QUESTION PAPER

Mathematics

1. In an experiment a die is thrown at random. An event is said to be completed is two consecutive 'u' occurs. Then the probability that the event will be completed in 5^{th} throw is

   (A) $\frac{150}{65}$

   (B) $\frac{175}{65}$

   (C) $\frac{200}{65}$

   (D) $\frac{125}{65}$

2. If sum of deviation of 50 observations from 30 is 50. Then mean of the observations is

   (A) 30

   (B) 31

   (C) 32

   (D) 33

3. The integration $\int \cos(\log_e^x)dx$ is equal to

   (A) $\frac{x}{2}\left(\cos(\log_e^x) + \sin(\log_e^x)\right) + C$

   (B) $\frac{x}{2}\left(\cos(\log_e^x) - \sin(\log_e^x)\right) + C$

   (C) $\frac{x}{2}\left(\sin(\log_e^x) - \cos(\log_e^x)\right) + C$

   (D) None of these

4. If $S_K = \frac{1+2+3+\cdots..+K}{K}$, then the value of A if $S_1^2 + S_2^2 + \cdots.. + S_{10}^2 = \frac{5}{12}A$

   (A) 297

   (B) 300

   (C) 303

   (D) 306

5. $\lim_{x\to\frac{\pi}{4}} \frac{\cot^3 x - \tan x}{\cos\left(x+\frac{\pi}{4}\right)}$ is equal to

(A) $4\sqrt{2}$

(B) $8\sqrt{2}$

(C) 8

(D) 4

6. If $f(x) = f(a-x)$ and $g(x) + g(a-x) = 4$, then the value of $\int_0^a f(x)g(x)dx$ is

(A) $2\int_0^a f(x)dx$

(B) $4\int_0^a f(x)dx$

(C) $-3\int_0^a f(x)dx$

(D) $\int_0^a f(x)dx$

7. If the vectors $\mu\hat{\imath} + \hat{\jmath} + \hat{k}$, $\hat{\imath} + \mu\hat{\jmath} + \hat{k}$ and $\hat{\imath} + \hat{\jmath} + \mu\hat{k}$ are coplanar, then μ equals to

(A) 1

(B) 0

(C) 2

(D) -1

8. If $R = \langle x: x > 0 \& \tan^{-1}2x + \tan^{-1}3x = \frac{\pi}{4}\rangle$ then the number of elements R has

(A) Infinite elements

(B) Two elements

(C) Three elements

(D) One element

9. If $x\frac{dy}{dx} + y = x\,ln\,x(x > 1)$ and $2y(2) = ln - 1$, then $y(e)$ equal to

(A) $\frac{e}{4}$

(B) $\frac{-e}{4}$

(C) $\frac{e^2}{2}$

(D) $-\frac{e^2}{4}$

10. The area bounded by the region between curves $y = x^2 + 2, x = 0, x = 3, y = x + 1$ is

(A) $\frac{15}{2}$

(B) $\frac{15}{4}$

(C) 5

(D) $\frac{17}{2}$

11. If $\left(2^{1/3} + \frac{1}{2}.\frac{1}{(3)^{1/3}}\right)^{10}$ then ratio of $5th$ term from start to $5th$ term from last is

(A) $4.(36)^{\frac{1}{3}}$

(B) $2.(16)^{\frac{4}{3}}$

(C) $2.2^{\frac{4}{3}}$

(D) $2.2^{\frac{1}{3}}$

12. If $f(x) = \min\{\sin x, \cos x\}$ in $x \in (-\pi, \pi)$. The point at which $f(x)$ is non-differentiable is a set

(A) $\left\{-\frac{\pi}{4}, o, \frac{\pi}{4}\right\}$

(B) $\{-\frac{3\pi}{4}, \frac{-\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}\}$

(C) $\left\{-\frac{3\pi}{4}, \frac{\pi}{4}, \frac{-\pi}{4}, \frac{3\pi}{4}\right\}$

(D) $\left\{-\frac{3\pi}{4}, \frac{\pi}{4}\right\}$

13. Two circles $x^2 + y^2 - 2x - 2y - 2 = 0$ and $x^2 + y^2 - 6x - 6y + 14 = 0$ are C_1 and C_2 respectively, then area of quadrilateral $PC_1\,QC_2$ is

(A) 8

(B) 2

(C) $4\sqrt{2}$

(D) 4

14. $\big((p \vee \sim q) \wedge (\sim p \wedge q)\big) \vee (\sim p \wedge \sim q)$ is logically equivalent is

(A) $p \wedge \sim q$

(B) $\sim p \wedge \sim q$

(C) $\sim p \wedge q$

(D) $p \wedge q$

15. $P=\begin{bmatrix}1 & 0 & 0\\ 3 & 1 & 0\\ 9 & 3 & 1\end{bmatrix}, Q-P^5=I_3$, where I_3 is 3×3 identity matrix and $Q=\begin{bmatrix}q_{11} & q_{12} & q_{13}\\ q_{21} & q_{22} & q_{23}\\ q_{31} & q_{32} & q_{33}\end{bmatrix}$, then the ratio $\frac{q_{21}+q_{31}}{q_{32}}$ equal to

(A) 28
(B) 10
(C) 9
(D) 6

16. If $S=\{1,2,\ldots.,100\}$, then number of subsets so that the product of all elements is even, is

(A) 2^{100}
(B) $2^{50}(2^{50}-1)$
(C) $2^{100}-1$
(D) $2^{50}-1$

17. A hyperbola whose vertices are $(-2,0)$ and $(2,0)$ and focus $(-3,0)$ then equation of hyperbola is

(A) $\frac{x^2}{25}-\frac{y^2}{16}=1$
(B) $\frac{x^2}{16}-\frac{y^2}{25}=1$
(C) $\frac{x^2}{4}-\frac{y^2}{5}=1$
(D) $\frac{x^2}{5}-\frac{y^2}{5}=1$

18. If $\frac{z-\alpha}{z+\alpha}$ is purely imaginary and $|z|=82$ then α is $(\alpha\in R)$

(A) 2
(B) 4
(C) 3
(D) 1

19. If $f(\theta)=3\cos\theta+5\sin\left(\theta-\frac{\pi}{6}\right)$ then maximum value of $f(\theta)$ is

(A) $\sqrt{19}$
(B) $\sqrt{34}$
(C) $\sqrt{26}$
(D) $\frac{\sqrt{72}}{\sqrt{7}}$

20. Ratio of roots of equation $3m^2x^2 + m(m-2) + 6 = 0$ is λ, then minimum value of $\lambda + \frac{1}{\lambda}$ is equal to

(A) -1

(B) 2

(C) -3

(D) -2

21. If $(2x)^{2y} = 4e^{2x-2y}$, then $\frac{dy}{dx}(1 + (ln\, 2x)^2)$ is equal to

(A) $ln\, 2x - \frac{\ln 2}{x}$

(B) $\frac{2\, ln\, x\, ln\, 2}{x}$

(C) $ln\, 2x$

(D) None

22. Three numbers are in $G.P.$, their product is 512. If we add 4 to first & second number, then they are in an $A.P.$ then the sum of original 3 numbers is

(A) 28

(B) 24

(C) 32

(D) 20

23. 3 boxes $1, 2, 3$ each contained 10 balls, labeled $1, 2, \ldots.10$. Let n_i be label on the ball drawn from box $i(i = 1, 2, 3,)$ then number of ways $n_1 < n_2 < n_3$ is

(A) 120

(B) 130

(C) 122

(D) 136

24. $(1 + \alpha)x + \beta y + z = 2, \alpha x + (1 + \beta)y + z = 3$ and $\alpha x + \beta y + 2z = 2$ has unique solution (α, β) is

(A) $(-2, 16)$

(B) $(2, -4)$

(C) $(-8, 6)$

(D) $(-2, 0)$

25. Let $y = 12 - x^2$. A rectangle in inscribed is parabola whose base lie on x- axis then maximum area of rectangle is

(A) 32

(B) 28

(C) 24

(D) 12

26. Let $y^2 = 4x$, point $P\ (4, -4), Q(9, 6)$ & vertex O. A point X is lie between arc POQ. Then maximum area of ΔPQX. Then maximum area of ΔPQX

(A) $\frac{125}{4}$

(B) $\frac{125}{2}$

(C) $\frac{135}{4}$

(D) $\frac{135}{2}$

27. If line perpendicular to line $2x - 3y + \lambda = 0$ pass through $(7, 15)$ & $(15, \beta)$ then β is equal to

(A) 3

(B) 2

(C) 1

(D) -3

28. If two circles one with centre $(1, 1)$ and radius 1 and other circle with centre $(9, 1)$ and radius 2, lies opposite side of straight line $3x + 4y = \lambda$. The set of values of λ is

(A) $[12, 21]$

(B) [13,22]

(C) $[10, 18]$

(D) $[15, 24]$

29. A tetrahedron has vertices at $O(0, 0, 0)$, $A(1, 2, 1), B(2, 1, 3)$ and $C(-1, 1, 2)$. The angle between the faces OAB and ABC is

(A) $\cos^{-1}\left(\frac{19}{35}\right)$

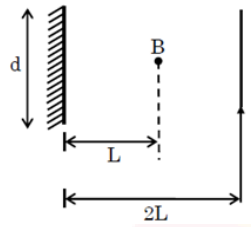
(B) $\sin^{-1}\left(\frac{19}{35}\right)$

(C) $\cos^{-1}\left(\frac{17}{35}\right)$

(D) $\sin^{-1}\left(\frac{14}{35}\right)$

Physics

1. A point source of light B is placed at a distance L in front of the centre of a mirror of width d hung vertically on a wall. A man walks in front of the mirror along a line parallel to the mirror at a distance $2L$ from it as shown. The greatest distance over which he can see the image of the light source in the mirror is



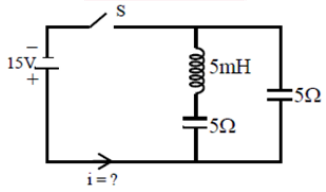
(A) $d/2$

(B) d

(C) $2d$

(D) $3d$

2. Find the current i in the circuit after closing the switch for long time.



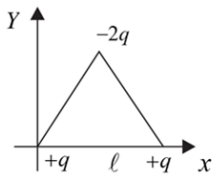
(A) $3A$

(B) $6A$

(C) $9A$

(D) $15A$

3. Three changes $+q$, $+q + -2q$ are arranged on equilateral triangle of side ℓ, as shower in figure. What is the dipole moment of the system



(A) $-\sqrt{3}q\ell\ \hat{j}$

(B) $+\sqrt{3}q\ell\ \hat{\imath}$

(C) $-\sqrt{3}q\ell\ \hat{\imath}$

(D) $+\sqrt{3}q\ell\ \hat{j}$

4. A particle of mass $0.03\,kg$ dropped from a tower of height $100\,m$. Simultaneously a bullets of mass $0.02\,kg$ is thrown up with speed $100\ m/s$ upwards. The bullets gets embedded into the particle. Calculate the maximum height covered by the particle after the collision from top most level of building

(A) $40\ m$

(B) $100\ m$

(C) $90\ m$

(D) $60\ m$

5. A non-uniform rod of length ℓ having mass density $\lambda(x) = (A + Bx^2)$ is placed on -x-axis with its ends at $(a, 0)$ and $(a + \ell, 0)$. The force it would exert on a point mass 'm' kept at the origin is

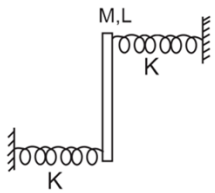
(A) $Gm\left[A\left(\frac{\ell}{a(a+\ell)}\right) + B\ell\right]$

(B) $Gm\left[A\left(\frac{\ell}{a(a-\ell)}\right) - B\ell\right]$

(C) $Gm\left[A\left(\frac{\ell}{a(a+\ell)}\right) + B\ell\right]$

(D) $Gm\left[A\left(\frac{\ell}{a(a+\ell)}\right) - B\ell\right]$

6. A rod of length ℓ, mass m are connected to two springs of spring constant K each. Find the frequency of small oscillation



(A) $\frac{1}{2\pi}\sqrt{\frac{K}{M}}$

(B) $\frac{1}{2\pi}\sqrt{\frac{2K}{M}}$

(C) $\frac{1}{2\pi}\sqrt{\frac{6K}{M}}$

(D) $\frac{1}{2\pi}\sqrt{\frac{3K}{M}}$

7. Two bulb $A(25W, 220V)$ and $B(100W, 220V)$ are connected in series. If power consumed by bulb A is P_1 and that of bulb B is P_2 then,

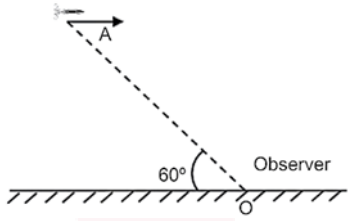
(A) $P_A : P_B$ is $\frac{1}{4}$

(B) $P_A : P_B$ is $\frac{9}{16}$

(C) $P_A : P_B$ is 4

(D) $P_A : P_B$ is 9

8. Aeroplane is coming from north at some height from ground when aeroplane is just above the person; person hears the second coming from north making angle 60^o with horizontal. Find speed of aeroplane



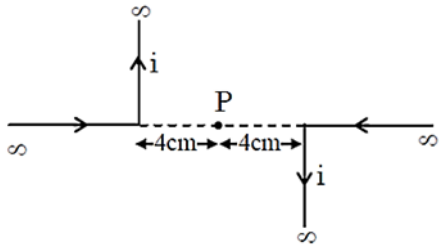
(A) $\frac{\sqrt{3}}{2}V$

(B) $\frac{V}{2}$

(C) $\frac{\sqrt{2}}{2}V$

(D) $\frac{2}{\sqrt{3}}V$

9. If magnetic field at point P is 10^{-4} Tesla. Determine current $'i'$?



(A) 20 $Amp.$

(B) 40 $Amp.$

(C) 30 $Amp.$

(D) 60 $Amp.$

10. A proton and α particle are accelerated through same potential difference and ether in transverse magnetic field. If ratio of masses of 2 particle $\frac{m_p}{m_x} = \frac{1}{4}$ and ratio of their charge $\frac{q_p}{q_\alpha} = \frac{1}{2}$. Find the ratio of radius of their circular path is magnetic field

(A) $\frac{1}{\sqrt{2}}$

(B) $\sqrt{2}$

(C) $\frac{1}{2}$

(D) 2

11. The equation of a wave on a string is given as $y(x,t) = 10^{-3}\sin(50 + 2x)$, time is in second, x is in meter. The velocity of the wave is

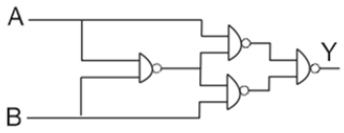
(A) 100 m/s towards negative x axis

(B) 25 m/s towards. Negative x-axis

(C) 100 m/s towards positive x-axis

(D) 25 m/s towards positive x-axis

12. Select the correct output Y



(A) $A.B$

(B) $A + B$

(C) $A.\overline{B} + B.\overline{A}$

(D) $A.B + \overline{A}.\overline{B}$

13. For a hydrogen-like atom the potential energy is given as $U(r) = \frac{1}{2}Kr^2$ where r is the radius of the orbit, K is a constant and E is the total enrgy then choose the correct option.

(A) r is proportinal to $\sqrt{n}, E$ is proportinal to $\sqrt{n}$

(B) r is proportinal to $\sqrt{n}, E$ is proportional to n

(C) r is proportinal n, E is proportinal to $\sqrt{n}$

(D) r is porportinal to n, E is proportinal to n

14. A carries wave of frequancy $100\,Khz$ is modulated. Minimum & Maximum amplitude of AM signal is $40\,V$ & $160\,V$ then find the modulation index.

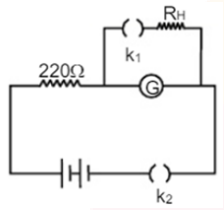
(A) 0.2

(B) 0.6

(C) 0.8

(D) 0.4

15. As shown in the figure initially switch k_1 is open and k_2 is closed and deflection of galvanometer is θ_0. Now both switch are closed then the deflection in galvanometer is (given $R_H = 5\Omega$)



(A) $24\,\Omega$

(B) $22\,\Omega$

(C) $42\,\Omega$

(D) $50\,\Omega$

16. In a meter bridge experiment the resistance of meter bridge wire varies with ℓ such that $\frac{dR}{d\ell} \propto \frac{1}{\sqrt{\ell}}$ where ℓ is distance for left end. What will be balancing length from left end if two resistances in left and right gap are equal.

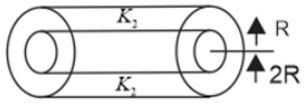
(A) $0.25\,m$

(B) $0.5\,m$

(C) $0.75\,m$

(D) $0.60\,m$

17. A cylinder has inner radius R and outer radius $2R$. The inner part is filled with a material of conductivity k_1 and outer with k_2. Find the equivalent thermal conductivity of the cylinder



(A) $K_1 + K_2$

(B) $\frac{K_1+K_2}{2}$

(C) $\frac{K_1+3K_2}{2}$

(D) $\frac{K_1+2K_2}{3}$

18. In a photoelectric effect the maximum speed of electrons is found to be $6 \times 10^5\ m/s$. The wave length used is $4000A°$. The work function of the metal is.

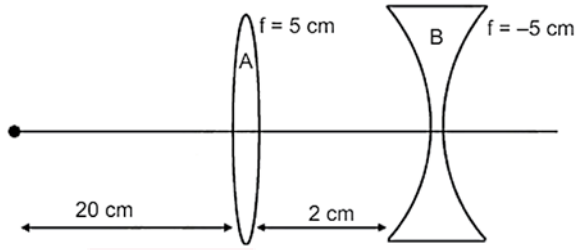
(A) $2.2eV$

(B) $2.076eV$

(C) $2.3eV$

(D) $2.4eV$

19. Find the posotion and nature of final image formed by the given combination of two lenses.



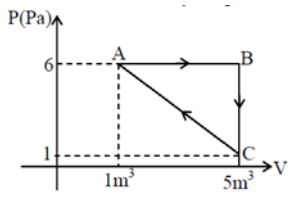
(A) Real image, 70 cm right of B

(B) Virtual image, 70 cm right of B

(C) Real image, $\frac{20}{3}\ cm$ left of B

(D) Real image $40, cm$ left of B

20. A cyclic process shown in figure. Find work done in cyclic process $ABCA$.



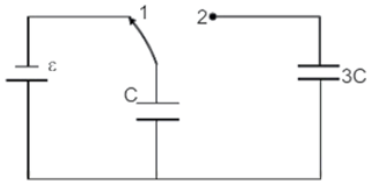
(A) $20J$

(B) $10J$

(C) $5J$

(D) $1J$

21. The circuit in figure is initially in steady state. What would be the heat generated if the switch is thrown from position 1 to position 2



(A) $\frac{3}{8}\frac{Q^2}{C}$

(B) $\frac{11}{8}\frac{Q^2}{C}$

(C) $\frac{3}{4}\frac{Q^2}{C}$

(D) $\frac{11}{4}\frac{Q^2}{C}$

22. A sattelite of mass m revolving around a planet in a circulr path or radius R. Another particle of same mass m movng radially inward collides inelastically with the sate llite. The path of the combined system after the collision will be

(A) Circular with same radius

(B) Circular with smaller radius

(C) Elliptical path

(D) Escape

23. Two trains of length $60\,m$ & $120\,m$ are moving with speeds $80\ km/h$ $30\ km/h$ respectively. Find the ratio of time taken by trains to cross each other in two cases first if they move in same direction and second if they move in opposite direction.

(A) $\frac{3}{2}$

(B) $\frac{8}{3}$

(C) $\frac{11}{8}$

(D) $\frac{11}{5}$

24. For a screw gauge least count of main scale is 1 mim. Find minimum number of divisions of circular scale s that it can measure diameter of 5 μm

(A) 500

(B) 100

(C) 50

(D) 200

25. An electromagnetic wave having amplitude of electric field 30 Vm^{-1} entres in a glss slab of refractive index 1.5. What would be the amplitude inside the salb if 4% of the incident energy is reflected.

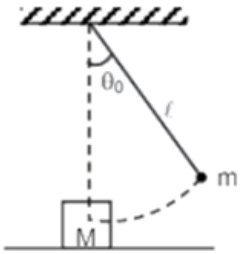
(A) 24

(B) 29

(C) 18

(D) 40

26. The ball of mass 'm' is released from the position shown in the figure, θ_0 being a small angle. If it rises to an angle θ_1 after perfectly elastic collision with the block of mass M then value of M is.



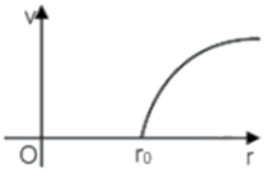
(A) $\left(\frac{\theta_0+\theta_1}{\theta_0-\theta_1}\right)m$

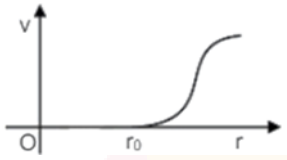
(B) $\left(\frac{\theta_0+\theta_1}{\theta_0-\theta_1}\right)\frac{m}{2}$

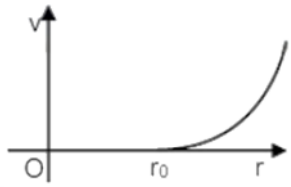
(C) $\left(\frac{\theta_0-\theta_1}{\theta_0+\theta_1}\right)m$

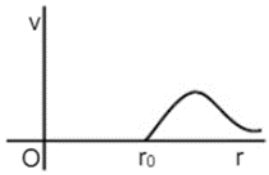
(D) $\left(\frac{\theta_0-\theta_1}{\theta_0+\theta_1}\right)\frac{m}{2}$

27. Charge is distributed uniformly in shape of spherical shell with centre at origion. Initial radius is r_0. It starts expanding due to mutual repulsion between the charges. Graph between radial velocity and radius at any time t is

(A) 

(B) 

(C) 

(D) 

28. An annular cylinder has inner $10\,cm$ outer radius $20\,cm$ and length $30\,cm$. The radius of a hollow cylinder having the same mass and moment of inertia (about its own axis) as the annular cylinder (about the axis) is

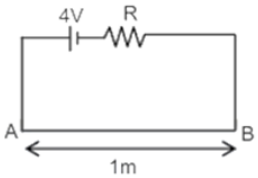
(A) $5\sqrt{6}\,cm$

(B) $5\sqrt{10}\,cm$

(C) $5\sqrt{2}\,cm$

(D) $5\sqrt{5}\,cm$

29. As shown in the diagram of potentiometer balancing length for $5\,mV$ is $10\,cm$. Find value of unknown resistance R is resistance of potentiometer wire AB is $5\,\Omega$



(A) $395\,\Omega$

(B) $495\,\Omega$

(C) $500\,\Omega$

(D) $400\,\Omega$

Chemistry

1. A solution of 4% X and another solution having 12% Y (Both solution have same solvent). If molar mass of X is A then molecular mass of Y is

   (A) $3A$

   (B) A

   (C) $\frac{A}{2}$

   (D) $2A$

2. BOD of sample first is $4\,ppm$ and BOD of second sample is $18\,ppm$. Which one is correct statement-

   (A) Both are highly polluted

   (B) Both are clean

   (C) First is clean and second is highly polluted

   (D) Second is clean and first is highly polluted

3. What is the oxidation number of I when iodine reacts with HNO_3?

   (A) -1

   (B) $+1$

   (C) $+3$

   (D) $+5$

4. For the following chemical reaction at $T = 300\ K$

   $Zn_{(s)} + Cu^{2+}_{(aq)} \rightleftharpoons Zn^{2+}_{(aq)} + Cu_{(s)}$

   If cell potential is $2\ V$ and $\frac{dE}{dT} = -5 \times 10^{-4}$ find ΔH.

   $F = 96500\ C$

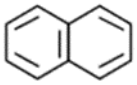
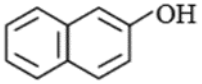
   (A) $384\ kJ$

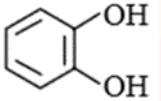
   (B) $+96\ kJ$

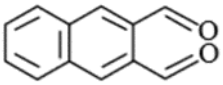
   (C) $-412\ kJ$

   (D) $-380\ kJ$

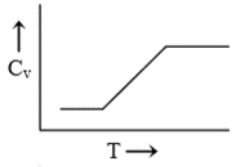
5. An element having atomic no. 120 (not yet discovered) is -
(A) Transition metal
(B) Inner transition metal
(C) Alkaline earth metal
(D) Alkali metal

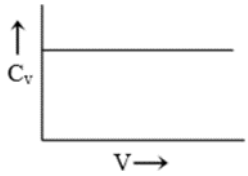
6. Which of the following has lowest freezing point-
(A) 
(B) 

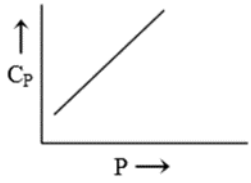
(C) 

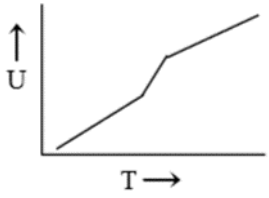
(D) 

7. What is the correct acidic order of the following compounds
$(a)\ CH \equiv CH$
$(b)\ CH_3 - C \equiv CH$
$(c)\ CH_2 = CH_2$
(A) $a < b < c$
(B) $a > b > c$
(C) $a = b < c$
(D) $b > a > c$

8. Which of the graph given below is incorrect-
(A) 

(B) 

(C) 

(D) 

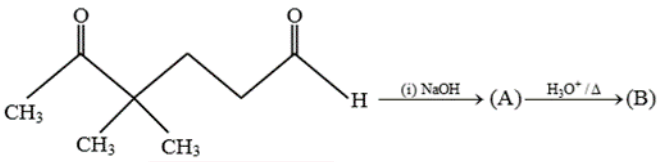
9. Which of the molecules are used to prepare co-polymer $PHBV$ (Poly $-\beta-$ hydroxybutyrate $-Co-\beta-$ hydroxy valerate)

(A) 2 hydroxy butanoic acid and 2 hydroxy pentanoic acid

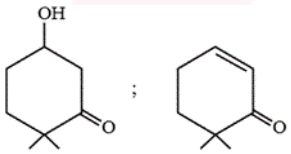
(B) 2 hydroxy butanoic acid and 3 hydroxy pentanoic acid

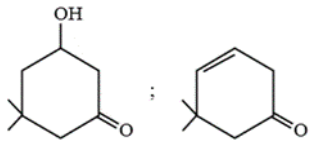
(C) 3 hydroxy butanoic acid and 2 hydroxy pentanoic acid

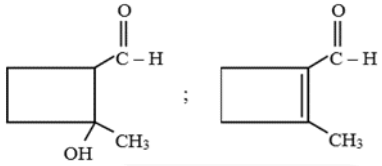
(D) 3 hydroxy butanoic acid and 3 hydroxy pentanoic acid

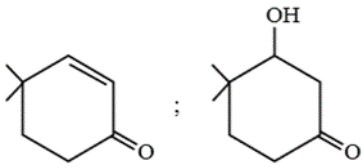
10. 

Product A & B respectively are

(A) 

(B) 

(C) 

(D) 

11. $A+2B \rightleftharpoons 2C+D$ Initial concentration of B is 1.5 times of A and at equilibrium, concentration of A and B are equal then find K_C

(A) 8

(B) 4

(C) 2

(D) 6

12. Which of the following amino acid is basic?

(A) Aspargin

(B) Alanine

(C) Lysine

(D) Serine

13. Which of the following gas has low adsorption value?

(A) H_2

(B) N_2

(C) CO_2

(D) CH_4

14. A complex has the formula $[M(H_2O)_6]Cl_2$ and has $\mu = 3.9\,BM$. Then, M (metal) present in the complex may be:

(A) V^{2+}, Fe^{2+}

(B) CO^{2+}, V^{2+}

(C) CO^{2+}, Fe^{2+}

(D) V^{2+}, Ni^{2+}

15. In Hall-Heroult process for the reduction of Aluminum, which substance is the cathode made of?

(A) Carbon

(B) Steel

(C) Pure aluminum

(D) Graphite

16. If $M + O_2 \rightarrow X$

$X + H_2O \rightarrow Z + H_2O_2 + O_2$. Then element M is-

(A) Li

(B) Rb

(C) Na

(D) Mg

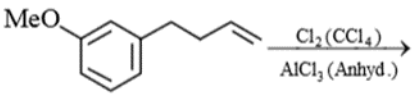
17. If solid $A(s)$ is dissociated in a closed container having equilibrium constant $A(s) \rightleftharpoons B(g) + C(g)$ $K_{P_1} = x$ and in the same container $D(s)$ is also added, if $K_{P_2} = y$ is equilibrium constant for $D(s) \rightleftharpoons C(g) + E(g)$. Total pressure at equilibrium is-

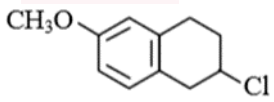
(A) $\sqrt{x+y}$

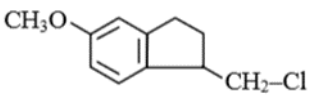
(B) $2\sqrt{x+y}$

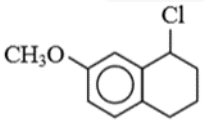
(C) $\sqrt{x^2+y^2}$

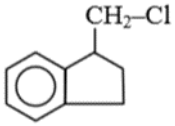
(D) $(x+y)$

18. 

(A) 

(B) 

(C) 

(D) 

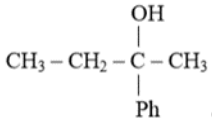
19. Which compound is minimum or not found in photochemical smog

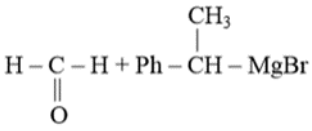
(A) $CH_2 = O$

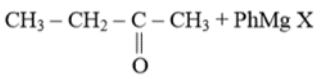
(B) NO_2

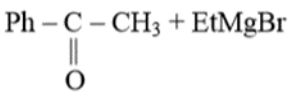
(C) O_3

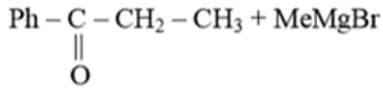
(D) N_2

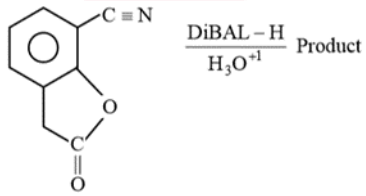
20.  can not be prepared by following-

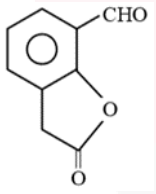
(A) 

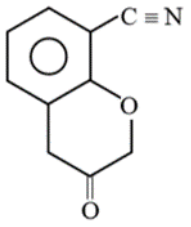
(B) 

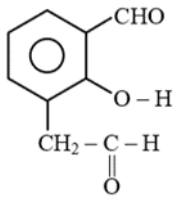
(C) 

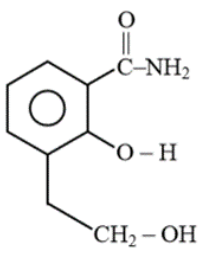
(D) 

21.  What is the product-

(A) 

(B) 

(C) 

(D) 

22. If A discompose as $0.05\mu g$ per year then how many years it will require to discompose from $5\mu g$ to $2.5\mu g$ –

(A) 25

(B) 20

(C) 100

(D) 50

23. If gas A has compressibility factor $3Z$ and volume $2V$ and gas B has compressibility factor Z and volume V at same temperature and same mole, then find relationship between P_A and P_B

(A) $3P_A = 2P_B$

(B) $2P_A = 3P_B$

(C) $P_A = P_B$

(D) $2P_A = P_B$

24. What is the hardness in terms of $CaCO_3$ of water in the given sample which contain $10^{-3}M\ CaSO_4$ $(mol\ wt\ 136)$

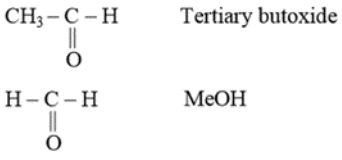
(A) 100 ppm

(B) 10 ppm

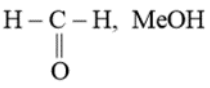
(C) 20 ppm

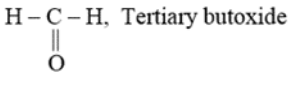
(D) 90 ppm

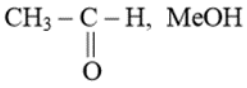
25. Aldehyde + Alcohol → Acetal

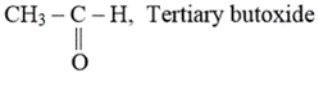


Which is suitable combination

(A) 

(B) 

(C) 

(D) 

26. $50\,ml$ of $0.5\,M$ oxalic acid neutralizes $25\,ml$ of $NaOH$. Then the amount of $NaOH$ in $50\,ml -$

(A) $80\,g$

(B) $4\,g$

(C) $5\,g$

(D) $40\,g$

27. With which d orbital ligand CN^{Θ} will form coordinate bond in $K_3[Co(CN)_6]$

(A) $dx^2 - y^2, dz^2$

(B) $dx^2 - y^2, dxy$

(C) dxy, dxz

(D) dz^2

28. A photons falls on the metal surface having wavelength $4000\,A^o$ and ejected electron have velocity $6 \times 10^5\ m/sec$. Calculate work function in $(eV)(m_e = 9.1 \times 10^{-31} kg)$

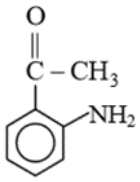
(A) $2.1\ eV$

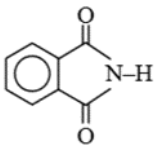
(B) $3.1\ eV$

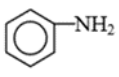
(C) $2.5\ eV$

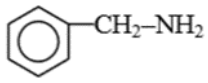
(D) $4.1\ eV$

29. Reactivity order these compound with Alkyl halide-

(A) 

(B) 

(C) 

(D) 

(A) $B > C > A > D$

(B) $A > B > C > D$

(C) $D > A > B > C$

(D) $D > C > A > B$