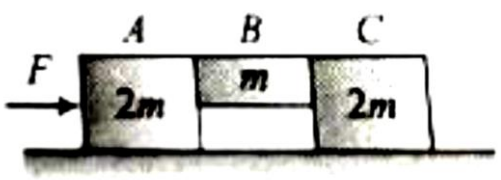
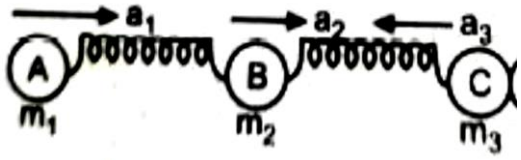
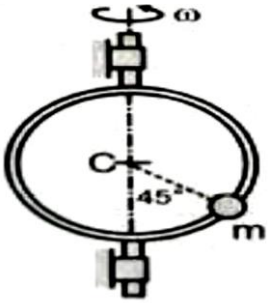
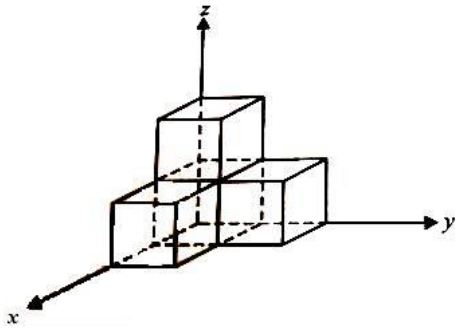
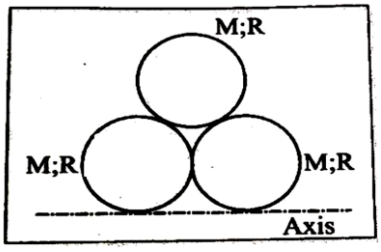
Single Correct Answer Type

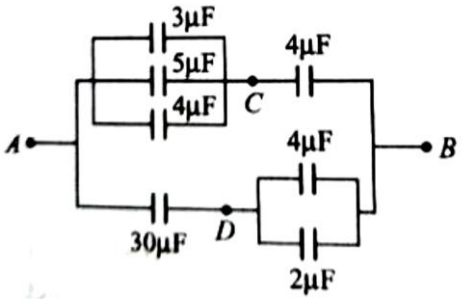
1.	Two cars start off race with velocity 4 m/s and 2 m/s and travel in straight line withuniform accelerations 1 m/s^2 and 2 m/s^2 respectively. If they reach the final point at thesame instant then the length of the path is	
	a)	30 m
	b)	32 m
	c)	20 m
	d)	24 m
Ans.	**d**	
Sol.:		
2.	For any arbitrary motion in space, which of the following relations are true:	
	a)	$\vec{V}_{average}=\left(\frac{1}{2}\left(\vec{v}(t_1)+\vec{v}(t_2)\right)\right)$
	b)	$\vec{V}_{average}=\frac{\left[\vec{r}(t_2)-\vec{r}(t_1)\right]}{(t_2-t_1)}$
	c)	$\vec{V}(t)=\vec{v}(0)+\vec{a}(t)$
	d)	$\vec{r}(t)=\vec{r}(0)+\vec{v}(0)t+\left(\frac{1}{2}\right)\vec{a}t^2$
Ans.	**b**	
Sol.:		
3.	In a cubical vessel (1m×1m×1m) the gas molecules of diameter 1.7×10^{-8} cm are at atemperature of 300 K and a pressure of 10^{-4} mm of mercury. The mean free path of thegas molecule is	
	a)	1 m
	b)	4 m
	c)	2.42 m
	d)	1 cm
Ans.	**c**	
Sol.:		
4.	The system is pushed by a force F as shown in figure. All surfaces are smooth exceptbetween B and C. Friction coefficient between B and C is μ. Minimum value of F toprevent block B from down ward slipping is 	
	a)	$\left(\frac{3}{2\mu}\right)mg$

	b)	$\left(\frac{5}{2\mu}\right)mg$
	c)	$\left(\frac{5}{2}\right)\mu mg$
	d)	$\left(\frac{3}{2}\right)\mu mg$
Ans.	**b**	
Sol.:		
5.	Shown in the following figure is a system of three particles of mass m_A= 1kg, m_B= 2kg& m_C= 4kg connected by two springs. The acceleration of A,B and Cat an instant are 1m/sec^2, 2m/sec^2 and 1/2m/sec^2 respectively directed as shown in thefigure, then the external force acting on the system is 	
	a)	1 N
	b)	7 N
	c)	3 N
	d)	2 N
Ans.	**c**	
Sol.:		
6.	A small bead of mass m = 1 kg is carried by a circular hoop having centre at C andradius r = 1 m which rotates about a fixed vertical axis. The coefficient of frictionbetween bead and hoop isμ= 0.5. The maximum angular speed of the hoop for whichthe bead does not have relative motion with respect to hoop is 	
	a)	$\left(5\sqrt{2}\right)^{1/2} rad/s$
	b)	$\left(10\sqrt{2}\right)^{1/2} rad/s$
	c)	$\left(15\sqrt{2}\right)^{1/2} rad/s$
	d)	$\left(30\sqrt{2}\right)^{1/2} rad/s$
Ans.	**d**	
Sol.:		
7.	Find the center of mass (x,y,z) of the following structure of four identical cubes if	

	thelength of the each side of a cube is 1 unit 	
	a)	$\frac{3}{4},\frac{3}{4},\frac{3}{4}$
	b)	$\frac{1}{4},\frac{1}{4},\frac{1}{4}$
	c)	$\frac{2}{3},\frac{2}{3},\frac{2}{3}$
	d)	1, 1, 1
Ans.	**a**	
Sol.:		
8.	The ratio of the weights of a body on the earth's surface to that on the surface of a planet is $\frac{9}{8}$, the mass of the planet is $\frac{1}{18}th$ of that of the earth. If R is the radius of theEarth, what is the radius of a planet? (take the planets to have the same density)	
	a)	$\frac{R}{4}$
	b)	$\frac{R}{3}$
	c)	$\frac{R}{9}$
	d)	$\frac{R}{17}$
Ans.	**a**	
Sol.:		
9.	A uniform rod of length L, has a mass per unit length λ and area of cross section A.The elongation in the rod is l due to its own weight, if it is suspended from the ceilingof a room. The young's modulus of the rod is	
	a)	$\frac{3\lambda gL^2}{Al}$
	b)	$\frac{\lambda gL^2}{2Al}$
	c)	$\frac{2\lambda gL}{Al}$
	d)	$\frac{\lambda gL^2}{Al}$
Ans.	**b**	

Sol.:		
10.	A solid sphere of radius R acquires a terminal velocity v_1 when falling (due to gravity)through a viscous liquid having a coefficient of viscosityη. The sphere is broken into1000 identical solid spheres. If each of these spheres acquires a terminal velocity v_2,when falling through the same fluid, the ratio $\frac{v_1}{v_2}$ equals to	
	a)	$\frac{1}{27}$
	b)	$\frac{1}{10}$
	c)	10
	d)	100
Ans.	**d**	
Sol.:		
11.	The efficiency of a Carnot engine operating between the temperatures T_1 and T_2 ($T_1 > T_2$) isη_0. The temperature of sink is decreased by α K and efficiency is η_1. Thetemperature of source is increased by α K and efficiency is η_2	
	a)	$\eta_1 = \eta_2 = \eta_0$
	b)	$\eta_1 > \eta_2 > \eta_0$
	c)	$\eta_1 < \eta_2 < \eta_0$
	d)	$\eta_1 > \eta_0 > \eta_2$
Ans.	**b**	
Sol.:		
12.	There are three rings each of mass M and radius R. What is the moment of inertiaabout the given axis? 	
	a)	$MR^2\left(5+2\sqrt{3}\right)$
	b)	$\frac{MR^2\left(15+4\sqrt{3}\right)}{2}$
	c)	$\frac{MR^2\left(5+\sqrt{3}\right)}{2}$
	d)	$MR^2\left(7+\sqrt{3}\right)$
Ans.	**b**	
Sol.:		
13.	A dog while barking delivers about 1mw power. If this power is uniformly distributedover hemispherical area, then the sound level at a distance of 5m is B_1. If instead of 1dog,	

	5 dogs start barking at same time each delivering 1mw power then, the sound level is B_2. Find, $\frac{B_1}{B_2}$ = (take log(6.37) = 0.8)	
	a)	$\frac{68}{75}dB$
	b)	$\frac{77}{66}dB$
	c)	$\frac{78}{66}dB$
	d)	$\frac{62}{71}dB$
Ans.	**a**	
Sol.:		
14.	A source of sonic oscillations with frequency *f*= 1700Hz and a receiver are located onthe same normal to a wall. Both the source and receiver are stationary, and the wallrecedes from the source with velocity u = 6.0 cm/s. Find the beat frequency registeredby the receiver. The velocity of sound is equal to v = 340 m/s	
	a)	0.2 Hz
	b)	0.6 Hz
	c)	0.4 Hz
	d)	1.2 Hz
Ans.	**b**	
Sol.:		
15.	Let a total charge 2Q be the distributed in a sphere of radius R, with the charge densityis given by$\rho(r) = kr$, where r is the distance from centre. Two charges A & B of -Q areplaced on diametrically opposite points at equal distance a, from the centre. If A & Bdo not experience any force, then	
	a)	$a = \frac{3R}{2^{1/4}}$
	b)	$a = \frac{R}{\sqrt{3}}$
	c)	$a = 8^{-1/4}R$
	d)	$a = 2^{-1/4}R$
Ans.	**c**	
Sol.:		
16.	Several capacitors are connected as shown in figure. If the charge on the 5μF capacitoris 120μC, the potential difference between points A and D is	



a) 16V

b) 32V

c) 64V

d) 14.2V

Ans. **a**

Sol.:

17. An electric motor operating on 50 volt D.C. supply draws a current of 10 amp. If theefficiency of motor is 40%, then the resistance of the winding of the motor is

a) 1.5 Ω

b) 3 Ω

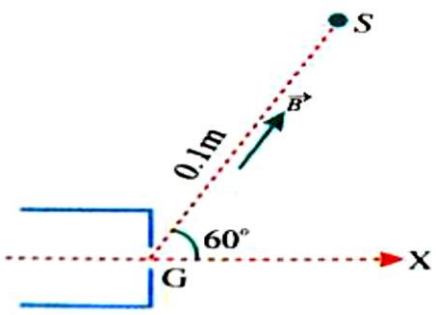
c) 4.5 Ω

d) 6 Ω

Ans. **b**

Sol.:

18. An electron gun G emits electron of energy 2 keV travelling in the positive Xdirection. The electrons are required to hit the spot S where GS = 0.1 m, and the lineGS makes an angle of 60° with the X-axis as shown in the figure. A uniform magneticfield B parallel to GS exists in the region outside the electron gun. Find the minimumvalue of B needed to make the electrons hit point S.



a) 4.73×10^{-3}T

b) 4.73×10^{-2}T

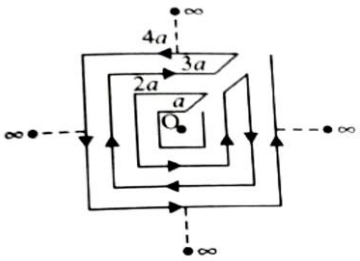
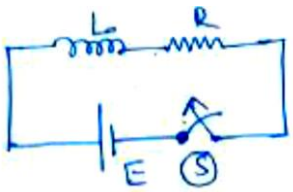
c) 2.73×10^{-2}T

d) 5.73×10^{-3}T

Ans. **a**

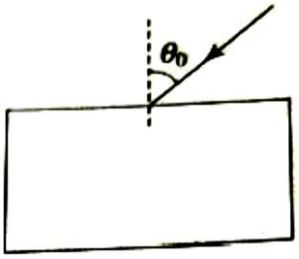
Sol.:

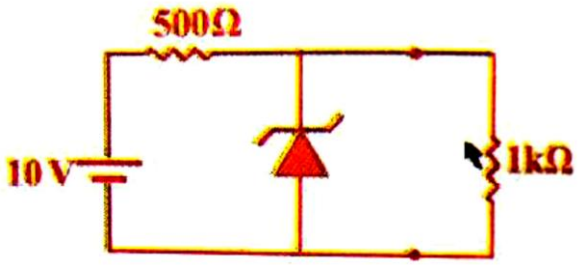
19. Determine the magnitude of magnetic field at the centre of the current carrying wirearrangement shown in the figure. The arrangement extends to infinity. The wiresjoining the successive squares are along the line passing though the centre and thecurrent in

	the wires is I. 	
	a)	$\frac{\mu_0 I}{\sqrt{2}\pi a}$
	b)	0
	c)	$\frac{2\sqrt{2}\mu_0 I}{\pi a}\ln 2$
	d)	$\frac{4\sqrt{7}\mu_0 I}{\pi a}\ln 2$
Ans.	**c**	
Sol.:		
20.	Consider the LR circuit shown in figure. If the switch S is closed at t = 0, then theamount of charge that passes through the battery between t = 0 and t = $\frac{L}{R}$ is 	
	a)	$\frac{7.3EL}{R^2}$
	b)	$\frac{EL}{2.7R^2}$
	c)	$\frac{2.7EL}{R^2}$
	d)	$\frac{EL}{7.3R^2}$
Ans.	**b**	
Sol.:		

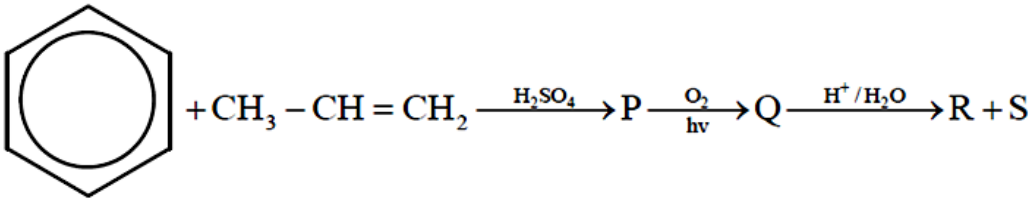
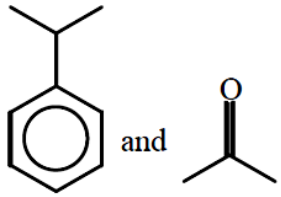
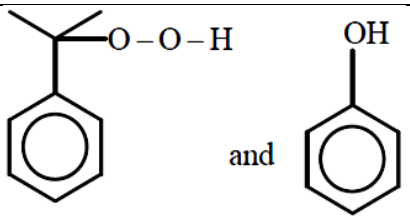
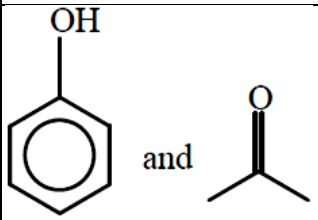
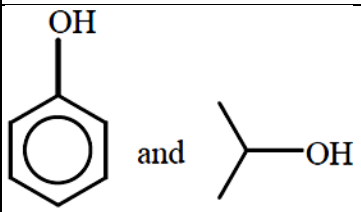
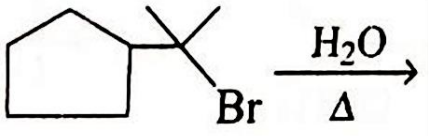
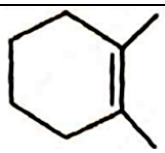
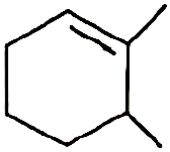
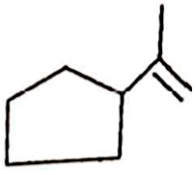
Integer Answer Type

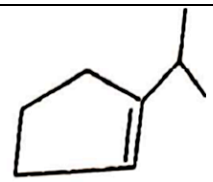
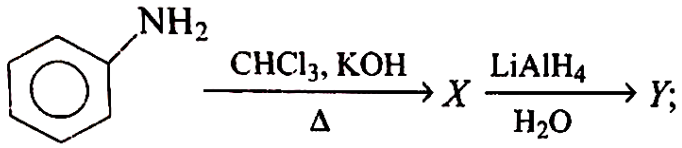
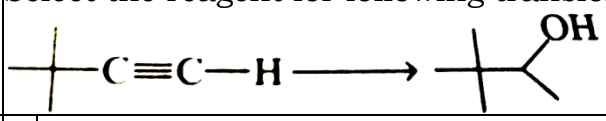
21.	A plane electromagnetic wave propagating in the x-direction has a wavelength of 60mm. The electric field is in the y-direction and its maximum magnitude is 99 v/m. Theequation for the electric field as a function of x and t is given by $99\sin \pi[10]^{2m}\left(t-\frac{x}{v}\right)$. Find the value of m is
Ans.	**5**
Sol.	

:	
22.	A slab of refractive index μ is placed in air and light is incident at maximum angle $\theta_0$from vertical. The minimum value of μ for which total internal reflection takes placeat the vertical surface is $\mu = \sqrt{\frac{4}{K} + \sin^2\theta}$. Then K is 
Ans.	**4**
Sol. :	
23.	A horizontal beam of vertically polarized light of intensity 44 W/m^2 is sent throughtwo polarizing sheets. The polarizing direction of the first is 60° to the vertical, andthat of the second is horizontal. The intensity of the light (in W/m^2) transmitted by thepair of sheets is n/4 where n=____
Ans.	**33**
Sol. :	
24.	The de Broglie wavelength of neutrons in thermal equilibrium is (Given m_n = 1.6 $\times 10^{-27}$ kg) (take $\sqrt{T} = 1$) in A°is 7.7 *x*, then the value of *x* is
Ans.	**4**
Sol. :	
25.	An electron jumps from the fourth orbit to the second orbit of hydrogen atom. Giventhe Rydberg's constant R = 10^5 cm^{-1}. The frequency, in Hz, of the emitted radiation will be $\frac{s}{16} \times 10^5$, the value of s is
Ans.	**9**
Sol. :	
26.	A container is filled with a radioactive substance for which the half life is 2 days. Aweek later, when the container is opened, it contains 5g of the substance.Approximately the number of grams of the substances were initially placed in thecontainer is 20N, the value of N is
Ans.	**4**

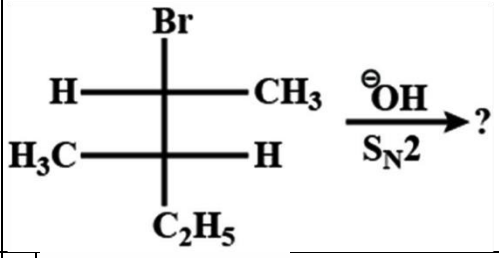
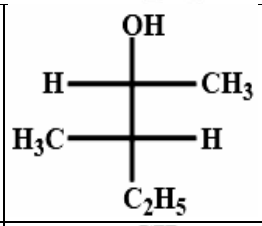
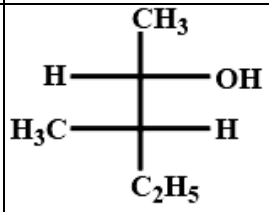
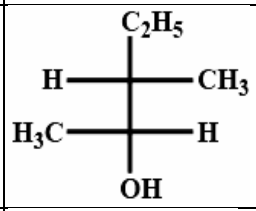
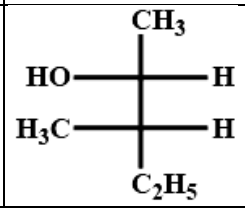
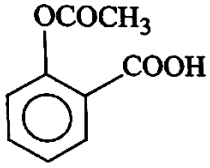
Sol. :	
27.	Figure shows the circuit of a simple constant voltage supply using zener diode. Theconstant voltage available across the zener diode is 5V. The current flowing throughthe 1 kΩ load in mA is 
Ans.	**5**
Sol. :	
28.	An amplitude modulated wave is modulated to 50 %. If carrier as well as one of theside bands are suppressed then the saving in power is 11.8y. The value of y is
Ans.	**8**
Sol. :	
29.	A tube of certain diameter and length 48 cm is open at both ends. Its fundamentalfrequency of resonance is found of be 320 Hz. The velocity of sound in air is 320 m/s.The diameter of the tube (in cm) is n/3 where n=____
Ans.	**10**
Sol. :	
30.	Interference fringes were produced using light in a double slit experiment. When amica sheet of uniform thickness and refractive index 1.6 (relative to air) is placed inthe path of light from one of the slits, the central fringe moves through some distance.This distance is equal to the width of 30 interference bands if light of wavelength4800 Å is used. The thickness of mica is $12x \times 10^{-6}$m then the value of x is
Ans.	**2**
Sol. :	

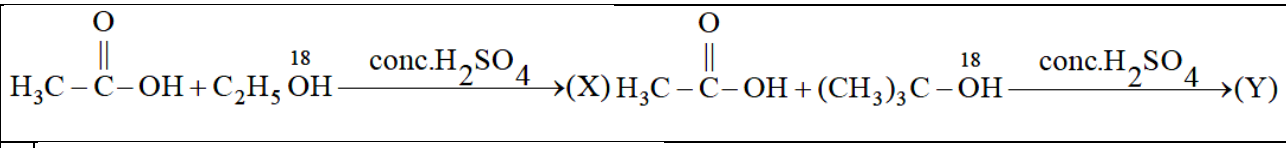
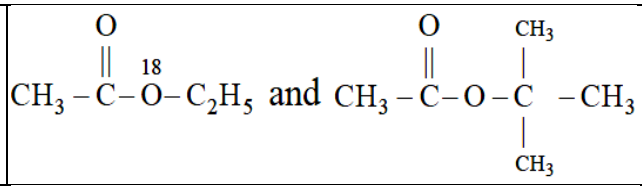
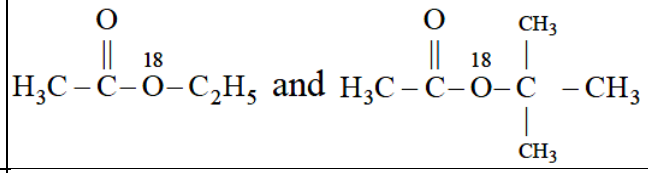
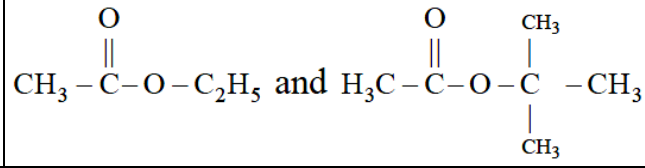
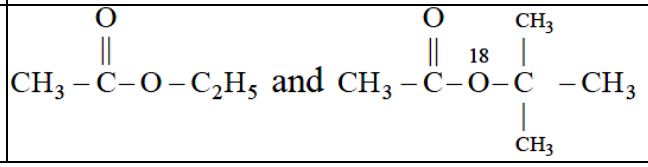
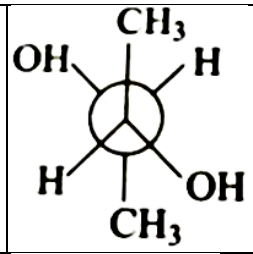
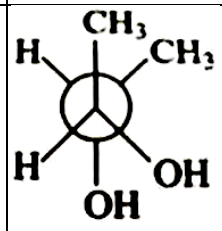
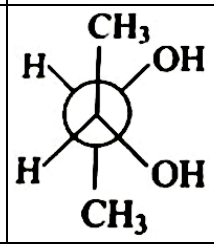
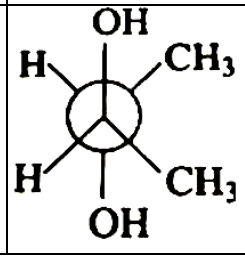
Single Correct Answer Type

31.	Identify R and S: 	
	a)	
	b)	
	c)	
	d)	
Ans.	**c**	
Sol.:		
32.	Find the major product of the following reaction: 	
	a)	
	b)	
	c)	

	d)	
Ans.	**a**	
Sol.:		
33.	Which of the following conditions regarding a chemical process ensures its spontaneity at all temperature?	
	a)	$\Delta H>0$, $\Delta G<0$
	b)	$\Delta H<0$, $\Delta S>0$
	c)	$\Delta H<0$, $\Delta S<0$
	d)	$\Delta H>0$, $\Delta S<0$
Ans.	**b**	
Sol.:		
34.	 (Y) is	
	a)	$Ph-\underset{\displaystyle H}{\underset{\vert}{N}}-CH_3$
	b)	$Ph\text{-}CH_2\text{-}NH_2$
	c)	$Ph-\underset{\displaystyle H}{\underset{\vert}{N}}-\overset{\displaystyle O}{\overset{\Vert}{C}}-NH_2$
	d)	$Ph-\overset{+}{N}\equiv\overset{-}{C}$
Ans.	**a**	
Sol.:		
35.	Excess of Li and Mg are allowed to react separately with 1 mole of N_2 gas, ratio of gaseous product obtained in complete hydrolysis of both compounds.	
	a)	1:2
	b)	2:1
	c)	1:1
	d)	2:3
Ans.	**c**	
Sol.:		
36.	Select the reagent for following transformation: 	
	a)	H_2-Pd; HCHO, H_2SO_4
	b)	H_2, Pd-$BaSO_4$; $Hg(OAC)_2$, H_2O, $NaBH_4$, $\overline{O}H$
	c)	BH_3, H_2O_2, $\overline{O}H$; Pd-C
	d)	Hg^{+2}, H_2SO_4; H_2, Pd-$BaSO_4$
Ans.	**b**	

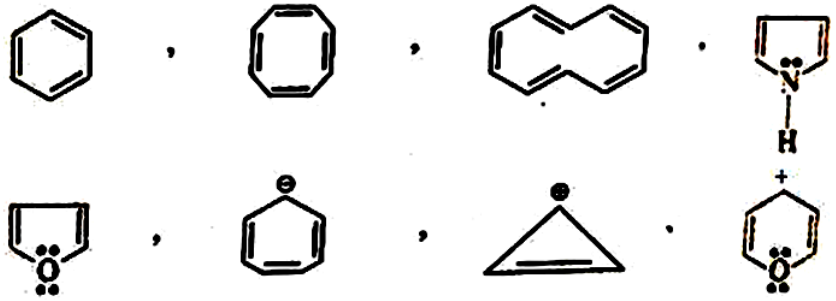
Sol.:		
37.	Consider the partial decomposition of A as $2A(g \rightleftharpoons 2B(g) + C(g)$. At equilibrium 700 mL gaseous mixture contains 100 mL of gas C at 10 atm and 300 K. What is the value of K_p for the reaction?	
	a)	$\frac{40}{7}$
	b)	$\frac{1}{28}$
	c)	$\frac{10}{28}$
	d)	$\frac{28}{10}$
Ans.	**c**	
Sol.:		
38.	A 0.020 m solution of each of the following compounds is prepared. Which solution would you expect to freeze at -0.1490^0C? K_f (water) = 1.86 K kg mol^{-1}? [Where, py = pyridine (unidentate), en = ethylenediamine (bidentate)]	
	a)	$[Co(en)_2Cl_2]Cl$
	b)	$Na[Co(EDTA)]$
	c)	$[Cr(py)_5Cl]Cl_2$
	d)	$[Cr(NH_3)_6]Cl_3$
Ans.	**d**	
Sol.:		
39.	Glucose when treated with CH_3OH in presence of dry. HCl gives α- and β-methylglycosides because it contains	
	a)	An aldehydic group
	b)	$-CH_2$-OH group
	c)	Give -OH group
	d)	None of these
Ans.	**a**	
Sol.:		
40.	For a first order reaction A → P, the temperature (T) dependent rate constant (k) was found to follow the equation: $\log k = -(2000)\frac{1}{T} + 6.0$. The pre-exponential factor A and the activation energy E_a, respectively are	
	a)	$1.0 \times 10^6 s^{-1}$ and 9.2 kJ mol^{-1}
	b)	6.0 s^{-1} and 16.6 kJ mol^{-1}
	c)	$1.0 \times 10^6 s^{-1}$ and 16.6 kJ mol^{-1}
	d)	$1.0 \times 10^6 s^{-1}$ and 38.3 kJ mol^{-1}
Ans.	D	
Sol.:		
41.	Select correct for reaction $Na_2CrO_4 + H_2SO_4 \rightarrow$	
	a)	It is a redox reaction in which green solution of $[Cr(H_2O)_6]^{+3}$ is produced
	b)	One of the product in reaction has trigonal planar structure
	c)	Dimeric bridged tetrahedral metal ion is produced
	d)	Dark blue colour is obtained in reaction
Ans.	**c**	
Sol.:		

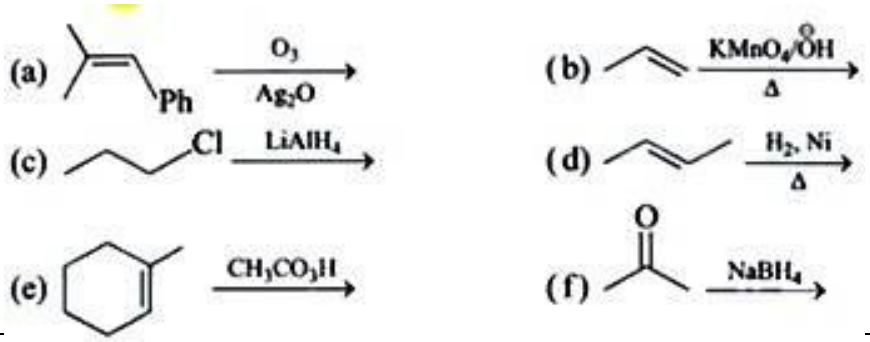
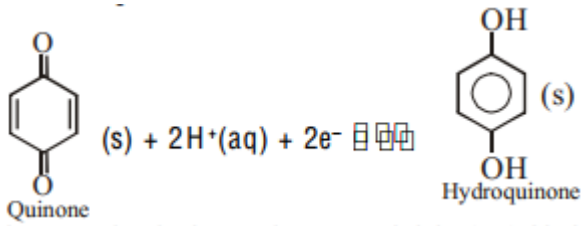
42.	In the following reaction the most probable product will be: 	
	a)	
	b)	
	c)	
	d)	
Ans.	**b**	
Sol.:		
43.	The compound  is used as:	
	a)	Antiseptic
	b)	Antibiotic
	c)	Analgesic
	d)	Pesticide
Ans.	**c**	
Sol.:		
44.	Which of the following sequences is correct for decreasing order of ionic radius?	
	a)	Se^{2-}, I^-, Br^-, O^{2-}, F^-
	b)	I^-, Se^{2-}, O^{2-}, Br^-, F^-
	c)	Se^{2-}, I^-, Br^-, F^-, O^{2-}
	d)	I^-, Se^{2-}, Br^-, O^{2-}, F^-
Ans.	**d**	
Sol.:		
45.	In the below reaction (X) and (Y) are respectively	

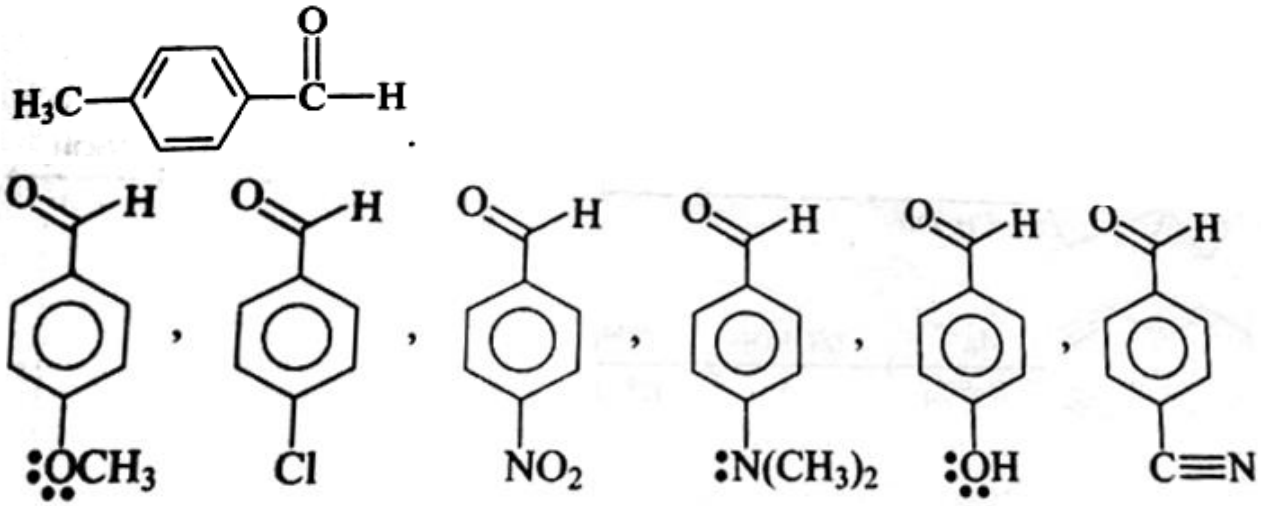
	
	a) 
	b) 
	c) 
	d) 
Ans.	**a**
Sol.:	
46.	Which one of the following is the most stable conformer?
	a) 
	b) 
	c) 
	d) 
Ans.	**c**
Sol.:	

47.	Which of the following fluoride of Xenon has zero dipole moment?	
	a)	XeF_2
	b)	XF_6
	c)	XeF_4
	d)	None of these
Ans.	d	
Sol.:		
48.	The spin magnetic moment of cobalt in the compound H g[Co(SC N)$_4$] is	
	a)	$\sqrt{3}$
	b)	$\sqrt{8}$
	c)	$\sqrt{15}$
	d)	$\sqrt{24}$
Ans.	c	
Sol.:		
49.	Which of the following is not a planar molecular?	
	a)	$H_2C = C = CH_2$
	b)	$H_2C = C = C = CH_2$
	c)	$H_2C = C = O$
	d)	NC - HC = CH - CN
Ans.	**a**	
Sol.:		
50.	The type of hybridization of boron in diborane is	
	a)	sp-hybridization
	b)	sp^2-hybridization
	c)	sp^3-hybridization
	d)	sp^3d^2-hybridization
Ans.	c	
Sol.:		

Integer Answer Type

51.	Find out number of aromatic compounds or ion from following 
Ans.	**5**
Sol.:	
52.	What is the minimum pH necessary to cause a precipitate of Pb(OH)$_2$, (K_{sp} = 1.2×10^{-3}) to form in a 0.12M $PbCl_2$ solution?
Ans.	**12**
Sol.:	
53.	Ratio of moles of Fe(II) oxidized by equal volumes of equimolar $KMnO_4$ and $K_2Cr_2O_7$

	solutions in acidic medium will be x : y. Then x + y =?
Ans.	**11**
Sol.:	
54.	The energy of a I, II and III energy levels of a certain atom are E, 4E/3 and 2E respectively. A photon of wavelength λ is emitted during a transition from III to I. What will be the wavelength of emission for transition II to I _____λ?
Ans.	**3**
Sol.:	
55.	99% of a first order reaction was complete in 32 minutes when 99.9% of the reaction will complete in _____min
Ans.	**48**
Sol.:	
56.	Of the following reactions how many reactions are considered as oxidation reaction 
Ans.	**3**
Sol.:	
57.	Q uinhydrone electrode is sometimes used to find the p H of a solution. It is based on the following electrode reaction:  Its standard electrode potential is 0.70 V. If in a particular solution, the electrode potential is found to be 0.58 V, the pH of the solution is
Ans.	2
Sol.:	
58.	A solution containing 500 gr of a protein per litre is isotonic with a solutioncontinuity 3.42 gr sucrose per litre the molar mass of protein is 5×10^x, hence x= ?
Ans.	**4**
Sol.:	
59.	The half-life of a reaction is halved as the initial concentration of the reactant is doubled. The order of reaction is
Ans.	2

Sol.:	
60.	Examine the structural formula of the following compounds and find out number ofcompounds which show higher rate of nucleophilic addition than 
Ans.	**3**
Sol.:	

Single Correct Answer Type

61.	The negation of the proposition: "If a number is divisible by 15, then it is divisible by5 or 3.	
	a)	If a number is divisible by 15, then it is not divisible by 5 and 3
	b)	A number is divisible by 15, and it is not divisible by 5 and 3
	c)	A number is divisible by 15, then it is not divisible by 5 or 3
	d)	A number is not divisible by 15or it is not divisible by 5 and 3
Ans.	b	
Sol.:		
62.	A particle starts to travel from a point P on the curve C_1 : $\|z- -3 -4i\|=5$, where $\|z\|$ ismaximum. From P, the particle moves through an angle $\tan^{-1}\frac{3}{4}$ in anticlock wisedirection on $\|z - 3- 4i\| = 5$ and reaches at point Q. From Q, it comes down parallel toimaginary axis by 2 units and reaches at point R. Complex number corresponding topoint R in the Argand plane is	
	a)	(3+5i)
	b)	(3+7i)
	c)	(3+8i)
	d)	(3+9i)
Ans.	b	
Sol.:		
63.	Let p and q be roots of the equation $x^2 - 2x + A = 0$ and let r and s be the roots of theequation $x^2 - 18x + B = 0$. If $p < q < r < s$ are in arithmetic progression. Then the valuesof A and B respectively are.	
	a)	–5,67
	b)	–3,77
	c)	67,–5

	d)	77,–3
Ans.	b	
Sol.:		
64.	$f(\theta)=\begin{vmatrix}1+\sin^2\theta & \cos^2\theta & 4\sin 2\theta \\ \sin^2\theta & 1+\cos^2\theta & 4\sin 2\theta \\ \sin^2\theta & \cos^2\theta & 1+4\sin 2\theta\end{vmatrix}$, then	
	a)	f(θ) = k must have solution if k∈[–6,6]
	b)	$\lim_{\theta\to\infty}\frac{f(\theta)}{\theta}$ is equal to 1
	c)	$\lim_{\theta\to 0}\frac{8-f'(\theta)}{\theta^2}$ is equal to 16
	d)	$\lim_{\theta\to\infty}\frac{f'(\theta)}{\theta}$ is equal to 1
Ans.	c	
Sol.:		
65.	The number of values of k, for which the system equations (k +1) x +8y = 4k,kx +(k +3) y = 3k –1 has no solution, is	
	a)	1
	b)	2
	c)	3
	d)	Infinite
Ans.	c	
Sol.:		
66.	The number of ways of forming an arrangement of 5 letters from the letters of the word“IITJEE” is	
	a)	60
	b)	96
	c)	120
	d)	180
Ans.	d	
Sol.:		
67.	The coefficient of x^5 in the expansion of $(x^2– x –2)^5$ is	
	a)	– 83
	b)	– 82
	c)	– 86
	d)	– 81
Ans.	d	
Sol.:		
68.	If $a_1, a_2, a_3, \ldots a_{4001}$ are terms of an AP such that $\frac{1}{a_1a_2}+\frac{1}{a_2a_3}+\ldots+\frac{1}{a_{4000}a_{4001}}=10$ and $a_2 + a_{4000} = 50$ then $\lvert a_1 – a_{4001}\rvert$ is equal to	
	a)	20
	b)	30
	c)	40
	d)	10

Ans.	b	
Sol.:		
69.	The value of $\binom{100}{0}\binom{200}{150}+\binom{100}{1}\binom{200}{151}+\binom{100}{2}\binom{200}{152}+....+\binom{100}{50}\binom{200}{200}$ is $\left(\binom{n}{r}={}^{n}C_{r}\right)$	
	a)	$\binom{300}{50}$
	b)	$\binom{100}{50}\times\binom{200}{150}$
	c)	$\binom{100}{50}^{2}$
	d)	$\binom{200}{100}^{2}$
Ans.	a	
Sol.:		
70.	ABC is an isocless triangle inscribed in a circle of radius of r, If AB = AC and h is theattitude from A to BC and if 'P' is the perimeter of triangle ABC whose area is Δ , then, $\underset{h\to 0}{Lt}\frac{\Delta}{P^3}=$	
	a)	$\frac{1}{16r}$
	b)	$\frac{1}{32r}$
	c)	$\frac{1}{64r}$
	d)	$\frac{1}{128r}$
Ans.	d	
Sol.:		
71.	If $y=\tan^{-1}\left[\frac{3+2\log x}{1-6\log x}\right]+\tan^{-1}\left[\frac{\log\left(\frac{e}{x^2}\right)}{\log(ex^2)}\right]$, then the value of $\frac{d^2y}{dx^2}$ is	
	a)	-1
	b)	1
	c)	0
	d)	$\text{Tan}^{-1}\{(\log x)^n\}$
Ans.	c	
Sol.:		
72.	The tangent and normal at the point P(4, 4) to the parabola, $y^2 = 4x$ intersect the x–axisat the points Q and R respectively. Then the cirucmcentre of the ΔPQR is	
	a)	(2, 0)
	b)	(2, 1)
	c)	(1, 0)
	d)	(1, 2)

Ans.	c	
Sol.:		
73.	Let f be a function defined by $f(x)=\begin{cases}\frac{\tan x}{x}, x\neq 0\\ 1, \quad x=0\end{cases}$ then f has	
	a)	minimum at x = 0
	b)	maximum at x = 0
	c)	minimum at $x=\frac{\pi}{4}$
	d)	maximum at $x=\frac{\pi}{4}$
Ans.	a	
Sol.:		
74.	The integral $\int\frac{3x^{13}+2x^{11}}{(2x^4+3x^2+1)^4}dx$ is equal to : (where C is a constant of integration):	
	a)	$\frac{x^4}{(2x^4+3x^2+1)^3}+C$
	b)	$\frac{x^{12}}{6(2x^4+3x^2+1)^3}+C$
	c)	$\frac{x^4}{6(2x^4+3x^2+1)^3}+C$
	d)	$\frac{x^{12}}{(2x^4+3x^2+1)^3}+C$
Ans.	b	
Sol.:		
75.	$\int_0^a \ln(\cot a+\tan x)dx$, where $a\in\left(0,\frac{\pi}{2}\right)$ is	
	a)	aln (sin a)
	b)	– a ln (sin a)
	c)	– a ln (cos a)
	d)	none of these
Ans.	b	
Sol.:		
76.	The area of the region in the xy-plane defined by the inequalities $x-2y^2\geq 0$, $1-x-\lvert y\rvert\geq 0$ is	
	a)	$\frac{1}{2}$
	b)	$\frac{1}{3}$
	c)	$\frac{1}{4}$
	d)	$\frac{7}{12}$
Ans.	d	

Sol.:		
77.	The solution of the differential equation $2x^3ydy + (1- y^2)(x^2y^2+ y^2-1)dx = 0$[Where c is a constant]	
	a)	$x^2y^2= (cx +1)(1- y^2)$
	b)	$x^2y^2= (cx +1)(1+ y^2)$
	c)	$x^2y^2= (cx -1)(1- y^2)$
	d)	none of these
Ans.	c	
Sol.:		
78.	A straight line L through the origin meets the lines x + y = 1 and x + y = 3 at P and Qrespectively. Through P and Q two straight lines L_1 and $L_2$are drawn, parallel to 2x – y= 5and 3x + y = 5 respectively. Lines L_1 and L_2 intersected at R. Then the locus of R isthe line	
	a)	x + 3y + 5 = 0
	b)	x - 3y - 5 = 0
	c)	x - 3y + 5 = 0
	d)	x + 3y - 5 = 0
Ans.	c	
Sol.:		
79.	Vertices of a variable triangle are (3,4);(5cosθ,5sinθ) and (5sinθ ,–5cosθ)where θ is aparameter then the locus of its orthocentre is	
	a)	$\left(\frac{x-3}{5}\right)^2+\left(\frac{y-4}{5}\right)^2=1$
	b)	$(x + y – 7)^2+ (x – y +1)^2= 100$
	c)	$(x – 3)^2+ (y – 4)^2= 200$
	d)	$(x – y – 7)^2+ (x + y +1)^2= 10$
Ans.	b	
Sol.:		
80.	From a point R(5,8)two tangents RPand RQare drawn to a given circle S = 0whoseradius is 5. If circumcentre of the triangle PQR is (2,3), then the equation of circle S = 0is	
	a)	$x^2+ y^2+ 2x + 4y – 20 = 0$
	b)	$x^2+ y^2+ x + 2 y –10 = 0$
	c)	$x^2+ y^2– x – 2y – 20 = 0$
	d)	$x^2+ y^2– 4x – 6y – 21 = 0$
Ans.	a	
Sol.:		

Integer Answer Type

81.	Locus of the mid points of the chords of the hyperbola $x^2 – y^2 =a^2$ that touch theparabola$y^2 = 4ax$ is$\lambda y^2 (x - a) = x^3\mu$, $\lambda,\mu \in R^+$ then $\frac{\lambda}{\mu}$ is _____.
Ans.	1
Sol.:	

82.	If the curves $\frac{x^2}{4}+y^2=1$ and $\frac{x^2}{a^2}+y^2=1$ for suitable value of a cut on four concyclicpoints, then find the radius of the smallest circle passing through these 4 points
Ans.	1
Sol.:	
83.	Consider the planes S_1 : 2x – y + z = 5, S_2 : x + 2y – z = 4 having normals N_1 and N_2 respectively. P(2,–1,0) and Q(1,1,–1)are points on S_1 and S_2 respectively.Let L_1be the line passing through P and parallel to N_1, L_2 be the line passing throughQ and parallel to N_2. The shortest distance between L_1 and L_2 isλ then $\sqrt{35}\lambda$ is_____
Ans.	2
Sol.:	
84.	$\vec{a}$ *and* $\vec{b}$ are non zero non-collinear vectors such that $\|\vec{a}\|=2, \vec{a}\cdot\vec{b}=1$ and angle between $\vec{a}$ *and* $\vec{b}$ is $\frac{\pi}{3}$. If $\vec{r}$ is any vector satisfying $\vec{r}\cdot\vec{a}=2, \vec{r}\cdot\vec{b}=8, (\vec{r}+2\vec{a}-10\vec{b})\cdot(\vec{a}\times\vec{b})=6$ and is equal $\vec{r}+2\vec{a}-10\vec{b}=\lambda(\vec{a}\times\vec{b})$ then λ =
Ans.	2
Sol.:	
85.	The position vectors of the vertices A,B,C of a tetrahedron ABCD are $\hat{i}+\hat{j}+\hat{k}, \hat{i}$ and $3\hat{i}$ respectively and the altitude from the vertex D to the opposite face ABC meets theface at E. If the length of the edge AD is 4 and the volume of the tetrahedron is $\frac{2\sqrt{2}}{3}$,then the length of DE is
Ans.	2
Sol.:	
86.	The probability of a bomb hitting a bridge is ½ and two direct hits areneeded to destroy it. The leastnumber of bombs required so that theprobability of the bridge being destroyed is greater than 0.9 is
Ans.	7
Sol.:	
87.	In a knockout tournament 16 equally skilled players namely P_1, P_2, -------- P_{16} areparticipating. In each round players are divided in pairs at random and winner fromeach pair moves in the next round. If P_2 reaches the semifinal, then the probability thatP_1 will win the tournament is $\frac{\lambda}{\mu}$ (where λ,μ are co prime numbers), find $\lambda+\mu$.
Ans.	21
Sol.:	
88.	The number of solutions of the equation $4^{\sin 2x+2\cos^2 x}+4^{1+2\sin^2 x-\sin 2x}=65$ in $\left[0,\frac{\pi}{2}\right]$ is
Ans.	1
Sol.:	
89.	ABC is a triangular park with AB = AC = 100cmA clock tower is situated at

	themidpoint of BC. The angles of elevation of the top of the tower at A and B areCot^{-1}3.2 and Cosec^{-1}2.6 The height of the tower is_____mt.
Ans.	25
Sol.:	
90.	90students take mathematics, 72 take science in class of 120 students. If 10 take neitherMathematics nor science then number of students who take both the subjects is
Ans.	52
Sol.:	