Sample-Paper

12th Maths

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1. The largest term common to the sequences1,11,21,31, ... to 100 terms and 31,36,41,46, ... to 100 terms is

(a) 531 (b) 471 (c) 281

(d) 521

(d)

2. If x is real, then the maximum and minimum value of the expression $\frac{x^2-3x+4}{x^2+3x+4}$ will be

(a) 2,1 (b) $5,\frac{1}{5}$ (c) $7,\frac{1}{7}$

(d) None of these

(c)

3. The sum of the coefficients of all odd degree terms in the expansion of $\left(x+\sqrt{x^3-1}\right)^5+\left(x-\sqrt{x^3-1}\right)^5, (x>1)$ is

(a) -1 (b) 0 (c) 1

(d) 2

(d)

4. The number of divisors of the form $4n+1, n \geq 0$ of the number $10^{10}11^{11}13^{13}$ is

(a) 750 (b) 840 (c) 924

(d) 1024

(c)

5. Find the general solution of the equation $(\sqrt{3}-1)cos\theta+(\sqrt{3}+1)sin\theta=2$

(a) $2n\pi \pm \frac{\pi}{4}-\frac{5\pi}{12}$ (b) $2n\pi \pm \frac{\pi}{4}+\frac{5\pi}{12}$ (c) $2n\pi \pm \pi-\frac{3\pi}{12}$

(d) None of these

(b)

6. If points $(0,0), \left(2,2\sqrt{3}\right)$ and (a,b) are vertices of an equilateral triangle, then (a,b) is equal to

(a) $(0,-4)$ (b) $(0,4)$ (c)$(4,0)$

(d) $(-4,0)$

(c)

7. Locus of the image of the point $(2,3)$ in the line $(2x-3y+4)+k(x-2y+3)=0, k \in R$, is a

(a) straight line parallel to X –axis (b) straight line parallel to Y -axis

(c) circle of radius $\sqrt{2}$ (d) circle of radius $\sqrt{3}$

(c)

8. Let L_1 be a line passing through the origin and L_2 be the line $x+y=1$. If the intercepts made by the circle $x^2+y^2-x+3y=0$ on L_1 and L_2 are equal, then L_1 is

(a) $x+y=0$ (b) $x+y=2$ (c) $x+7y=0$ (d) $x-7y=0$

(c)

9. If a, b, c are in GP and x is the AM between a and b, y the AM between b and c, then

(a) $\frac{a}{x}+\frac{c}{y}=1$ (b) $\frac{a}{x}+\frac{c}{y}=2$ (c) $\frac{a}{x}+\frac{c}{y}=3$

(d) None of these

(b)

10. The equation $e^{sin x}-e^{-sin x}-4=0$ has

(a) infinite number of real roots (b) no real root

(c) exactly one real root (d) exactly four real roots

(b)

11. Out of 8 sailors on a boat, 3 can work only one particular side and 2 only the other side. Then, number of ways in which the sailors can be arranged on the boat is

(a) 2718 (b) 1728 (c) 7218

(d) None of these

(b)

12. In a $\triangle PQR$, if $3sinP + 4cosQ = 6$ and $4sinQ + 3cosP = 1$, then the angle R is equal to

(a) $\frac{5\pi}{6}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$

(d) $\frac{3\pi}{4}$

(b)

13. If the equation of the locus of a point equidistant from the points (a_1, b_1) and (a_2, b_2) is $(a_1 - a2x+b1-b2y+c=0$, then the value of c is

(a) $a_1^2 - a_2^2 + b_1^2 - b_2^2$ (b) $\sqrt{a_1^2 + b_1^2 - a_2^2 - b_2^2}$

(c) $\frac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$ (d) $\frac{1}{2}(a_2^2 + b_2^2 - a_1^2 - b_1^2)$

(d)

14. Equation of the straight line which belongs to the system of straight lines $a(2x + y - 3) + b(3x + 2y - 5) = 0$ and is farthest from the point $(4, -3)$ is

(a) $4x + 11y - 15 = 0$ (b) $3x - 4y + 1 = 0$

(c) $7x + y - 8 = 0$ (d) None of these

(b)

15. The set of values of a for which the point $(2a, a + 1)$ is an interior point of the larger segment of the circle $x^2 + y^2 - 2x - 2y - 8 = 0$ made by the chord $x - y + 1 = 0$ is

(a) $\left(\frac{5}{9}, \frac{9}{5}\right)$ (b) $\left(0, \frac{5}{9}\right)$ (c) $\left(0, \frac{9}{5}\right)$

(d) $\left(1, \frac{9}{5}\right)$

(c)

16. If $(2,1), (5,2)$ and $(3,4)$ are vertices of a triangle, its circumcentre is

(a) $\left(\frac{13}{2}, \frac{9}{2}\right)$ (b) $\left(\frac{13}{4}, \frac{9}{4}\right)$ (c) $\left(\frac{9}{4}, \frac{13}{4}\right)$

(d) $\left(\frac{9}{2}, \frac{13}{2}\right)$

(b)

17. One diagonal of a square is along the line $8x - 15y = 0$ and its one vertex (1, 2), then equations of a side passing through this vertex are

(a) $7x + 23y - 53 = 0, 23x - 7y - 9 = 0$ (b) $7x - 23y - 53 = 0, 23x + 7y - 9 = 0$

(c) $7x + 23y + 53 = 0, 23x - 7y + 9 = 0$ (d) $7x + 23y + 53 = 0, 23x + 7y + 9 = 0$

(a)

18. The line $3x - 4y - k = 0$ touches the circle $x^2 + y^2 - 4x - 8y - 5 = 0$ at (a, b). Then $k, (a, b)$ is

(a) $15, (5,0)$ (b) $-35, (-1,8)$ (c) Both (a) and (b) (d) None of these

(c)

19. A point moves is such a way that the sum of squares of its distances from A(2, 0) and B(–2, 0) is always equal to the square of the distance between A and B, then the locus of point P is

(a) $x^2 + y^2 - 2 = 0$ (b) $x^2 + y^2 + 2 = 0$

(c) $x^2 + y^2 + 4 = 0$ (d) $x^2 + y^2 - 4 = 0$

(d)

20. The equation of the straight lines through (–2, –7) and having intercept of length 3 between the lines 4x + 3y = 12 and 4x + 3y = 3 is

(a) 7x – 24y – 182 = 0 (b) 7x + 24y + 182 = 0

(c) 7x + 24y –182=0 (d) None of these

(b)

12th Chemistry

1. 20 mL 1 M H_2SO_4, 25 ml of 4 M HNO_3 and 30 ml of XM HCl were mixed and made up to 1000 ml. 20 ml of solution formed required 26 ml of $Ba(OH)_2$ solution prepared by dissolving 4.725 g of pure $Ba(OH)_2.8H_2O$ in water made up to 0.25 litre. What is the molarity of HCl solution (i.e. Find X)

(a) 1.7 (b) 1.3 (c) 0.75 (d) 0.53

(d)

2. When 200 ml of an aqueous solution of H_2O_2 is titrated with an excess of KI solution in dilute H_2SO_4 the liberated I_2 required 50 ml of 0.1 M $Na_2S_2O_3$ solution for complete reaction. Calculate the percentage strength and volume strength of H_2O_2 solution.

(a) 0.085% and 0.28 volume (b) 0.062% and 0.75 volume

(c) 0.075% and 0.65 volume (d) 0.042% and 0.14 volume

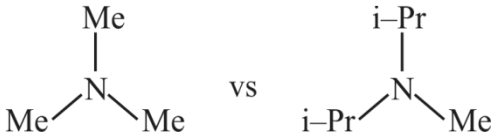
(d)

3. Hydrogen, when subjected to photo dissociation, yields one normal atom and one atom possessing 1.83 eV more energy than normal atom. The bond dissociation energy of Hydrogen molecule into normal atoms is 103 kcal mol^{-1}. Compute the wavelength of effective photon for photo dissociation of hydrogen molecule in the given case.

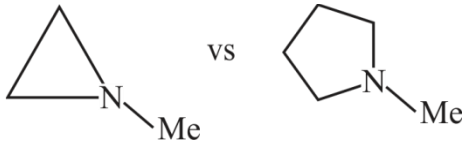
(a) 1830 Å (b) 1760 Å (c) 1969 Å (d) 1600 Å

(c)

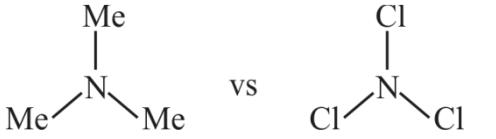
4. Several factors (steric, electronic, orbital interactions etc.) can affect the inversion barrier of an amine. In the given pair which data is correctly placed?

(a) 

$\Delta G^{\ddagger} = 7.9$ kcal/mol $\Delta G^{\ddagger} = 0.2$ kcal/mol

(b) 

$\Delta G^{\ddagger} = 20.5$ kcal/mol $\Delta G^{\ddagger} = 7.0$ kcal/mol

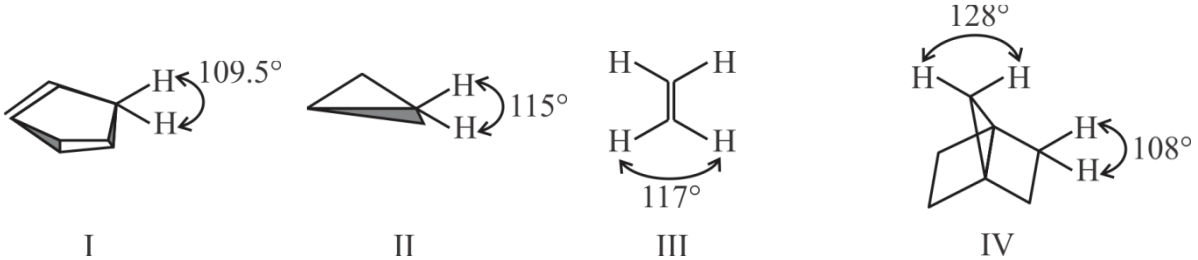
(c) 

$\Delta G^{\ddagger} = 7.9$ kcal/mol $\Delta G^{\ddagger} = 22.9$ kcal/mol

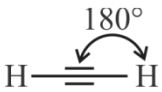
(d) All of these

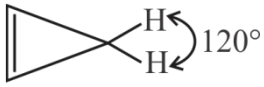
(d)

5. Selected bond angles for six hydrocarbons are shown below. Arrange these hydrocarbons according to their pK_a values, from the lowest to the highest.



I II III IV





(a) V < I < VI < II < III < IV

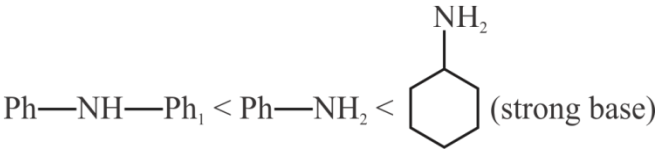
(b) IV < I < II < III < V < VI

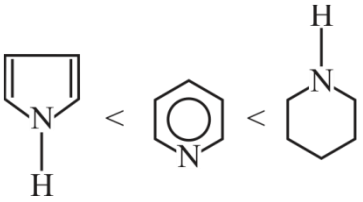
(c) II < IV < I < VI < V < III

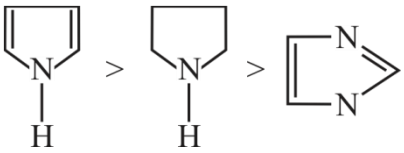
(d) I < V < IV < III < II < VI

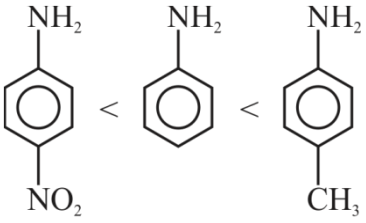
(d)

6. In sets a–d, only one of the set is incorrect regarding basic strength, Select it:

(a) 

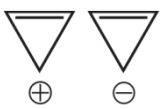
(b) 

(c) 

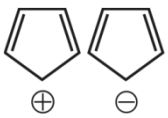
(d) 

(c)

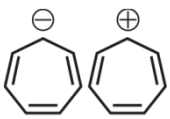
7. In which pair second ion is more stable than first?



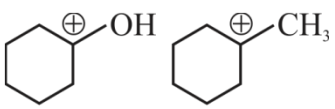
I



II



III



IV

(a) (i) and (ii) (b) (ii) and (iii) (c) (ii) and (iv) (d) (iii) and (iv)

(b)

8. The stability order of the following carbocations is:

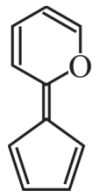
(a) II > IV > III > I

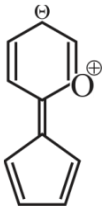
(b) IV > II > III > I

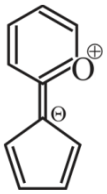
(c) II > III > I > IV

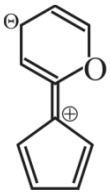
(d) I > III > II > IV

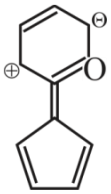
(c)

9. The most stable canonical structure of given molecule  is:

(a) 

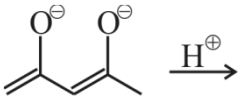
(b) 

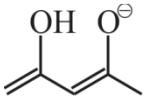
(c) 

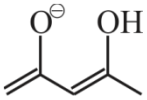
(d) 

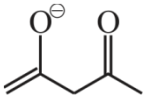
(b)

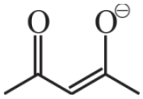
10. Based upon an understanding of product stability, predict the product formed when the following dianion reacts with one equivalent of acid.



(a) 

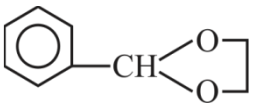
(b) 

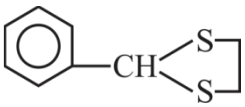
(c) 

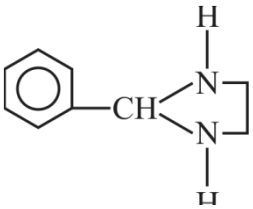
(d) 

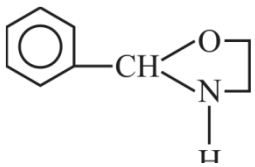
(d)

11. Which of the following compounds has most acidic hydrogen?

(a) 

(b) 

(c) 

(d) 

(b)

12. The correct order of a dipole moment is:

(a) $CH_4 < NF_3 < NH_3 < H_2O$

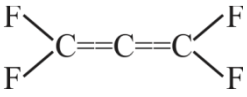
(b) $NF_3 < CH_4 < NH_3 < H_2O$

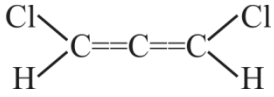
(c) $NH_3 < NF_3 < CH_4 < H_2O$

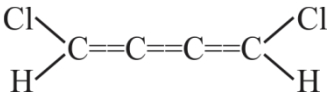
(d) $H_2O < NH_3 < NF_3 < CH_4$

(a)

13. Which of the following molecule is polar as well as planar?

(a) 

(b) 

(c) 

(d) None of these

(b)

14. Select the correct order of polymerization tendency from the following:

(a) Si — O > P — O > S — O > Cl — O

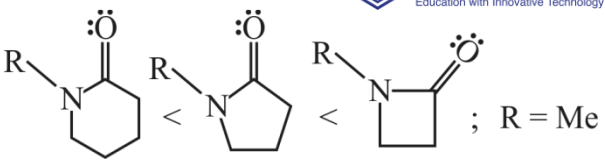
(b) P — O > S — O > Cl — O > Si — O

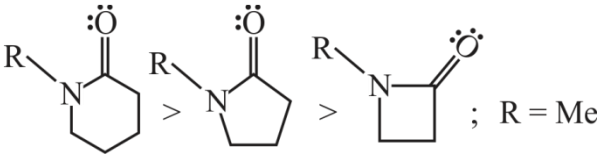
(c) Cl — O > S — O > P — O > Si — O

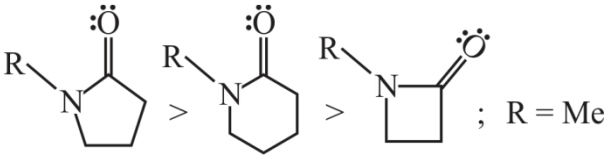
(d) Si — O < P — O < S — O < Cl — O

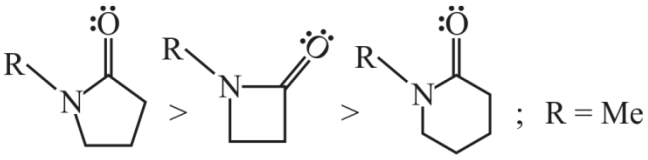
(a)

15. Select the correct order of Lewis basic strength for exocyclic carbonyl oxygen:

(a)  ; R = Me

(b)  ; R = Me

(c)  ; R = Me

(d)  ; R = Me

(b)

12th Biology

1. Quaternary structure of protein does not contain :
(a) Interrelationship of amino acids in a polypeptide chain
(b)Interrelation between the polypeptide chains of a protein having more than two polypeptide chains
(c)The arrangement of amino acids in the polypeptide chain
(d) None of the above
(b)

2. Which one of the coelenterates does not exhibit polymorphism
(a) Physalia (poruguese man of war)
(b) Obelia (Marine polyp)
(c) Hydra (freshwater polyp)
(d) Millipora (stinging coral)
(c)

3. In Cockroach, the number of ganglia are

(a)Two pairs thoracic and four pairs abdominal
(b) Three pairs thoracic and six pairs abdominal
(c) Three pairs thoracic and five pairs abdominal
(d)Two pairs thoracic and six pairs abdominal
(b)

4. Match List I with List II

List I	List II
A. Gonado corticoids	(i) Carbohydrate metabolism
B. Mineralocorticoids	(ii) Regulated by the circulating level of Ca 2+ ions
C. Glucocorticoids	(iii) Balance of electrolytes and water in our body
D. PTH	(iv) Secretion of estrogen and androgens

Choose the option with all correct matches:
(a) A-(iv), B(iii), C-(ii), D-(i)
(b) A(iv), B(iii), C(i), D(ii)
(c) A(iv), B-(ii), C-(iii), D-(i)
(d) A-(iv), B-(iii), C-(ii), D-(i)
(b)

5. Which of the following statements is false?
(a) Chitin, a complex or heteropolysaccharide occurring in exoskeleton of arthropods consists of NAG
(b) Glucosamine and N-acetyl glucosamine are modified sugar
(c) Cellulose shows blue color when treated with I2
(d) Starch shows blue color when treated with I2
(c)

6. Match column I with column II

Column I	Column II
(1)Agar	I. Gelidium, Gracilaria
(2)Algin	II. Brown algae
(3) Carrageen	III. Red algae
(4) Chlorella & Spirullina	IV. Single cell protein, used food supplements by space travelers

Choose the correct combination –
(a) A-I, B-II, C-III, D-IV
(b) A-IV, B-III, C-II, D-I
(c) A-II, B-I, C-III, D-IV
(d) A-III, B-II, C-I, D-IV
(a)

7. I. Cerebellum has very convoluted surface in order to provide the additional space for more neurons
II. Medulla is connected to the spinal cord
III. Medulla contains controlling centers for respiration, cardiovascular reflexes and gastric secretion
(a)All are correct
(b) Only I is correct

(c) Only I and III are correct

(d) Only II is correct

(a)

8. A stimulus is received by a receptor, which initiates an impulse in the afferent neuron. The afferent neuron transmits the signal via _____ nerve root into _____ (at the level of spinal cord).

The efferent neuron than carries signal from _____ to the _____.

(a) Ventral, CNS, PNS, sensory organs

(b) Ventral, CNS, CNS, effector

(c) Dorsal, CNS, PNS, affector

(d) Dorsal, CNS, CNS, effector

(d)

9. Which of the following statements is false about the compound epithelium?

I. It consists of several layers

II. It covers the dry surface of the skin, the moist surface of buccal cavity, pharynx, inner lining of ducts of salivary glands and pancreatic ducts

III. It provides protection against chemical and mechanical stresses

IV. Being multilayered it has a great role in secretion and absorption

(a) Only III (b) Only IV (c) Only I and IV (d) Only I

(b)

10. Which of the following statements about cell junctions is false?

I. All the cells of the epithelium are held together with little intercellular materials

II. In almost all animal tissues specialized junction provide both structural and functional link between its individual cells

III. Tight junctions help to stop substances from leaking across a tissue

IV. Adhering junctions provide cementing to keep neighboring cells together

V. Gap junctions provide cytoplasmic channels between cells for passage of ions, small molecules and sometimes big molecules

(a) Only II and III (b) Only I and II (c) Only V (d) None

(d)

11. What is absent in mammalian erythrocytes?

(a)Aerobic respiration (b) Nucleus (c) DNA (d)All of these

(d)

12. The cell cycle of a somatic cell usually consists of all the following except

(a) The first part of the interphase is called as G1 phase. During this there is maximum increase in cell size and there is active synthesis of RNA and proteins

(b) In synthetic phase-'S' phase the DNA molecule of each chromosome replicate by synthesis of new DNA molecule

(c) DuringG2 phase a cell contains double the amount(4n) of DNA present in the original diploid cell(2n)

(d) The cell cycle consists of a short interphase and long M-phase

(d)

13. In meiosis, the daughter cells differ from parent cell as well as amongst themselves due to
(a) Segregation and crossing over
(b) Independent assortment and crossing over
(c) Independent assortment, segregation and crossing over
(d) Segregation and independent assortment
(c)

14. Which of the following statements is false about cones?
I. The daylight (photopic) vision and colour vision are function of cones
II. In human eye, there are three types of cones having characteristic photopigments that respond to red, green and blue light
III. The sensations of different colours are produced by various combination of these 3 types of cones
IV. When these 3 types of cones are stimulated equally, a sensation of white light is produced.
(a) Only IV (b) Only I and IV (c) Only III (d) None
(d)

15. Which of the following statements is correct?
(a) Movable skull bone is mandible
(b) We move our hands while walking for balancing
(c) Cartilaginous joints have little mobility due to fibrocartilage disc between its articular ends e.g. inter-vertebral disc between centers of vertebrae
(d)All
(d)

16. The vascular cambium form :
(a) More secondary xylem towards inner face as compared to secondary phloem outside.
(b) Secondary medullary rays within the secondary cortex area.
(c) More secondary phloem outside than secondary xylem inside.
(d) Secondary permanent tissues that can dedifferentiate to produce phellogen
(a)

17. Match List I with List II and choose the correct answer using the codes given below the list:

List I	List II
A. Polyarch radial vascular bundle	1. Potato root
B. Bicollateral vascular bundle	2. Leaves
C. Closed vascular bundle	3. Maize root
D. Triarch radial vascular bundles	4. Cucurbita stem

Codes :
(a) A - 3, B - 4, C - 2, D - 1
(b) A - 3, B - 4, C - 1, D - 2
(c) A - 4, B - 3, C - 2, D - 1
(d) A - 2, B - 3, C - 1, D - 4
(a)

18. Root hair is
(a) Unicellular, thread like endogenous
(b) Multicellular, thread like, modified epidermis
(c) Unicellular, threadlike, modified epidermal
(d) Multicellular, thread like, modified epidermal cell
(c)

19. Scutellum is a
(a) Food storing haploid structure in grass embryo
(b) Remnant of cotyledon in maize
(c) Shield shaped and large cotyledon of grasses
(d) Protective covering of plumule in grasses
(c)

20. Which of the following statements is/are correct regarding phloem transport?
(a) Gravity influence phloem transport
(b) Phloem transport occurs unidirectional
(c) Sugar transported in phloem as non-reducing sugar
(d) Ca2+ is most abundant cation in phloem sap
(c)

12th Physics

1. A quantity X is given by $\varepsilon_0 l \frac{\Delta V}{\Delta t}$, where ε_0 is the permittivity of free space, l is the length, ΔV is a potential difference and Δt is a interval. The dimensional formula for X is the same as that of
(A) Resistance (B) Charge
(C) Voltage (D) Current

Ans: D

2. *A body is moved along a straight line path by a machine delivering constant power. The distance moved by the body in time t is proportional to*
(a) $t^{3/2}$ *(b)* $t^{1/4}$
(c) $t^{1/2}$ *(d)* $t^{3/4}$

Ans: A

3. *A glass marble projected horizontally from the top of a table falls at a distance x from the edge of the table. If h is the highest of the table, then the velocity of projection is*

(A) $h\sqrt{\frac{g}{2x}}$ (B) $x\sqrt{\frac{g}{2h}}$

(C) gxh (D) $gx + h$.

Ans: B

4. A bob hanging from the ceiling of the car acts as an accelerometer. Then the relation expressing horizontal acceleration a of the car and the angle θ made by bob with the vertical is

(A) $a = g\tan\theta$ (B) $a = g\sin\theta$

(C) $a = g\cot\theta$ (D) None

Ans: A

5. An object is attached to a vertical spring and is allowed to fall under the gravity. What is the distance traversed by the object before being stopped?

(A) mg/k (B) 2mg/k (C) mg/2k (D) none of these

Ans:B

6. The moment of inertia of a ring about one of its diameters is I. What will be its moment of inertia about a tangent parallel to the diameter?

(A) 4I (B) 2I (C) $\frac{3}{2}I$ (D) 3I

Ans:d

7. At what height the gravitational field reduces by 75% the gravitational field at the surface of earth?

(A) R (B) 2R

(C) 3R (D) 4R

Ans: A

8. Two soap bubbles, of radii 3 cm and 4 cm, coalesce in vacuum under isothermal conditions to form a bigger bubble of radius R. Then R is equal to

(A) 3 cm (B) 4 cm (C) 5 cm (D) 7 cm

Ans: C

9. What fraction of the total energy is kinetic when the displacement is one-half of the amplitude?

(A) $\frac{1}{4}$ (B) $\frac{2}{4}$

(C) $\frac{3}{4}$ (D) $\frac{3.5}{4}$

Ans: C

10. A whistle giving out 450 Hz approaches a stationary observer at a speed of 33 m/s. The frequency heard by the observer in Hz is

(A) 409 (B) 429
(C) 517 (D) 500

Ans: D

11. During an experiment an ideal gas is found to obey an additional law

VP^2 = constant. The gas is initially at temp T and volume V.

What will be the temperature of the gas when it expands to a volume 2V?

(A) $T' = \sqrt{4}\ T$ *(B)* $T' = \sqrt{2}\ T$

(C) $T' = \sqrt{5}\ T$ *(D)* $T' = \sqrt{6}\ T$

Ans. (b)

12. The coefficient of expansion of a crystal in one direction (x–axis) is 2.0 □ 10^{-6} K^{-1} and that in the other two perpendicular (y–and z–axes) direction is 1.6 □ 10^{-6} K^{-1}. What is the coefficient of cubical expansion of the crystal?

(A) 1.6 □ 10^{-6} K^{-1} (B) 1.8 □ 10^{-6} K^{-1}
(C) 2.0 □ 10^{-6} K^{-1} (D) 5.2 □ 10^{-6} K^{-1}

Ans: D

13. 80 gm of water at 30^oC is poured on a large block of ice at 0^oC.

The mass of ice that melts is

(A) 30 gm (B) 80 gm
(C) 150 gm (D) 1600 gm

Ans: A

14. Find the time during which a layer of ice of thickness 2.0 cm on the surface of a pond will have its thickness increased by 2 mm when the temperature conductivity of ice = 5×10^{-3}

cal cm^{-1} s^{-1} $(°C)^{-1}$, density of ice at 0°C = 0.91 g cm^{-3} and latent heat of fusion = 80 cal g^{-1}

(A) 6 min 5 s (B) 2 min 6 s
(C) 5 min 6 s (D) 3 min 5 s

Ans: C

15. Two blocks of masses 2kg and 5kg are connected by a light string passing over a frictionless pulley. The tension in the cord connecting the masses will be

(A) 20N (B) 30N
(C) 28 N (D) 50 N

Ans: C