

# **S.B.P. D.A.V. Centenary Public School, Fatehabad.**

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## ***Holidays' Assignments for Summer Vacations, June-2023***

### ***Class: XII Nonmedical***

#### ***General Instructions:***

- 1. Get up early in the morning and go out for a walk daily. Do yoga daily for healthy living.*
- 2. The summer break for class VI-XII will be from 01.06.2023 to 02.07.2023 (Both days inclusive). School will reopen on 03.07.2023.*
- 3. Revise the syllabus of all subjects done before summer vacations for Unit Tests to be started from 04.07.2023.*
- 4. Try to make your handwriting better by practicing and do your HW in good handwriting.*
- 5. Register & Participate in 1<sup>st</sup> stage of 9<sup>th</sup> Online International Humanity Olympiad by accessing through our web portal – <http://www.humanityolympiad.org> or Android App - Awake Humanity (play store). Every individual passing the exam (i.e. scoring minimum 40%) will get an e-certificate through e-mail immediately on their emails. School code is : FATE103.*

#### **English Core**

1. Revise the following syllabus for Unit Test-

Reading Section- Comprehension

Writing Section- Notice Writing, Letter to Editor

Flamingo- Lesson – 1 to 4

Poem- 1(My Mother at Sixty-Six)

Vistas- Lesson- 1

Solve the following Worksheets in BBC Compacta

2. Comprehension - Pages- 3 to 22

3. Notice Writing - Pages- 95 to 100

4. Letter to Editor - Pages- 135 to 145

5. Extracts of all the Lessons and Poem included in Unit Test (as mentioned above)

6. Find out the idioms and phrases used in the lessons- The Rattrap and The Third Level. Describe the meaning of each phrase/idiom and use it in 2 sentences.

7. Make a beautiful Art piece using Bangles or an art piece making the Best Out of Waste (Reference- Lost Spring)

8. As Father's Day is around the corner, take an interview of your father asking about his life journey so far. Based on the answers you get, write a biography on your father's life. Give it a suitable title too.

9. Urvashi Butalia (Born in Haryana in 1952) is an Indian [feminist](#) writer, publisher and activist. She is known for her work in the women's movement of India, as well as for authoring books such as- The Other Side of Silence: Voices from and the Partition of India

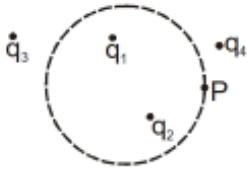
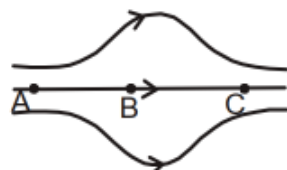
Speaking Peace: Women's Voices from Kashmir

Read any one of the above-mentioned books and write synopsis in 150-200 words.

# Physics

- **Revise chapter 1 , 2 and 3 for UT.**
- **Complete all PYQ of chapter 1 , 2 and 3 provided in class in numerical notebook.**
- **Complete all NCERT examples , problems and NCERT exemplar questions and answers in summer homework notebook.**
- **Complete practical file of all the assigned experiments and activities.**
- **Make a video of demonstrating any 2 activities of physics from the syllabus.**
- **Complete physics worksheet provided below in fair notebook.**

## Physics Worksheet for Summer Vacation

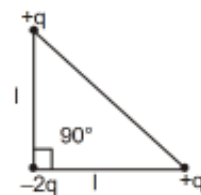
- Q.1 Electric field inside the cavity of uniformly charged sphere is:  
 (1) Non uniform (2) Uniform  
 (3) Zero (4) Same as that on the surface of charged solid sphere
- Q.2 Select from the four particles that contribute to the electric field at point P on the surface.  
 (1)  $q_3$  and  $q_4$  (2)  $q_1, q_2, q_4$   
 (3)  $q_1, q_2, q_3$  and  $q_4$  (4)  $q_1$  and  $q_2$
- 
- Q.3 The locus of zero potential points for a dipole is:  
 (1) not available (2) a plane  
 (3) a straight line (4) a circle
- Q.4 Electric flux through a closed surface area S enclosing charge Q is  $\phi$ . If the surface area is doubled, then the flux is :  
 (1)  $2\phi$  (2)  $\phi/2$  (3)  $\phi/4$  (4)  $\phi$
- Q.5 The charge q is projected into an uniform electric field E, maximum work done when it moves a distance y is:  
 (1)  $qEy$  (2)  $qy/E$  (3)  $qE/y$  (4)  $y/qE$
- Q.6 The figure shows some of the electric field lines corresponding to an electric field. The figure suggests:  
 (1)  $E_A > E_B > E_C$  (2)  $E_A = E_B = E_C$   
 (3)  $E_A = E_C > E_B$  (4)  $E_B > E_A = E_C$
- 
- Q.7 A charge q is placed at the mid point of the line joining two equal charges Q. The system of the three charges will be in equilibrium if q is equal to :  
 (1)  $-Q/2$  (2)  $-Q/4$  (3)  $+Q/4$  (4)  $Q/2$
- Q.8 Force of interaction between two small dipoles at axial positions of each other is directly proportional to  $r^n$ , where r is distance between the center of dipoles. Value of n is:  
 (1)  $-1$  (2)  $-2$  (3)  $-3$  (4)  $-4$
- Q.9 Electric field due to an electric dipole at a distance r from its center in axial position is E. If the dipole is rotated through an angle of  $90^\circ$  about its perpendicular axis, the electric field in magnitude at the same point will be :  
 (1) E (2)  $E/4$  (3)  $E/2$  (4)  $2E$
- Q.10 If  $E_a$  and  $E_{eq}$  are the magnitude of electric field at the axial and equatorial points due to a short electric dipole, then the correct relation is:  
 (1)  $E_{eq} = 2E_a$  (2)  $2E_{eq} = E_a$  (3)  $E_{eq} = E_a$  (4) None of these

Q.11 Two identical small conducting spheres A and B have charges  $+1 \text{ mC}$  and  $-3 \text{ mC}$  on them and they attract each other with a force  $F$ . Two other identical spheres C and D each containing  $+5 \text{ mC}$  are touched separately to A and B respectively and removed. The magnitude of force between sphere A and B now is:

- (1)  $12F$  (2)  $4F$  (3)  $2F$  (4)  $F$

Q.12 What is the magnitude of dipole moment of the system shown in figure?

- (1)  $ql$  (2)  $\sqrt{3}(ql)$  (3)  $\sqrt{2}(ql)$  (4)  $ql/\sqrt{2}$



Q.13 If the coulombic force acting between two protons separated by a distance  $r$  is  $F$ , what would be the

force acting between two alpha particles, separated by a distance  $2r$ ?

- (1)  $F/2$  (2)  $F$  (3)  $2F$  (4)  $3F$

Q.14 A charge  $Q$  is placed at the corner of a cube of edge length  $L$ . The electric flux linked to one of the faces not touching the charge  $Q$  is:

- (1)  $Q/24\epsilon_0$  (2)  $Q/6\epsilon_0$  (3)  $Q/8\epsilon_0$  (4) Zero

Q.15 In a uniform electric field,

- (1) All points are at the same potential  
(2) No two points can have the same potential  
(3) Points separated by the same distance must have the same difference in potential  
(4) None of the above

Q.16 Two equal point charges  $+Q$  each are kept at the two corners of an equilateral triangle. Another charge  $+q$  is kept at the center of the triangle as shown in figure. The distance between the centre and vertex is  $r$ . The resultant force on  $+q$  is:



Q.17 There are two charges  $+1 \mu\text{C}$  and  $+5 \mu\text{C}$ . The ratio of the forces acting on one charge due to the other charge will be:

- (1)  $1 : 5$  (2)  $1 : 1$  (3)  $5 : 1$  (4)  $1 : 25$

Q.18 An electric dipole of dipole moment  $P$  is rotated in a uniform electric field of strength  $E$  from position of stable equilibrium to unstable equilibrium. Then work done by external agent in this process is:

- (1) Zero (2)  $PE$  (3)  $2PE$  (4)  $-2PE$

Q.19 A given charge situated at a certain distance from an electric dipole in the end-on position experiences a force  $F$ . If the distance of the charge is doubled, the force acting on the charge will be

- (1)  $2F$  (2)  $F/2$  (3)  $F/4$  (4)  $F/8$

Q.20 A thin film soap bubble of radius  $R$  is given a uniform negative charge  $-Q$ . The radius  $R$

- (1) Becomes  $R/2$  (2) Increases (3) Decreases (4) Becomes  $R/\pi$

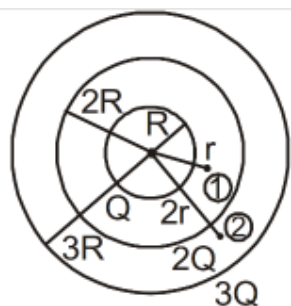
Q.21 Two equal negative charges  $-q$  are fixed at points  $(0, -a)$  and  $(0, a)$  on  $y$ -axis. A positive charge  $Q$  is released from rest at the point  $(2a, 0)$  on the  $x$ -axis. The charge  $Q$  will:

- (1) execute simple harmonic motion  
(2) move to the origin and remains at rest  
(3) move to infinity  
(4) execute oscillatory but not simple harmonic motion

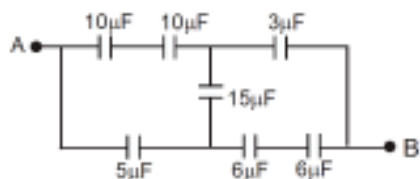
Q.22 What is the angle between the electric dipole moment and the electric field due to itself on the equatorial line ?

- (1)  $0^\circ$  (2)  $90^\circ$  (3)  $180^\circ$  (4) None of these

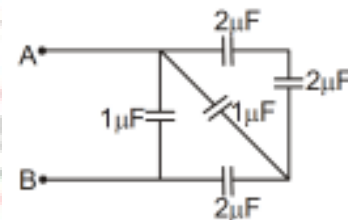
- Q.23 In the arrangement of concentric shells as shown in the given figure, the ratio of electric field at points (1), (2) is:



- (1) 1 : 2                      (2) 3 : 4                      (3) 4 : 3                      (4) 2 : 3
- Q.24 Which of the following is not true about equipotential surfaces ?  
 (1) They do not cross each other  
 (2) They are concentric spheres for uniform electric field  
 (3) Rate of change of potential with position on them is zero  
 (4) They can be spheres
- Q.25 A capacitor is charged by a battery and the energy stored is  $U$ . The battery is now removed and the separation between the plates is doubled. The energy stored now is :  
 (1)  $U/2$                       (2)  $U$                       (3)  $2U$                       (4)  $4U$
- Q.26 In the figure shown, the equivalent capacitance between A and B is:

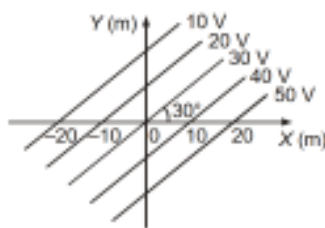


- (1)  $3.75 \mu F$                       (2)  $5.25 \mu F$                       (3)  $6.5 \mu F$                       (4)  $10.5 \mu F$
- Q.27 The total capacity of the system of capacitors shown in figure below between the points A and B is:



- (1)  $1 \mu F$                       (2)  $2 \mu F$                       (3)  $3 \mu F$                       (4)  $4 \mu F$
- Q.28 A hollow metal sphere of radius 10 cm is charged such that the potential on its surface becomes 80V. The potential at the centre of sphere is :  
 (1) 80V                      (2) 800V                      (3) 8V                      (4) Zero
- Q.29 The potential energy of a charged parallel plate capacitor connected to a battery is  $U_0$ . If a slab of dielectric constant  $K$  is inserted fully between the plates, then the new potential energy will be:  
 (1)  $U_0/K$                       (2)  $U_0K$                       (3)  $U_0/K^2$                       (4)  $U_0^2$
- Q.30 Two concentric conducting thin shells of radius  $a$  and  $b$  ( $a > b$ ) carry charges  $Q$  and  $3Q$  respectively. The net charge on the outer surface of the outer shell is:  
 (1)  $4Q$                       (2)  $3Q$                       (3)  $2Q$                       (4)  $Q$
- Q.31 If electrostatic potential at a distance  $r$ , from the centre of a small dipole, in axial position is  $V$ , then potential at a distance  $2r$  from the centre on the same line is:  
 (1)  $V/8$                       (2)  $4V$                       (3)  $8V$                       (4)  $V/4$

Q.32 Equipotential surfaces in a region are shown. Magnitude of electric field in the region is:

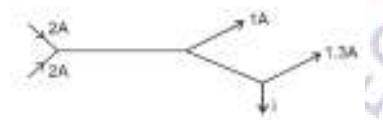


- (1) 2 V/m      (2) 10 V/m      (3) 1 V/m      (4) Zero

Q.33 A positive charge is moving under the effect of a uniform electric field alone. It moves from potential zone  $V_1$  to potential zone  $V_2$  ( $V_2 < V_1$ ). Its speed:

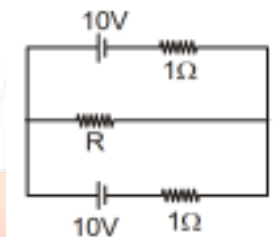
- (1) Increases      (2) Decreases  
(3) Remains constant      (4) Will become zero at  $V_2$

Q.34 The figure below shows current in a part of electric circuit. The current  $i$  is:-



- (1) 1.7A      (2) 3.7A      (3) 1.3A      (4) 1A

Q.35 The maximum power developed across a variable resistance  $R$  in the circuit shown in figure is:



- (1) 50 W      (2) 75 W      (3) 25 W      (4) 100 W

Q.36 A wire is stretched by 10% of its original length by applying a force. The percentage change in the resistance of wire is:

- (1) 21%      (2) 10%      (3) 11%      (4) 1%

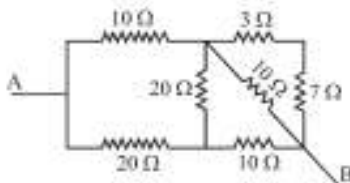
Q.37 Ohm's law is true for

- (1) Metallic conductors  
(2) All conductors  
(3) Electrolytes when current passes through them  
(4) Diode when current flows

Q.38 A current of 0.9A flows through  $2\Omega$  resistor and 0.3A through  $7\Omega$  resistor when they are separately connected across a cell. The internal resistance of the cell is:

- (1)  $0.5\Omega$       (2)  $1.0\Omega$       (3)  $1.2\Omega$       (4)  $2.0\Omega$

Q.39 Find the effective resistance across A and B in the given circuit.



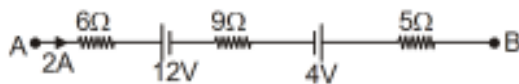
- (1)  $5\Omega$       (2)  $10\Omega$       (3)  $15\Omega$       (4)  $20\Omega$

Q.40 Three equal resistors connected in series across a source of emf together dissipate 10 watt. If the same resistors are connected in parallel across the same emf, the power dissipated will be

- (1) 10 watt      (2) 30 watt      (3)  $10/3$  watt      (4) 90 watt

Q.41 The potential difference between A and B in the following figure is:





- (1) 32V                      (2) 48V                      (3) 24V                      (4) 14V
- Q.42 A wire is made by the combination of thin and thick wire connected in series. The current density:
- (1) In thick wire is more
  - (2) In thin wire is more
  - (3) Is same in both
  - (4) Depends upon the voltage of battery
- Q.43 A steady current flows in a metallic conductor of non uniform cross-section. The quantity/quantities that remain constant along the length of conductor is/are:
- (1) current, electric field and drift speed
  - (2) drift speed only
  - (3) current and drift speed
  - (4) current only
- Q.44 The masses of three wires of copper are in ratio of 1 : 3 : 5 and their lengths are in the ratio 5 : 3 : 1. The ratio of their electrical resistances is:
- (1) 1 : 3 : 5                      (2) 15 : 3 : 1                      (3) 1 : 15 : 125                      (4) 125 : 15 : 1
- Q.45 If a battery of fixed emf  $e$  and internal resistance  $r$  is connected to a variable external resistance  $R$ , then the condition for which the power delivered by the battery to the load will be maximum, is:
- (1)  $r = R/2$                       (2)  $r = R$                       (3)  $r = 4R$                       (4)  $r = R/3$

## Chemistry

- **REVISE unit 1, 2 and 3 for U.T**
- Investigatory Project Report to be made on the topics allotted in class.
- Do following assignment in your holidays' homework notebook.
- Do all the NCERT Exemplar questions of unit 1,2 & 3.

### ASSERTION -REASON TYPE QUESTIONS

In the following questions, two statements (Assertion) A and Reason (R) are given.

Mark

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

1. **Assertion:** When a blood cell is placed in hypertonic solution, it shrinks.  
**Reason:** Blood is isotonic with 0.9% NaCl solution.
2. **Assertion:** The aquatic species feel more comfortable in winter than summer  
**Reason:** Solubility of gases increases with increase of temperature.
3. **Assertion:** Azeotropic mixture are formed only by non-ideal solutions.  
**Reason:** Boiling point of an azeotropic is either higher than both the components or lower than both the components.
4. **Assertion:** Soft drink and soda water bottles are sealed under high pressure.  
**Reason:** The dissolution of gas in liquid is an endothermic process.
5. **Assertion:** On adding non-volatile solute to water its vapour pressure increases.  
**Reason:** Relative lowering of vapour pressure is a colligative property
6. **Assertion:** Addition of ethylene glycol to water lowers the freezing point of water, therefore, used as antifreeze.  
**Reason:** 1, 2-Ethanediol is soluble in water because it can form H-bond with water,

therefore vapour pressure of solution is lowered.

7. **Assertion:** In an ideal solution,  $\Delta H_{\text{mix}}$  is zero.

**Reason:** In an ideal solution, A – B interactions are lower than A-A and B-B interactions.

8. **Assertion:** Mixture of ethanol and cyclohexane forms a solution with negative deviation from Raoult's law.

**Reason:** When ethanol mixes in cyclohexane, it reduces the intermolecular force between ethanol molecules.

9. **Assertion:** Van't Hoff factor for Benzoic acid in Benzene is less than 1

**Reason:** Benzoic acid dimerizes in Benzene.

10. **Assertion:** Larger the value of cryoscopic constant of the solvent, lesser will be the freezing point of solution.

**Reason:** Depression in freezing point depends on the nature of the solvent.

11. **Assertion:** An aqueous solution of NaCl freezes below 273 K.

**Reason:** Vapour pressure of the solution is less than that of the pure solvent.

12. **Assertion:** The sum of mole fractions of all components of a solution is unity.

**Reason:** Mole fraction is independent of temperature.

13. **Assertion:** Osmosis involves movement of solvent molecules from its lower concentration to its higher concentration.

**Reason:** Solution having the same osmotic pressure are called isotonic solution.

14. **Assertion:** When blood cell is placed in a solution containing 1.5 % NaCl, it will shrink.

**Reason:** Blood is isotonic with 1.5% NaCl solution.

15. **Assertion:** Molarity of a solution in liquid state changes with temperature.

**Reason:** The volume of a solution changes with change in temperature.

16. **Assertion:** Rate constant of a zero-order reaction has same units as the rate of reaction.

**Reason:** Rate constant of a zero-order reaction does not depend upon the concentration of reactant.

17. **Assertion :** The molecularity of the reaction ,  $\text{H}_2 + \text{Br}_2 \rightarrow 2 \text{HBr}$  is 2

**Reason :** The order of the reaction can be determined only experimentally.

18. **Assertion:** All collision of reactant molecules lead to product formation.

**Reason:** Only those collisions in which molecules have correct orientation and sufficient kinetic energy lead to compound formation

19. **Assertion :** Half-life period is always independent of initial concentration .

**Reason :** Half-life Period is inversely proportional to rate constant.

20. **Assertion:** Diamond shall convert to graphite.

**Reason:** The rate is so slow that the change is not perceptible at all.

21. **Assertion:** A catalyst does not alter the free energy change of a reaction.

**Reason:** A catalyst lowers the activation energy of a process.

22. **Assertion:** According to collision theory the rate of reaction does not depend on collision frequency.

**Reason:** The collisions in which molecules collide with sufficient kinetic energy and proper orientation are called effective collisions.

23. **Assertion:** The slowest elementary step in a complex reaction decides the rate of the reaction.

**Reason:** The slowest elementary step always has the smallest molecularity.

24. **Assertion:** Hydrolysis of methyl ethanoate is a pseudo first order reaction.

**Reason:** Water is present in large excess and therefore its concentration remained Constant throughout the reaction.

25. **Assertion:** The order for a reaction with rate constant  $k=3 \times 10^4 \text{ s}^{-1}$  is 1.

**Reason:** Order of a reaction is the sum of the powers to which concentration terms are raised to in the rate law .

26. **Assertion :** Rate constant of a zero order reaction has the same units as the rate of reaction .

**Reason :** Rate of a zero order reaction does not depend on the concentration..

27. **Assertion:** 50% of a reaction is completed in 50 sec, 75% of the reaction will be completed in 75 sec.

**Reason:** The rate constant of a zero-order reaction depends upon time.

28. **Assertion:** The thermal decomposition of HI on gold is a zero-order reaction.

**Reason:** The thermal decomposition of HI on gold depends on the initial concentration

29. **Assertion:** The reaction  $X \rightarrow Y$  follows second order kinetics. If concentration of X increased 3 times rate become 3 times.

**Reason:** The rate of a reaction is directly proportional to the concentration of reactants

30. **Assertion:** The enthalpy of reaction remains constant in the presence of a catalyst.

**Reason:** A catalyst participating in the reaction, forms different activated complex and lowers down the activation energy but the difference in energy of reactant and product remains the same.

31. On dissolving sugar in water at room temperature solution feels cool to touch. Under which of the following cases dissolution of sugar will be most rapid?

- i.) Sugar crystals in cold water.
- ii.) Sugar crystals in hot water.
- iii.) Powdered sugar in cold water.
- iv.) Powdered sugar in hot water.

32. An X molal solution of a compound in benzene has mole fraction of solute equal to 0.2. The value of X is :

- (i) 14
- (ii) 3.2
- (iii) 1.4
- (iv) 2

33. Mole fraction of ethanol in ethanol water mixture is 0.25. Hence percentage concentration of ethanol by weight of mixture is:

- (i) 25%
- (ii) 75%
- (iii) 46%
- (iv) 54%

34. Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is

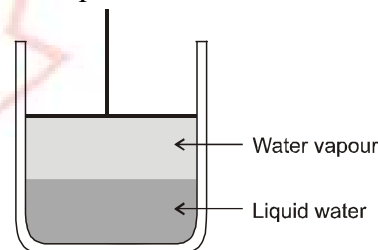
- i) 3.28 mol Kg<sup>-1</sup>
- (ii) 2.28 mol Kg<sup>-1</sup>
- (iii) 0.44 mol Kg<sup>-1</sup>
- (iv) 1.14 mol Kg<sup>-1</sup>

35. A 5.2 molal aqueous solution of CH<sub>3</sub>OH is supplied. What is the mole fraction of methyl alcohol in the solution?

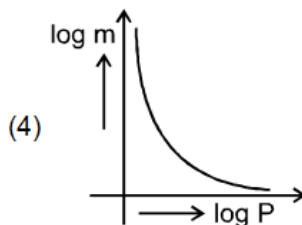
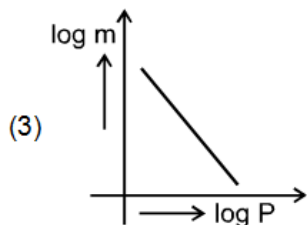
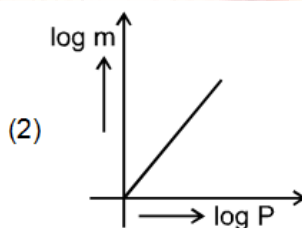
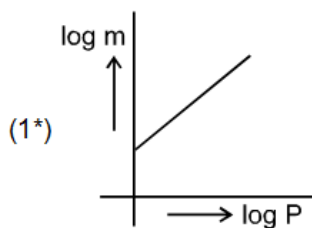
- i) 0.050
- (ii) 0.100
- (iii) 0.190
- (iv) 0.086

36. The vapour pressure of water at 20°C is 17.54 mmHg. What will be the vapour pressure of the water in the apparatus shown after the piston is lowered, decreasing the volume of the gas above the liquid to one half of its initial volume (assume temperature constant).

- (i) 8.77 mmHg
- (ii) 17.54 mmHg
- (iii) 35.08 mmHg
- (iv) between 8.77 and 17.54 mmHg



37. Which of the following curves represents the Henry's law?





38. Two liquids A and B form an ideal solution at temperature T. When the total vapour pressure above the is 400 torr, the mol fraction of A in the vapour phase is 0.4 and in the liquid phase 0.75. What are the vapour pressures of pure A?
- (i)  $P_A^0 = 213.33$  torr      (ii)  $P_A^0 = 216.32$  torr      (iii)  $P_A^0 = 219.35$  torr      (iv)  $P_A^0 = 209.33$  torr
39. Which of the following will form an ideal solution?
- (i)  $C_2H_5OH$  and water      (ii)  $HNO_3$  and water  
(iii)  $CHCl_3$  and  $CH_3COCH_3$       (iv)  $C_6H_6$  and  $C_6H_5CH_3$
40. Which of the following shows negative deviation from Raoult's law?
- (i)  $CHCl_3$  and acetone  
(ii)  $CHCl_3$  and  $C_2H_5OH$   
(iii)  $C_6H_5CH_3$  and  $C_6H_6$   
(iv)  $C_6H_6$  and  $CCl_4$
41. Among the following that does not form an ideal solution is -
- (i)  $C_6H_6$  and  $C_6H_5CH_3$       (ii)  $C_2H_5Cl$  and  $C_6H_5OH$   
(iii)  $C_6H_5Cl$  and  $C_6H_5Br$       (iv)  $C_2H_5Br$  and  $C_2H_5I$
42. Total vapour pressure of mixture of 1 mol A ( $P_A^0 = 150$  torr) and 2 mol B ( $P_B^0 = 240$  torr) is 200 torr. In this case-
- (i) there is positive deviation from Raoult's law  
(ii) there is negative deviation from Raoult's law  
(iii) there is no deviation from Raoult's law  
(iv) molecular masses of A and B are also required for calculating the deviation
43. van't Hoff factor  $i$  for an infinitely dilute solution of  $NaHSO_4$  is: —
- (i)  $1/2$       (ii)  $1/3$       (iii) 3      (iv) 2
44. Phenol associates in benzene solvent to form double molecules. By the freezing point depression method, the van't Hoff's factor has been found to be 0.54. To what degree, phenol is associated?
- (i) 0.46      (ii) 0.54      (iii) 0.98      (iv) 0.92
45. If  $\alpha$  is the degree of dissociation of  $Na_2SO_4$ , the van't Hoff's factor (i) used for calculating the molecular mass is
- (i)  $1 + \alpha$       (ii)  $1 - \alpha$       (iii)  $1 + 2\alpha$       (iv)  $1 - 2\alpha$
46. 1 mol each of following solutes are taken in 9 mol water
- i)  $NaCl$       ii)  $K_2SO_4$       iii)  $Na_3PO_4$       iv) glucose
47. Osmotic pressure will be in order
- (i)  $A < B < C < D$       (ii)  $D < C < B < A$       (iii)  $D < A < B < C$       (iv) equal
48. If relative decrease in vapour pressure is 0.4 for a solution containing 1 mol  $NaCl$  in 3 mol  $H_2O$ ,  $NaCl$  .....is ionised.
- (i) 60%      (ii) 50%      (iii) 100%      (iv) 40%
49. Elevation in boiling point was  $0.52^\circ C$  when 6 g of a compound x was dissolved in 100 g of water. Molecular weight of x is : ( $K = 0.52$  Kelvin  $kg\ mol^{-1}$ )
- (i) 120      (ii) 60      (iii) 100      (iv) 342
- (1) 0.4 M      (2) 0.8 M      (3) 1.0 M      (4) 1.2 M
50. What will be the temperature at which a solution containing 6 g of glucose per 1000 g water will boil, if molal elevation constant for water is  $0.52/1000K\cdot kg\cdot mol^{-1}$ ?
- (i)  $100.173^\circ C$       (ii)  $100.0173^\circ C$       (iii)  $100.173^\circ C$       (iv) None

51. Adding powdered Pb and Fe to a solution containing 1.0 M of each of  $\text{Pb}^{2+}$  and  $\text{Fe}^{2+}$  ions would result in the formation of  
 (i) More of Pb and  $\text{Fe}^{2+}$  ions (ii) More of Fe and  $\text{Pb}^{2+}$  ions  
 (iii) More of Fe and Pb (iv) More of  $\text{Fe}^{2+}$  and  $\text{Pb}^{2+}$  ions
52. The standard electrode potentials of the two half cell are given below :  
 $\text{Ni}^{2+} + 2\text{e}^- = \text{Ni}$  ;  $E^\circ = -0.25 \text{ V}$   
 $\text{Zn}^{2+} + 2\text{e}^- = \text{Zn}$  ;  $E^\circ = -0.77 \text{ V}$   
 The emf of cell formed by combining the two half cells would be:  
 (i)  $-1.02 \text{ volt}$  (ii)  $+0.52 \text{ volt}$  (iii)  $+1.02 \text{ volt}$  (iv)  $-0.52 \text{ volt}$
53. The electric charge for electrode deposition of one gram equivalent of a substance is:  
 (1) 1 amp/sec (2) 96,500 C/sec (3) 1 amp/hour (4) 96,500 C
54. The amount of an ion discharged during electrolysis is not directly proportional to:  
 (1) resistance (2) time  
 (3) Current strength (4) electrochemical equivalent of the element
55. W g of copper deposited in a copper voltameter when an electric current of 2 ampere is passed for 2 hours. If one ampere of electric current is passed for 4 hours in the same voltameter, copper deposited will be:  
 (1) W (2) W/2 (3) W/4 (4) 2W
56. Electrolysis can be used to determine atomic masses. A current of 0.550 A deposits 0.55 g of a certain metal in 100 minutes. Calculate the atomic mass of the metal if  $n = 3$  :  
 (1) 100 (2) 45.0 (3) 48.25 (4) 144.75
57. How many minutes will it take to plate out 5.0 g of Cr from a  $\text{Cr}_2(\text{SO}_4)_3$  solution using a current of 15 A? (Atomic weight: Cr = 52.0)  
 (1) 254 (2) 30 (3) 152 (4) 103
58. An electrolysis of a oxytungsten complex ion using 1.10 A for 40 min produces 0.838 g of tungsten. What is the charge of tungsten in the material? (Atomic weight: W = 184)  
 (1) 6 (2) 2 (3) 4 (4) 1
59. Faraday's law of electrolysis fails when:  
 (1) Temperature is increased (2) Inert electrodes are used  
 (3) A mixture of electrolytes is used (4) In none of the above cases
60. The specific conductivity of a saturated solution of AgCl is  $3.40 \times 10^{-6} \text{ ohm}^{-1} \text{ cm}^{-1}$  at  $25^\circ\text{C}$ .  
 If  $\lambda_{\text{Ag}^+} = 62.3 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$  &  $\lambda_{\text{Cl}^-} = 67.7 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ , the solubility of AgCl at  $25^\circ\text{C}$  is :  
 (1)  $2.6 \times 10^{-5} \text{ M}$  (2)  $4.5 \times 10^{-3} \text{ M}$  (3)  $3.6 \times 10^{-5} \text{ M}$  (4)  $3.6 \times 10^{-3} \text{ M}$
61. At infinite dilution, the eq. conductances of  $\text{CH}_3\text{COONa}$ , HCl and  $\text{CH}_3\text{COOH}$  are 91, 426 and 391  $\text{mho cm}^2$  respectively at  $25^\circ\text{C}$ , The eq. conductance of NaCl at infinite dilution will be:  
 (1) 126 (2) 209 (3) 391 (4) 908

62. The value of  $\lambda_m^\infty$  for  $\text{NH}_4\text{Cl}$ ,  $\text{NaOH}$  and  $\text{NaCl}$  are 129.8, 248.1 and 126.4  $\text{ohm}^{-1} \text{cm}^2 \text{mol}^{-1}$  respectively.

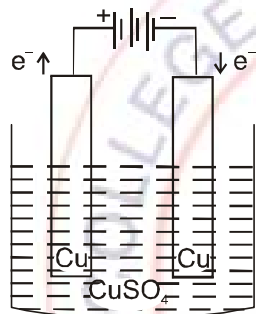
Calculate  $\lambda_m^\infty$  for  $\text{NH}_4\text{OH}$  solution (in  $\text{ohm}^{-1} \text{cm}^2 \text{mol}^{-1}$ )

- (1) 215.5                      (2) 251.5                      (3) 244.7                      (4) 351.5

63. The ionization constant of a weak electrolyte is  $25 \times 10^{-6}$  while the equivalent conductance of its 0.01 M solution is  $19.6 \text{ S cm}^2 \text{eq}^{-1}$ . The equivalent conductance of the electrolyte at infinite dilution (in  $\text{S cm}^2 \text{eq}^{-1}$ ) will be :

- (1) 250                      (2) 196                      (3) 392                      (4) 384

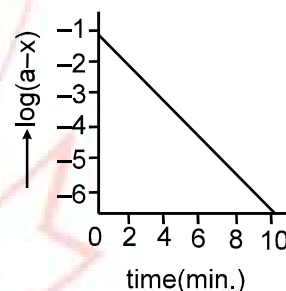
64. In the adjacent diagram the electrolytic cell contains 1 L of an aqueous 1 M Copper (II) sulphate solution. If 0.4 mole of electrons passed through of cell, the concentration of copper ion after passage of the charge will be



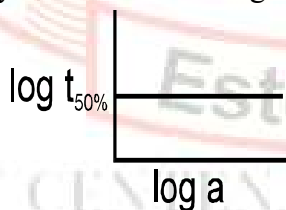
- (1) 0.4 M                      (2) 0.8 M                      (3) 1.0 M                      (4) 1.2 M

65. The conversion of vinyl allyl ether to pent-4-enol follows certain kinetics. The following plot is obtained for such a reaction. The order for the reaction is

- (1) zero                      (2) -1  
(3) 1                      (4) 2



66. A graph plotted between  $\log t_{50\%}$  vs.  $\log$  concentration is a straight line. What conclusion can you draw from this graph.



- (1)  $n = 1$  ;  $t_{1/2} \propto a$                       (2)  $n = 2$ ,  $t_{1/2} \propto 1/a$   
(3\*)  $n = 1$  ;  $t_{1/2} = (0.693 / k)$                       (4) None of these

67. In the first order reaction 75% of the reactant disappeared in 1.388 hrs. Calculate the rate constant of the reaction :

- (1)  $1 \text{ s}^{-1}$                       (2\*)  $2.8 \times 10^{-4} \text{ s}^{-1}$                       (3)  $17.2 \times 10^{-3} \text{ s}^{-1}$                       (4)  $1.8 \times 10^{-3} \text{ s}^{-1}$

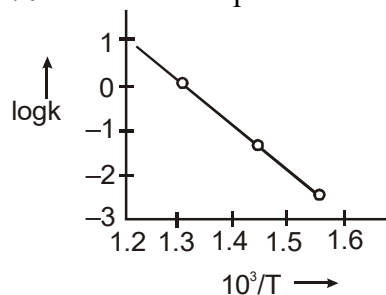
68. Catalyst increases the rate of reaction because:

- (1) it decreases  $\Delta H$                       (2) it increases  $\Delta H$   
(3) it decreases activation energy                      (4) it increases activation energy

69. For a reaction following  $n^{\text{th}}$  order kinetics, the half life ( $t_{1/2}$ ) would depend upon the initial concentration

- (1) as:  
(1\*)  $t_{1/2} \propto a^{1-n}$                       (2)  $t_{1/2} \propto a^{n-1}$                       (3)  $t_{1/2} \propto a^n$                       (4)  $t_{1/2} \propto a^{-n}$

70 For the decomposition of HI the following logarithmic plot is shown : [R = 1.98 cal/mol-K]



The activation energy of the reaction is about

- (1) 45600 cal (2) 13500 cal (3) 24600 cal (4) 32300 cal
71. Half life period of 10 gm radioactive element is 20 days. Then half life period of 100 gm of this element is :  
 (1\*) 20 days (2) 200 days (3) 100 days (4) 10 days
44. A reaction involving two different reactants can never be :  
 (1\*) unimolecular reaction (2) first order reaction  
 (3) Second order reaction (4) bimolecular reaction
72. For a reaction  $\frac{1}{2} A \longrightarrow 2B$ , rate of disappearance of 'A' related to the rate of appearance of 'B' by the expression.  
 (1)  $-\frac{d[A]}{dt} = \frac{1}{4} \frac{d[B]}{dt}$   
 (2)  $-\frac{d[A]}{dt} = \frac{d[B]}{dt}$   
 (3)  $-\frac{d[A]}{dt} = 4 \frac{d[B]}{dt}$   
 (4)  $-\frac{d[A]}{dt} = \frac{1}{2} \frac{d[B]}{dt}$
73. Consider the reaction,  $Cl_2(aq) + H_2S(aq) \longrightarrow S(s) + 2H^+(aq) + 2Cl^-(aq)$   
 The rate equation for this reaction is rate = k [Cl<sub>2</sub>][H<sub>2</sub>S]  
 Which of these mechanisms is/are consistent with this rate equation?  
 A.  $Cl_2 + H_2S \longrightarrow H^+ + Cl^- + Cl^+ + HS^-$  (slow)  
 $Cl^+ + HS^- \longrightarrow H^+ + Cl^- + S$  (fast)  
 B.  $H_2S \rightleftharpoons H^+ + HS^-$  (fast equilibrium)  
 $Cl_2 + HS^- \longrightarrow 2Cl^- + H^+ + S$  (slow)  
 (1) B only (2) Both A and B (3) Neither A nor B (4) A only
74. The rate of a chemical reaction doubles for every 10°C rise of temperature. If the temperature is raised by 50°C, the rate of the reaction increases by about :  
 (1) 10 times (2) 24 times (3\*) 32 times (4) 64 times
75. The rate of a reaction doubles when its temperature changes from 300 K to 310 K. Activation energy of such a reaction will be : (R = 8.314 JK<sup>-1</sup> mol<sup>-1</sup> and log 2 = 0.301)  
 (1\*) 53.6 kJ mol<sup>-1</sup> (2) 48.6 kJ mol<sup>-1</sup> (3) 58.5 kJ mol<sup>-1</sup> (4) 60.5 kJ mol<sup>-1</sup>
76. For the non-stoichiometry reaction  $2A + B \rightarrow C + D$ , the following kinetic data were obtained in three separate experiments, all at 298 K.

Initial Concentration (A)	Initial Concentration (B)	Initial rate of formation of C (mol L <sup>-1</sup> S <sup>-1</sup> )
0.1 M	0.1 M	$1.2 \times 10^{-3}$
0.1 M	0.2 M	$1.2 \times 10^{-3}$
0.2 M	0.1 M	$2.4 \times 10^{-3}$

The rate law for the formation of C is :

$$(1) \frac{dc}{dt} = k[A][B] \quad (2) \frac{dc}{dt} = k[A]^2[B] \quad (3) \frac{dc}{dt} = k[A][B]^2 \quad (4^*) \frac{dc}{dt} = k[A]$$

77. For a first order reaction  $(A) \rightarrow \text{products}$  the concentration of A changes from 0.1 M to 0.025 M in 40 minutes. The rate of reaction when the concentration of A is 0.01 M is :

- (1)  $1.73 \times 10^{-5} \text{ M/min}$  (2)  $3.47 \times 10^{-4} \text{ M/min}$   
 (3)  $3.47 \times 10^{-5} \text{ M/min}$  (4)  $1.73 \times 10^{-4} \text{ M/min}$

## Elective Maths

### Revise chapter 1,2,3,4 for unit tests.

#### Relations & Functions

1. If a relation  $R = \{(a,b) : b-a=4, b \geq 7\}$  is defined on  $N$ , then :

- [a]  $(2,6) \in R$  [b]  $(4,7) \in R$  [c]  $(1,5) \in R$  [d]  $(4,8) \in R$

2. The number of relations  $R : A \rightarrow B$ , where  $A = \{a,b,c\}$  and  $B = \{e,f\}$  is :

- [a] 48 [b] 16 [c] 32 [d] 64

3. If  $A = \{1,2,3\}$ , then which of the following relation is not an equivalence relation on A?

- [a]  $\{(1,1),(2,2),(3,3)\}$  [b]  $\{(1,1),(2,2),(3,3),(1,2),(2,1)\}$   
 [c]  $\{(1,1),(2,2),(3,3),(2,3),(3,2)\}$  [d]  $\{(1,1),(2,2),(3,3),(1,3),(3,1),(2,3)\}$

4. If the relation  $R : A \rightarrow B$ , where  $A = \{1,2,3\}$  and  $B = \{1,3,5\}$  is defined by :

$R = \{(x,y) : x \leq y, x \in A, y \in B\}$ , then :

- [a]  $R = \{(1,3),(1,5),(2,3),(2,5),(3,5)\}$  [b]  $R = \{(1,1),(1,5),(2,3),(2,5),(3,5)\}$   
 [c]  $R = \{(1,3),(1,5),(3,3),(2,5),(3,5)\}$  [d]  $R = \{(1,3),(1,5),(2,3),(2,5),(5,5)\}$

5. Let  $N$  be the set of natural numbers and the function  $f : N \rightarrow N$  be defined by

$f(n) = 2n + 3 \forall n \in N$ . Then  $f$  is

- [a] surjective [b] injective [c] bijective [d] none of these

6. For real numbers  $x$  and  $y$ , define  $xRy$  if and only if  $x - y + \sqrt{2}$  is an irrational number.

Then the relation  $R$  is

- (A) reflexive (B) symmetric (C) transitive (D) none of these

7. Let  $f : N \rightarrow N$  be defined as  $f(x) = x^2$ . Which one is true.

- [a]  $f$  is one-one onto [b]  $f$  is many one onto  
 [c]  $f$  is one but not onto [d]  $f$  is neither one-one nor onto

8. A relation  $R$  in  $S = \{(1,1), (1,3), (2,2), (3,3)\}$ . Which element(s) of relation  $R$  be removed to make  $R$  an equivalent relation?

- [a]  $(1,1)$  [b]  $(1,3)$  [c]  $(2,2)$  [d]  $(3,3)$

9. If  $R$  is a relation of set  $A = \{1,2,3\}$  given by  $R = \{(1,1), (2,2), (1,3)\}$ , then  $R$  is

- [a] Reflexive [b] Symmetric [c] Transitive [d] both a and b

10. If  $R$  is a relation of set  $A = \{1,2,3\}$  given by  $R = \{(1,1), (2,2), (3,3)\}$ , then  $R$  is

- [a] Reflexive [b] Symmetric [c] Transitive [d] Equivalence

11. If  $R$  is a relation of set  $A = \{1,2,3\}$  given by  $R = \{(1,1), (1,2), (2,1)\}$ , then  $R$  is

- [a] Reflexive [b] Symmetric [c] Transitive [d] Equivalence

12. If  $A = \{1,2,3\}$ , then which of the following relations are equivalence relation on A?

- [a]  $\{(1,1),(2,2),(3,3)\}$  [b]  $\{(1,1),(2,2),(3,3),(1,2),(2,1)\}$   
 [c]  $\{(1,1),(2,2),(3,3),(2,3),(3,2)\}$  [d]  $\{(1,1),(2,2),(3,3),(1,3),(3,1),(2,3)\}$



13. If R is a relation of set  $A = \{1, 2, 3\}$  given by  $R = \{(1, 3)\}$ , then R is  
 [a] Reflexive [b] Symmetric [c] Transitive [d] both a and b
14. If R is a relation of set  $A = \{1, 2, 3\}$  given by  $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)\}$ , then R is  
 [a] Reflexive but not symmetric [b] symmetric but not transitive  
 [c] symmetric and Transitive [d] neither symmetric nor transitive
- [a] A is false and R is true.  
 [b] A is true and R is false.  
 [c] Both A and R are true and R is the correct explanation of A.  
 [d] Both A and R are true but R is not the correct explanation of A.
15. Assertion : Domain and range of relation  $R = \{(x, y) : x - 2y = 0\}$  defined on the set  $A = \{1, 2, 3, 4\}$  are respectively  $\{1, 2, 3, 4\}$  and  $\{2, 4, 6, 8\}$ .  
 Reason : Domain and range of a relation R are respectively the sets  $\{a : a \in A \text{ and } (a, b) \in R\}$  and  $\{b : b \in A \text{ and } (a, b) \in R\}$
16. Assertion : The greatest integer function  $f : R \rightarrow R$  given by  $f(x) = [x]$  is one – one.  
 Reason : A function  $f : A \rightarrow B$  is said to be injective if  $f(a) = f(b) \Rightarrow a = b$ .

### Inverse Trigonometric Functions

1. If  $\operatorname{cosec}^{-1} x = 2\sec^{-1} y$ , then  $\sin^{-1} \frac{1}{x} + 2\sin^{-1} \frac{1}{y}$  equals to :  
 [a]  $\pi$  [b]  $\frac{\pi}{2}$  [c]  $\frac{\pi}{4}$  [d]  $\frac{-\pi}{6}$
2. The value of  $\left[\tan\left(\frac{\pi}{2} - \cos^{-1} \frac{3}{5}\right)\right]^2$   
 [a] 16/25 [b] 9/16 [c] 9/25 [d] 16/9
3. The value of  $\tan^2(\sec^{-1} 5) + \cot^2(\operatorname{cosec}^{-1} 3)$  is  
 [a] 35 [b] 34 [c] 32 [d] 36
4. If  $5\tan^{-1} x + \cot^{-1} x = 7\pi/6$ , then x equals  
 [a]  $\sqrt{3}$  [b]  $1/\sqrt{3}$  [c] -1 [d]  $\frac{1}{2}$
5. The value of  $\left[1 + \operatorname{cosec}\left(\tan^{-1} \frac{3}{4}\right)\right]^2$   
 [a] 9/64 [b] 64/9 [c] 81/16 [d] 16/81
6.  $\tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{9}\right) =$   
 [a]  $\tan^{-1}\left(\frac{12}{93}\right)$  [b]  $\tan^{-1}\left(\frac{31}{4}\right)$  [c]  $\tan^{-1}\left(\frac{4}{33}\right)$  [d]  $\tan^{-1}\left(\frac{8}{31}\right)$
7. If  $\cos(\tan^{-1} 3/4 + \cot^{-1} x) = 0$ , then the value of x is  
 [a] 1/5 [b] 3/4 [c] 3/5 [d] 1
8. The principal value of  $\tan^{-1}(1) - \cos^{-1}(-1/2) - \operatorname{cosec}^{-1}(-2) + \sin^{-1}(1/2)$   
 [a]  $\pi/4$  [b]  $5\pi/4$  [c]  $\pi/12$  [d]  $2\pi/3$
9. The value of the expression  $\sin\left(\frac{1}{2}\cos^{-1} \frac{8}{9}\right)$   
 [a]  $1/3\sqrt{2}$  [b]  $3\sqrt{2}$  [c]  $\frac{\sqrt{3}+2}{2}$  [d]  $3+\sqrt{2}$
10. If  $\tan^{-1}(x) - \cot^{-1}(x) = \tan^{-1}(1/\sqrt{3})$ , then the value of  $\sec(2/x)$  is equal to :  
 [a]  $\pi/6$  [b]  $-\pi/4$  [c]  $-\pi/6$  [d]  $2\pi/3$
11. If  $3\tan^{-1} x + \cot^{-1} x = \pi$ , then x equals  
 [a] 0 [b] 1 [c] -1 [d]  $\frac{1}{2}$

12. The principal value of :  $2\cos^{-1}\left(\frac{1}{2}\right) - 3\sin^{-1}\left(\frac{1}{2}\right) + 3\tan^{-1}\left(\frac{-1}{\sqrt{3}}\right)$

[a]  $\frac{2\pi}{3}$

[b]  $\frac{\pi}{6}$

[c]  $-\frac{\pi}{3}$

[d]  $\frac{-\pi}{6}$

13. The value of  $\csc\left(\frac{\pi}{6} + \sec^{-1}x + \csc^{-1}x\right)$

[a]  $\frac{1}{2}$

[b] 1

[c] 2

[d]  $\frac{1}{4}$

14. The value of  $\tan\left(\frac{\pi}{4} - 2\tan^{-1}\frac{1}{2}\right)$

[a] 7

[b]  $\frac{1}{7}$

[c]  $-\frac{1}{7}$

[d] -7

15. Value of  $\sin[\cot^{-1}\{\tan\{\cos^{-1}x\}\}]$

[a] x

[b]  $\frac{1}{x}$

[c] |x|

[d]  $\sqrt{1-x^2}$

(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) Both A and R are false.

(d) Both A and R are true

16. Assertion (A) : The principal value of inverse trigonometric function  $\cos^{-1}\left(\frac{-1}{2}\right)$  is  $\left(\frac{-2\pi}{3}\right)$

Reason (R) : The principal- value-branch of  $\cos^{-1}x$  is  $[-\pi, \pi]$

17. Assertion (A) : If  $\sin^{-1}x + \cot^{-1}\left(\frac{3}{4}\right) = \frac{\pi}{2}$ , then x is  $\frac{3}{5}$

Reason (R) :  $\sin^{-1}x + \cos^{-1}x = \frac{\pi}{2}$

## Matrix & Determinant

1. If  $A = \begin{bmatrix} 0 & -1 & 2 \\ 2 & -2 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 1 & 1 \end{bmatrix}$  and  $P = AB$ , then  $(P^{-1})'$  is equal to

[a]  $\begin{bmatrix} 2 & -2 \\ 2 & 1 \end{bmatrix}$

[b]  $\begin{bmatrix} 2 & 2 \\ -2 & 1 \end{bmatrix}$

[c]  $\begin{bmatrix} 1/3 & -1/3 \\ 1/3 & 1/6 \end{bmatrix}$

[d]  $\begin{bmatrix} 1/3 & 1/3 \\ -1/3 & 1/6 \end{bmatrix}$

2. If number of elements in a matrix is 60 then how many different order of matrix are possible.

[a] 12

[b] 6

[c] 24

[d] none of these

3. If  $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$  and  $(aI_2 + bA)^2 = A$ , then

[a]  $a=b=1/\sqrt{2}$

[b]  $a=b=\sqrt{2}$

[c]  $a=b=1/\sqrt{3}$

[d]  $a=b=\sqrt{3}$

4. If  $A = \begin{bmatrix} 1 & -2 \\ 3 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} -1 & 4 \\ 2 & 3 \end{bmatrix}$  and  $ABC = \begin{bmatrix} 4 & 8 \\ 3 & 7 \end{bmatrix}$ , then C is equal to :

[a]  $\frac{1}{66} \begin{bmatrix} 72 & -32 \\ 57 & -29 \end{bmatrix}$

[b]  $\frac{1}{66} \begin{bmatrix} -54 & -110 \\ 3 & 11 \end{bmatrix}$

[c]  $\frac{1}{66} \begin{bmatrix} -72 & 32 \\ -57 & -29 \end{bmatrix}$

[d]  $\frac{1}{66} \begin{bmatrix} -54 & -110 \\ 3 & -11 \end{bmatrix}$

5. If  $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$  and  $10B = \begin{bmatrix} 4 & 2 & 2 \\ -5 & 0 & a \\ 1 & -2 & 3 \end{bmatrix}$  where  $B=A^{-1}$ , then a is equal to :

[a] 2

[b] -1

[c] -2

[d] 5

6. Let  $A = \begin{bmatrix} 5 & 5a & a \\ 0 & a & 5a \\ 0 & 0 & 5 \end{bmatrix}$ , if  $|A^2| = 25$  then |a| is equal to :

[a] 5

[b] 25

[c] 1

[d]  $\frac{1}{5}$

7. If  $\begin{bmatrix} 0 & 2q & r \\ p & q & -r \\ p & -q & r \end{bmatrix}$  is orthogonal, then the value of p, q and r is :

[a]  $p = \pm \frac{1}{\sqrt{2}}, q = \pm \frac{1}{\sqrt{6}}, r = \pm \frac{1}{\sqrt{3}}$  [b]  $p = \pm \frac{1}{\sqrt{6}}, q = \pm \frac{1}{\sqrt{2}}, r = \pm \frac{1}{\sqrt{3}}$

[c]  $p = \pm \frac{1}{\sqrt{3}}, q = \pm \frac{1}{\sqrt{6}}, r = \pm \frac{1}{\sqrt{2}}$  [d]  $p = \pm \frac{1}{\sqrt{2}}, q = \pm \frac{1}{\sqrt{3}}, r = \pm \frac{1}{\sqrt{6}}$

8. If  $A = \begin{bmatrix} 2 & 0 & 0 \\ 2 & 2 & 0 \\ 2 & 2 & 2 \end{bmatrix}$ , then  $\text{adj}(\text{adj}A)$  is equal to : [ Note :  $\text{adj}(\text{adj}A) = |A|^{n-2}.A$  ]

[a]  $6 \begin{bmatrix} 2 & 0 & 0 \\ 2 & 2 & 0 \\ 2 & 2 & 2 \end{bmatrix}$  [b]  $16 \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$  [c]  $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$  [d]  $8 \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$

9. If  $A^2 = A$ , then  $(I+A)^4$  is equal to :

[a]  $I+A$  [b]  $I+4A$  [c]  $I+15A$  [d]  $I+19A$

10. Matrix A has x rows and (x+5) columns. Matrix B has y rows and (11-y) columns. Both AB and BA exist, then :

[a]  $x=3, y=4$  [b]  $x=4, y=3$  [c]  $x=3, y=8$  [d]  $x=8, y=3$

11. Using determinants, the value of x if the points (5,5), (-k,1) and (10,7) are collinear.

[a] 4 [b] -4 [c] 5 [d] -5

12. Using determinants, the value of x if the area of triangle A(-3,1), B(2,x), C(5,1) is 20 units<sup>2</sup>.

[a] -4 [b] 5 [c] 6 [d] 7

13. If A is a square matrix and  $A^2 = A$ , then  $(A+I)^3 - 7A$  is equal to :

[a] I [b] A [c] -A [d] 3A

14. If  $A = [a_{ij}]_{m \times n}$  is a square matrix, if

[a]  $m < n$  [b]  $m > n$  [c]  $m = n$  [d] none of these

15. The number of all possible matrices of order  $3 \times 3$  with each entry 2 and 3 is :

[a] 27 [b] 18 [c] 81 [d] 512

16. Which of the given values of x and y make the following pair of matrices equal

$$\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix} = \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$$

[a]  $x=-1/3, y=7$  [b] not possible to find [c]  $x=7, y=-2/3$  [d]  $x=-1/3, y=-2/3$

17. Assuming that X and Z are matrices of order  $2 \times n$  and  $2 \times p$ . If  $n=p$ , then the order of the matrix  $7X-5Z$  is :

[a]  $p \times 2$  [b]  $2 \times n$  [c]  $n \times 3$  [d]  $p \times n$

18. Which of the given values of x and y make the following pair of matrices equal

$$\begin{bmatrix} 2x & 1 \\ 5 & x+2y \end{bmatrix} = \begin{bmatrix} 4 & 1 \\ 5 & 0 \end{bmatrix}$$

[a]  $x=2, y=1$  [b]  $x=2, y=-1$  [c]  $x=-2, y=-1$  [d]  $x=-1, y=-2$

19. If  $Y = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$  and  $2X+Y = \begin{bmatrix} 7 & 8 \\ -3 & 4 \end{bmatrix}$ , then the value of matrix X is :

[a]  $\begin{bmatrix} 4 & 6 \\ 4 & 0 \end{bmatrix}$  [b]  $\begin{bmatrix} 2 & -3 \\ -2 & 2 \end{bmatrix}$  [c]  $\begin{bmatrix} 2 & 3 \\ 2 & 0 \end{bmatrix}$  [d]  $\begin{bmatrix} 2 & 3 \\ -2 & 0 \end{bmatrix}$

20. If  $A = [a_{ij}]_{2 \times 2}$  where  $a_{ij} = i + j$ , then A is equal to :

[a]  $\begin{bmatrix} 4 & 6 \\ 4 & 0 \end{bmatrix}$  [b]  $\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$  [c]  $\begin{bmatrix} 2 & 3 \\ 3 & 0 \end{bmatrix}$  [d]  $\begin{bmatrix} 2 & 3 \\ -3 & 4 \end{bmatrix}$

21. Sum of two skew symmetric matrices is always :

- [a] symmetric [b] diagonal [c] Identity [d] skew symmetric

22. If A and B are symmetric matrices of same order then (AB-BA) is :

- [a] symmetric [b] diagonal [c] Identity [d] skew symmetric

23. If  $A = \begin{bmatrix} 5 & 7 \\ 4 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$ , then  $2A-B$  is :

[a]  $\begin{bmatrix} 9 & 11 \\ 10 & -1 \end{bmatrix}$  [b]  $\begin{bmatrix} 3 & -5 \\ 8 & -1 \end{bmatrix}$  [c]  $\begin{bmatrix} 9 & -11 \\ 10 & -1 \end{bmatrix}$  [d]  $\begin{bmatrix} 3 & 8 \\ 5 & -1 \end{bmatrix}$

24. If A is a matrix of order  $3 \times 2$  and B is the matrix of order  $4 \times 3$ , then the order of matrix BA is

- [a]  $2 \times 4$  [b]  $4 \times 2$  [c]  $4 \times 3$  [d]  $2 \times 3$

25. If  $X = \begin{bmatrix} 3 & 2 \\ 3 & 4 \end{bmatrix}$  and  $Y = \begin{bmatrix} 1 & 2 \\ 3 & 0 \end{bmatrix}$ , then the value of matrix  $X - 2Y$  is :

[a]  $\begin{bmatrix} 4 & 10 \\ -4 & 8 \end{bmatrix}$  [b]  $\begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$  [c]  $\begin{bmatrix} 4 & 2 \\ 5 & 10 \end{bmatrix}$  [d]  $\begin{bmatrix} 4 & -2 \\ 5 & 10 \end{bmatrix}$

26. If  $X = \begin{bmatrix} 4 & -9 \\ -3 & 13 \end{bmatrix}$  and  $Y = \begin{bmatrix} -1 & 3 \\ 1 & -4 \end{bmatrix}$ , then the value of matrix  $X + 3Y$  is :

[a]  $\begin{bmatrix} 1 & 12 \\ 5 & -11 \end{bmatrix}$  [b]  $\begin{bmatrix} 4 & 9 \\ 4 & 8 \end{bmatrix}$  [c]  $\begin{bmatrix} 1 & 12 \\ 5 & 11 \end{bmatrix}$  [d]  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

27. The value of determinant  $A = \begin{vmatrix} 3 & -1 & -2 \\ 0 & 0 & -1 \\ 3 & -5 & 0 \end{vmatrix}$  is

- [a] 12 [b] 13 [c] -12 [d] -13

(a) Both A and R are true and R is the correct explanation of A.

(b) A is true but R is false.

(c) Both A and R are false.

(d) A is false and R is true

28. Assertion (A) : Matrix  $\begin{bmatrix} 0 & 3 & 2 \\ -3 & 0 & -5 \\ -2 & 5 & 0 \end{bmatrix}$  is a skew symmetric matrix.

Reason (R) : A matrix is skew symmetric if  $A' = -A$

29. Assertion (A): If  $\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 12 \\ 7 \\ 8 \end{bmatrix}$ , then the value of  $x = 4$ ,  $y = 5$  and  $z = 3$

Reason (R) : Two matrices A and B are said to be defined for multiplication. If the number of rows of A(pre-multiplier) is equal to the number of rows of B(post-multiplier).

30. Assertion (A) : If function  $f(x) = \begin{cases} \frac{x^2+3x-10}{x-2} & x \neq 2 \\ k & x = 2 \end{cases}$  is continuous at  $x=2$ , then the value of  $k=7$

Reason (R) : Every polynomial function is a continuous function.

## Case Study

1. Sohan wants to donate a rectangular plot of land for school in his village. When he was asked to give the dimensions of the plot, he told that if its length is decreased by 50m and breadth is increased by 50m, then its area will remain the same, but if length is decreased by 10m and breadth is decreased by 20m, then its area will be decreased by  $5300m^2$ .

**Based on the given information, answer the following questions :**

[i] The equations representing the dimensions of the plot in terms of x and y are :

[a]  $x-y=50, 2x-y=550$  [b]  $x-y=50, 2x+y=550$

[c]  $x+y=50, 2x+y=550$  [d]  $x+y=50, 2x-y=550$

[ii] Which of the following matrix equation is represented by the given information.

[a]  $\begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$  [b]  $\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$

[c]  $\begin{bmatrix} 1 & 1 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$  [d]  $\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$

[iii] The value of x (length of rectangular field) is

[a] 150m [b] 400m [c] 200m [d] 320m

[iv] The value of x (breadth of rectangular field) is

[a] 150m [b] 430m [c] 200m [d] 350m

[v] How much is the area of the rectangular field?

[a]  $60000\text{m}^2$  [b]  $30000\text{m}^2$  [c]  $20000\text{m}^2$  [d]  $15000\text{m}^2$

1. A school wants to award its students for the values of honesty, regularity and hard work with a total cash award of Rs. 6000. Three times the award money for hard work added to that given for honesty amounts to Rs. 11000. The award money given for honesty and hard work together is double the one given for regularity.

**Based on the above information, answer the following questions :**

[i] If Rs. x awarded to honesty, Rs. y to regularity and Rs. z awarded to hard work, then write the matrix equation representing the above situation.

[ii] If A is coefficient matrix, then find the value of  $[\text{adj. } A]$ .

[iii] Find the value of  $A^{-1}$

[iv] The value of x, y and z.

2. Ram and Sham are playing Ludo at home during summer break. While rolling the dice, Ram's brother Sonu observed that the possible outcomes of the throw every time belongs to set  $\{1,2,3,4,5,6\}$ . Let A be the set of players while B be the set of all possible outcomes i.e.  $A=\{R,S\}$ ,  $B=\{1,2,3,4,5,6\}$

**Based on the above information, answer the following questions :**

[i] Name the relation R which satisfy the given condition:  $B \rightarrow B$  defined by  $R=\{(x,y) : y \text{ is divisible by } x\}$

[ii] Let R be the relation on B defined by  $R=\{(2,2),(1,3),(3,4),(3,1),(4,3),(5,5)\}$ . Name the type of relation.

[iii] How many numbers of relations are possible from A to B.

Activities :

1. To verify that the relation R in the set of L of all lines in a plane, defined by  $R=\{(l,m) : l \text{ is parallel to } m\}$  is an equivalence relation.

2. To demonstrate different types of functions.

3. Draw the graph of  $\sin^{-1}x$  and  $\cos^{-1}x$



## Physical Education

- Prepare Chapter 1 to 3 for July Unit Test.
- Draw a Fixture of 11 teams on the basis of knockout tournament.
- Draw the Pictures of common postural deformities.
- Make a list of Asanas and mention the procedure and benefits of Asanas.
  - Tadasana
  - Halasana
  - Dhanurasana
  - Pachimottanasana
  - Gomukhasana
  - Bhujangasana
  - Vakrasana
  - Matsyasana

## Music

Q 1. Make one composition in Ektala or in Jhaptala.

Q 2. Make a video of any classical or semi classical song, and send video through whatsapp on 9416726190.

Q 3. Make a composition of Raga Bhairav with following words-

प्रभुवर हमारे मन को , भक्ति का दान देना,  
सबके मैं काम आऊ, बुद्धि का दान देना |  
जीवन में मेरे दाता, तेरा ही नाम गाऊं,  
तुम्हें छोड़ कर मैं दाता, कहीं और कैसे जाऊं |  
सुख में तुझे न भूलूँ, शक्ति का दान देना |

Syllabus for UT:

1. Roopak Tala, Jhap tala with single and double
2. Short Description of Alankara, Alap & Gram
3. Time Theory of Ragas
4. Detailed Description of Raga Bhairav, Malkaus