is

(a) $y = x \pm 1,\ y = -x \pm 1$ (b) $y = x \pm 5,\ y = -x \pm 5$

(c) $y = x \pm 7,\ y = -x \pm 7$ (d) none of these

89. The value of the parameter for the hyperbola $4x^2 - 3y^2 = 12$ at the point $\left(2, \frac{2}{\sqrt{3}}\right)$ is

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) none of these

90. If any point on a hyperbola is $(3\tan\theta, 2\sec\theta)$ then eccentricity of the hyperbola is

(a) $\frac{\sqrt{17}}{2}$ (b) $\frac{\sqrt{13}}{2}$ (c) $\frac{\sqrt{17}}{4}$ (d) none of these

TEST-7

ANSWERS

Physics

1.	(b)	2.	(d)	3.	(b)	4.	(a)	5.	(a)
6.	(c)	7.	(b)	8.	(b)	9.	(b)	10.	(b)
11.	(b)	12.	(a)	13.	(d)	14.	(c)	15.	(a)
16.	(a)	17.	(d)	18.	(c)	19.	(c)	20.	(a)
21.	(d)	22.	(a)	23.	(c)	24.	(a)	25.	(b)
26.	(b)	27.	(b)	28.	(c)	29.	(c)	30.	(a)

Chemistry

31.	(c)	32.	(b)	33.	(a)	34.	(a)	35.	(d)
36.	(c)	37.	(c)	38.	(c)	39.	(b)	40.	(c)
41.	(c)	42.	(b)	43.	(a)	44.	(b)	45.	(b)
46.	(c)	47.	(b)	48.	(c)	49.	(c)	50.	(a)
51.	(b)	52.	(b)	53.	(d)	54.	(a)	55.	(c)
56.	(c)	57.	(c)	58.	(a)	59.	(a)	60.	(a)

Mathematics

61.	(b)	62.	(a)	63.	(c)	64.	(c)	65.	(a)
66.	(d)	67.	(c)	68.	(b)	69.	(c)	70.	(b)
71.	(b)	72.	(b)	73.	(d)	74.	(a)	75.	(d)
76.	(a)	77.	(d)	78.	(d)	79.	(d)	80.	(b)
81.	(d)	82.	(a)	83.	(c)	84.	(b)	85.	(c)
86.	(a)	87.	(c)	88.	(a)	89.	(c)	90.	(b)