AIEEE PAPER -2005

PHYSICS

Q.1 A projectile can have the same range 'R' for two angles of projection. If 't_1' and 't_2' be the times of flights in the two cases, then the product of the two time of flights is proportional to

(1) R^2 (2) $1/R^2$ (3) $1/R$ (4) R

Q.2 An annular ring with inner and outer radii R_1 and R_2 is rolling without slipping with a uniform angular speed. The ratio of the forces experienced by the two particles situated on the inner and outer parts of the ring, $\frac{F_1}{F_2}$ is

(1) $\frac{R_2}{R_1}$ (2) $\left(\frac{R_1}{R_2}\right)^2$ (3) 1 (4) $\frac{R_1}{R_2}$

Q.3 A smooth block is released at rest on a 45º incline and then slides a distance 'd'. The time taken to slide is 'n' times as much to slide on rough incline than on a smooth incline. The coefficient of friction is

(1) $\mu_K = 1 - \frac{1}{n^2}$ (2) $\mu_k = \sqrt{1-\frac{1}{n^2}}$

(3) $\mu_S = 1-\frac{1}{n^2}$ (4) $\mu_S = \sqrt{1-\frac{1}{n^2}}$

Q.4 The upper half of an inclined plane with inclination ϕ is perfectly smooth while the lower half is rough. A body starting from rest at the top will again come to rest at the bottom if the coefficient of friction for the lower half is given by

(1) 2 sin ϕ (2) 2 cos ϕ

(3) 2 tan ϕ (4) tan ϕ

Q.5 A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm. How much further it will penetrate before coming to rest assuming that it faces constant resistance to motion ?

(1) 3.0 cm (2) 2.0 cm (3) 1.5 cm (4) 1.0 cm

Q.1 fdlh i{kih dk nk i{ki&dk.kk d fy, leku ijkl 'R' gk ldrk gA ;fn nkuk idj.kk d fy, mMM;u dkyk d eku 't_1' rFkk 't_2' g] rk bu nkuk mM;u dkyk dk x.kuQy fuEufyf[kr e l fdld vuØekuikrh g \

(1) R^2 (2) $1/R^2$ (3) $1/R$ (4) R

Q.2 dkb oy;kdkj NYyk] ftl dh vkrj rFkk cká f=kT;k, R_1 rFkk R_2 g] fcuk fQly ,d leku dk.kh; pky l ykVfud xfr dj jgk gA NYy d vkrj rFkk cká Hkkxk ij fLFkr nk d.kk ij vkjkfir cyk $\frac{F_1}{F_2}$ dk vuikr g

(1) $\frac{R_2}{R_1}$ (2) $\left(\frac{R_1}{R_2}\right)^2$ (3) 1 (4) $\frac{R_1}{R_2}$

Q.3 ,d fpduk xVdk 45º vkur ry ij fLFkj voLFkk e NkM tku ij 'd' njh rd fQlyrk gA [kjnj vkur ry ij fQlyu e yxk le; fpdu vkur ry ij yx le; dk 'n' xuk gA rc ?k"k.k x.kkd g

(1) $\mu_K = 1 - \frac{1}{n^2}$ (2) $\mu_k = \sqrt{1-\frac{1}{n^2}}$

(3) $\mu_S = 1-\frac{1}{n^2}$ (4) $\mu_S = \sqrt{1-\frac{1}{n^2}}$

Q.4 vkufr ϕ d fdlh vkur ry dk Åijh vk/kk Hkkx i.kr% fpduk g] tcfd uhpyk vk/kk Hkkx [kjnjk gA dkb oLrq bl ry d 'kh"k l fojke voLFkk l pydj bl ry dh ryh ij iu% fojke voLFkk e vk tk,xh] ;fn uhpy vk/k Hkkx d fy, ?k"k.k x.kkd dk eku g

(1) 2 sin ϕ (2) 2 cos ϕ

(3) 2 tan ϕ (4) tan ϕ

Q.5 fdlh fLFkj y{; ij nkxh x;h xkyh] ml y{; dk 3 cm c/ku d i'pkr] viuk vk/kk ox [kk nrh gA ;g eku r g, fd xkyh viuh xfr d le; fu;r vojk/k dk lkeuk djrh g] fojke e vku l iо y{; dk vkj fdruk c/ku djxh \

(1) 3.0 cm (2) 2.0 cm (3) 1.5 cm (4) 1.0 cm

Space for Rough Work

Q.6 Out of the following pair, which one does NOT have identical dimensions is
(1) angular momentum and Planck's constant
(2) impulse and momentum
(3) moment of inertia and moment of a force
(4) work and torque

Q.7 The relation between time t and distance x is $t = ax^2 + bx$ where a and b are constants. The acceleration is
(1) $-2abv^2$ (2) $2bv^3$ (3) $-2av^3$ (4) $2av^2$

Q.8 A car, starting from rest, accelerates at the rate f through a distance S, then continues at constant speed for time t and then decelerates at the rate f/2 to come to rest. If the total distance traversed is 15 S, then

(1) S = ft (2) $S = \frac{1}{6}ft^2$

(3) $S = \frac{1}{2}ft^2$ (4) $S = \frac{1}{4}ft^2$

Q.9 A particle is moving eastwards with a velocity of 5m/s. In 10 seconds the velocity changes to 5 ms^{-1} northwards. The average acceleration in this time is

(1) $\frac{1}{\sqrt{2}}$ ms^{-2} towards north-east

(2) $\frac{1}{\sqrt{2}}$ ms^{-2} towards north

(3) zero

(4) $\frac{1}{\sqrt{2}}$ ms^{-2} towards north-west

Q.10 A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at 2 m/s^2. He reaches the ground with a speed of 3 m/s. At what height, did he bail out ?
(1) 91 m (2) 182 m (3) 293 m (4) 111 m

Q.6 uhps fn;s x, ;qXeksa esa ls fdl ;qXe dh foek,¡ leku ugha gS \
(1) dks.kh; laosx rFkk IySad&fu;rkad
(2) vkosx rFkk laosx
(3) tM+Ro&vk?kw.kZ rFkk cy&vk?kw.kZ
(4) dk;Z rFkk cy&vk?kw.kZ

Q.7 le; t rFkk nwjh x ds chp lEcU/k dk $t = ax^2 + bx$ }kjk O;Dr fd;k x;k gS] ;gk¡ a rFkk b fLFkjkad gSaA ;gk¡ Roj.k gS
(1) $-2abv^2$ (2) $2bv^3$ (3) $-2av^3$ (4) $2av^2$

Q.8 dksbZ dkj fojkekoLFkk ls xfr vkjEHk djds S nwjh rd f dh nj ls Rofjr gksrh gS] rRi'pkr t le; rd fu;r pky ls pyrh gS vkSj fQj f/2 dh nj ls efnr gksdj fojke esa vk tkrh gSA ;fn dkj }kjk pyh x;h dqy nwjh 15 S gS] rks

(1) S = ft (2) $S = \frac{1}{6}ft^2$

(3) $S = \frac{1}{2}ft^2$ (4) $S = \frac{1}{4}ft^2$

Q.9 dksbZ d.k 5m/s ds osx ls iwokZfHkeq[k xfr dj jgk gSA 10 lsd.M esa bl d.k dk osx ifjofrZr gksdj 5 ms^{-1} mÙkjkfHkeq[k gks tkrk gSA bl le; vUrjky esa d.k dk vkSlr Roj.k gS

(1) $\frac{1}{\sqrt{2}}$ ms^{-2} mÙkj&iwoZ fn'kk esa

(2) $\frac{1}{\sqrt{2}}$ ms^{-2} mÙkj fn'kk esa

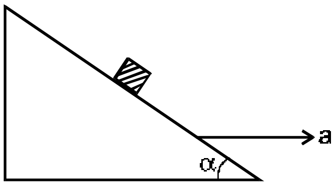
(3) 'kwU;

(4) $\frac{1}{\sqrt{2}}$ ms^{-2} mÙkj&if'pe fn'kk esa

Q.10 dksbZ iSjk'kwfVLV iSjk'kwV lfgr dwnus ij 50 m fcuk fdlh ?k"kZ.k ds fxjrk gSA iSjk'kwV ds [kqyus ij mlesa 2 m/s^2 dk eanu gksrk gS rFkk og 3 m/s dh pky ls i`Foh ij igq¡prk gSA fdl Å¡pkbZ ij og iSjk'kwV lfgr dwnk Fkk \
(1) 91 m (2) 182 m (3) 293 m (4) 111 m

Space for Rough Work

Q.11 A block is kept on a frictionless inclined surface with angle of inclination 'α'. The incline is given an acceleration 'a' to keep the block stationary. Then 'a' is equal to



(1) $g / \tan\alpha$ (2) $g \operatorname{cosec}\alpha$
(3) g (4) $g\tan\alpha$

Q.12 A spherical ball of mass 20 kg is stationary at the top of a hill of height 100 m. It rolls down a smooth surface to the ground, then climbs up another hill of height 30 m and finally rolls down to a horizontal base at a height of 20 m above the ground. The velocity attained by the ball is

(1) 40 m/s (2) 20 m/s
(3) 10 m/s (4) $10\sqrt{30}$ m/s

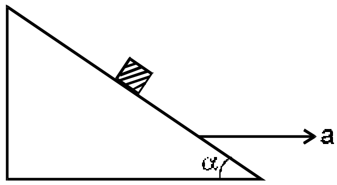
Q.13 A body A of mass M while falling vertically downwards under gravity breaks into two parts, a body B of mass $\frac{1}{3}$M and a body C of mass $\frac{2}{3}$ M. The centre of mass of bodies B and C taken together shifts compared to that of body A towards

(1) depends on height of breaking
(2) does not shift
(3) body C
(4) body B

Q.14 The moment of inertia of uniform semicircular disc of mass M and radius r about a line perpendicular to the plane of the disc through the centre is

(1) $\frac{1}{4}Mr^2$ (2) $\frac{2}{5}Mr^2$ (3) Mr^2 (4) $\frac{1}{2}Mr^2$

Q.11 dkb xVdk 'α' vkufr d fdlh ?k"k.kjfgr vkur i"B ij j[kk gA bl vkur i"B dks dkb Roj.k 'a' inku fd;k tkrk g] rkfd xVdk fLFkj jgA rc 'a' cjkcj g



(1) $g / \tan\alpha$ (2) $g \operatorname{cosec}\alpha$
(3) g (4) $g\tan\alpha$

Q.12 20 kg n0;eku dh dkb xky xn 100 m Åpkb d fdlh ior d 'kh"k ij fLFkj gA ;g fdlh fpdu i"B ij vk/kkj rd ykVfud xfr djrh g vkj fQj 30 m Åpkb d ,d vU; ior ij p< tkrh g vkj vUr e i Foh l 20 m Åpkb d fdlh {kfrt vk/kkj ij y<drh gA xn }kjk ikIr ox g

(1) 40 m/s (2) 20 m/s
(3) 10 m/s (4) $10\sqrt{30}$ m/s

Q.13 M n0;eku dk dkb fi.M A x:Ro d v/khu Å/okk/kj uhp fxjr le; nk Hkkxk e VV tkrk g] tk bl idkj g ($\frac{1}{3}$M n0;eku dk fi.M B rFkk $\frac{2}{3}$ M n0;eku dk fi.M C A nkuk fi.Mk B rFkk C dk ,d lkFk feykdj fy;k x;k n0;eku dUn fi.M A d n0;eku dUn dh rqyuk e

(1) LFkkukUrfjr gkxk] rFkk ;g LFkkukUrj.k VVu dh Åpkb ij fuHkj djxk
(2) LFkkukUrfjr ugh gkxk
(3) fi.M C dh vkj LFkkukUrfjr gkxk
(4) fi.M B dh vkj LFkkukUrfjr gkxk

Q.14 M n0;eku rFkk r f=kT;k dh fdlh ,dleku v/ko Ùkkdkj fMLd dk fMLd d ry d yEcor rFkk fMLd d dUn l xtju okyh j[kk d ifjr% tMRo vk?k.k g

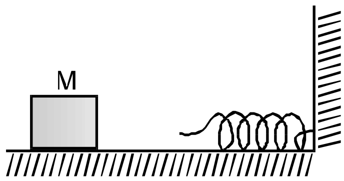
(1) $\frac{1}{4}Mr^2$ (2) $\frac{2}{5}Mr^2$ (3) Mr^2 (4) $\frac{1}{2}Mr^2$

Space for Rough Work

Q.15 A particle of mass 0.3 kg is subjected to a force $F = -kx$ with $k = 15$ N/m. What will be its initial acceleration if it is released from a point 20 cm away from the origin ?

(1) 3 m/s^2 (2) 15 m/s^2 (3) 5 m/s^2 (4) 10 m/s^2

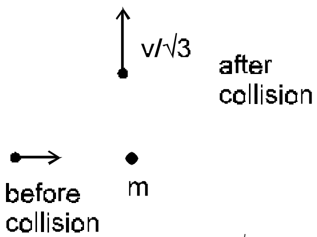
Q.16 The block of mass M moving on the frictionless horizontal surface collides with the spring of spring constant K and compresses it by length L. The maximum momentum of the block after collision is



(1) $\sqrt{MK}\,L$ (2) $\frac{KL^2}{2M}$

(3) zero (4) $\frac{ML^2}{K}$

Q.17 A mass 'm' moves with a velocity 'v' and collides inelastically with another identical mass. After collision the I[st] mass moves with velocity $\frac{v}{\sqrt{3}}$ in a direction perpendicular to the initial direction of motion. Find the speed of the 2[nd] mass after collision.



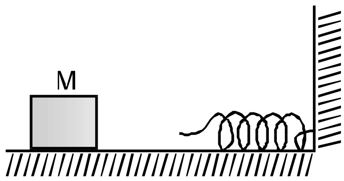
(1) v (2) $\sqrt{3}$ v

(3) $\frac{2}{\sqrt{3}}$ v (4) $\frac{v}{\sqrt{3}}$

Q.15 0.3 kg n0;eku d fdlh d.k ij dkb cy $F = -kx$ vkjksfir g] tcfd $k = 15$ N/m A ;fn bl d.k dk ey fcUn l 20 cm njh d fdlh fcUn l eDr fd;k tkrk g] rk bl d.k dk vkjfEHkd Roj.k D;k gkxk \

(1) 3 m/s^2 (2) 15 m/s^2 (3) 5 m/s^2 (4) 10 m/s^2

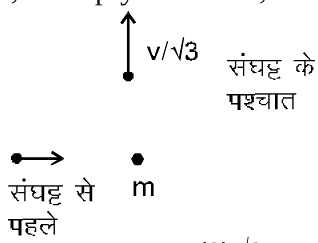
Q.16 M n0e;ku dk dkb xVdk fdlh ?k"k.kjfgr {kfrt i"B ij pydj K deku fLFkjkd dh deku l Vdjkrk g vkj ml L yEckb l lihfMr djrk gA VDdj d ckn xVd dk vf/kdre lox gkxk



(1) $\sqrt{MK}\,L$ (2) $\frac{KL^2}{2M}$

(3) zero (4) $\frac{ML^2}{K}$

Q.17 'v' ox l xfreku dkb n0;eku 'm' fdlh vU; lole n0;eku l viR;kLFk l?kê djrk gA l?kê d i'pkr igyk n0;eku viuh vkjfEHkd xfr dh fn'kk d yEcor fn'kk e $\frac{v}{\sqrt{3}}$ ox l xfr dju yxrk gA l?kê d i'pkr nlj n0e;ku dh pky Kkr dhft;A



(1) v (2) $\sqrt{3}$ v

(3) $\frac{2}{\sqrt{3}}$ v (4) $\frac{v}{\sqrt{3}}$

Space for Rough Work

Q.18 A 20 cm long capillary tube is dipped in water. The water rises upto 8 cm. If the entire arrangement is put in a freely falling elevator the length of water column in the capillary tube will be

(1) 8 cm (2) 10 cm (3) 4 cm (4) 20 cm

Q.19 If 'S' is stress and 'Y' is Young's modulus of material of a wire, the energy stored in the wire per unit volume is

(1) $2S^2Y$ (2) $\frac{S^2}{2Y}$ (3) $\frac{2Y}{S^2}$ (4) $\frac{S}{2Y}$

Q.20 Average density of the earth

(1) does not depend on g

(2) is a complex function of g

(3) is directly proportional to g

(4) is inversely proportional to g

Q.21 A body of mass m is accelerated uniformly from rest to a speed v in a time T. The instantaneous power delivered to the body as a function of time is given by

(1) $\frac{mv^2}{T^2}.t$ (2) $\frac{mv^2}{T^2}.t^2$

(3) $\frac{1}{2}\frac{mv^2}{T^2}.t$ (4) $\frac{1}{2}\frac{mv^2}{T^2}.t^2$

Q.22 Consider a car moving on a straight road with a speed of 100 m/s. The distance at which car can be stopped is [$\mu_k = 0.5$]

(1) 800 m (2) 1000 m (3) 100 m (4) 400 m

Q.23 Which of the following is incorrect regarding the first law of thermodynamics ?

(1) It is not applicable to any cyclic process

(2) It is a restatement of the principle of conservation of energy

(3) It introduces the concept of the internal energy

(4) It introduces the concept of the entropy

Q.18 20 cm yEch dkb df'kdk uyh ikuh e MckbZ tkrh g f t lu m l e 8 cm Åpkb rd ikuh mBrk gA ;fn bl lEi.k 0;oLFkk dk fdlh eDr :i l fxjrh fy¶V e j[k fn;k tk,] rk df'kdk uyh e ikuh d LrEHk dh yEckbZ D;k gksxh \

(1) 8 cm (2) 10 cm (3) 4 cm (4) 20 cm

Q.19 ;fn fdlh rkj d inkFk dk ifrcy 'S' rFkk ;x iR;kLFkrk x.kkd 'Y' g] rk rkj d ifr ,dkd vk;ru e lfpr Åtk g

(1) $2S^2Y$ (2) $\frac{S^2}{2Y}$ (3) $\frac{2Y}{S^2}$ (4) $\frac{S}{2Y}$

Q.20 i Foh dk vkl r ?kuRo

(1) g ij fuHkj ugh djrk

(2) g dk lfEeJ Qyu gkrk g

(3) g d vuØekuikrh gkrk g

(4) g d 0;RØekuikrh gkrk g

Q.21 m nO;eku dh dkb oLr fojkekoLFkk l ,d leku Rofjr gkdj T le; e pky v ikIr djrh gA le; d Qyu d :i e bl oLr dk inku dh x;h rkRdkfyd 'kfDr g

(1) $\frac{mv^2}{T^2}.t$ (2) $\frac{mv^2}{T^2}.t^2$

(3) $\frac{1}{2}\frac{mv^2}{T^2}.t$ (4) $\frac{1}{2}\frac{mv^2}{T^2}.t^2$

Q.22 lh/kh lMd ij 100 m/s dh pky l xfreku fdlh dkj ij fopkj dhft,A og njh Kkr dhft, ftl e bl dkj dk jkdk tk ldrk g [$\mu_k = 0.5$]

(1) 800 m (2) 1000 m (3) 100 m (4) 400 m

Q.23 Å"ekxfrdh d igy fu;e d ckj e fuEufyf[kr e l dku lk idFku lR; ugh g \

(1) ;g fdlh pØh; iØe ij ykx gkuk ;kX; ugh g

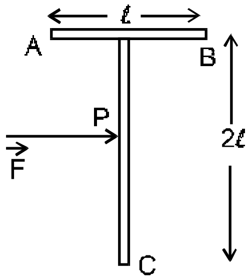
(2) ;g Åtk d lj{k.k fu;e dk iudFku g

(3) ;g vkrfjd Åtk dh ldYiuk dk iLrkfor djrk g

(4) ;g ,UVkih dh ldYiuk dk iLrkfor djrk g

Space for Rough Work

Q.24 A 'T' shaped object with dimensions shown in the figure, is lying on a smooth floor. A force '$\vec{F}$' is applied at the point P parallel to AB, such that the object has only the translational motion without rotation. Find the location of P with respect to C.



(1) $\frac{2}{3}\ell$ (2) $\frac{3}{2}\ell$ (3) $\frac{4}{3}\ell$ (4) ℓ

Q.25 The change in the value of 'g' at a height 'h' above the surface of the earth is the same as at a depth 'd' below the surface of earth. When both 'd' and 'h' are much smaller than the radius of earth, then which one of the following is correct ?

(1) $d = \frac{h}{2}$ (2) $d = \frac{3h}{2}$ (3) d = 2h (4) d = h

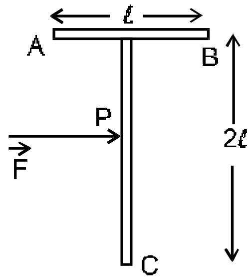
Q.26 A particle of mass 10 g is kept on the surface of a uniform sphere of mass 100 kg and radius 10 cm. Find the work to be done against the gravitational force between them to take the particle far away from the sphere (you may take $G = 6.67 \times 10^{-11}$ Nm^2 / kg^2)

(1) 13.34×10^{-10} J (2) 3.33×10^{-10} J
(3) 6.67×10^{-9} J (4) 6.67×10^{-10} J

Q.27 A gaseous mixture consists of 16 g of helium and 16 g of oxygen. The ratio $\frac{C_p}{C_v}$ of the mixture is

(1) 1.59 (2) 1.62 (3) 1.4 (4) 1.54

Q.24 'T' vkd`fr dh dkbZ oLrq ftldh foek,¡ vkjs[k esa n'kkZ, vuqlkj g]S fdlh fpduh Q'kZ ij iMh gS A AB ds lekUrj fcUnq P ij dkbZ cy '$\vec{F}$' bl izdkj vkjksfir fd;k tkrk g]S fd bl oLrq esa fcuk ?kw.kZu gq, dsoy LFkkukUrj.kh; xfr gksrh gS A C ds lkis{k P dh fLFkfr Kkr dhft;s A



(1) $\frac{2}{3}\ell$ (2) $\frac{3}{2}\ell$ (3) $\frac{4}{3}\ell$ (4) ℓ

Q.25 i`Foh ds i`"B ls 'h' Åpkbz ij 'g' ds eku esa vUrj i`Foh ds i`"B ls 'd' xgjkbZ ij 'g' ds eku esa vUrj ds cjkcj gS A tc 'd' rFkk 'h' nksuksa ds eku i`Foh dh f=kT;k ls cgqr de gksrs g]S rc fuEufyf[kr esa ls dkSu lR; g\

(1) $d = \frac{h}{2}$ (2) $d = \frac{3h}{2}$ (3) d = 2h (4) d = h

Q.26 10 g nzO;eku dk dkbZ d.k 100 kg nzO;eku rFkk 10 cm f=kT;k ds fdlh ,d leku xksys ds i`"B ij j[kk gS A bu nksuksa ds chp xq:Rokd"kZ.k cy ds fo:) d.k dks xksys ls vR;f/kd nwj ys tkus esa fd;k tkus okyk dk;Z Kkr dhft;s (vki G dk eku 6.67×10^{-11} Nm^2 / kg^2 ys ldrs g)

(1) 13.34×10^{-10} J (2) 3.33×10^{-10} J
(3) 6.67×10^{-9} J (4) 6.67×10^{-10} J

Q.27 fdlh xSlh; feJ.k esa 16 g ghfy;e rFkk 16 g vkWDlhtu gS A bl feJ.k dk $\frac{C_p}{C_v}$ vuqikr g

(1) 1.59 (2) 1.62 (3) 1.4 (4) 1.54

Space for Rough Work

Q.28 The intensity of gamma radiation from a given source is I. On passing through 36 mm of lead, it is reduced to I/8. The thickness of lead which will reduce the intensity to I/2 will be
(1) 6 mm (2) 9 mm (3) 18 mm (4) 12 mm

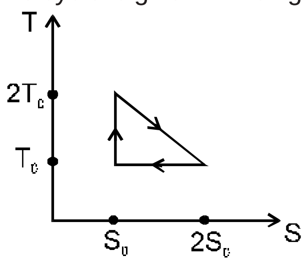
Q.29 The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 2480 nm is incident on it. The band gap in (eV) for the semiconductor is
(1) 1.1 eV (2) 2.5 eV (3) 0.5 eV (4) 0.7 eV

Q.30 A photocell is illuminated by a small bright source placed 1 m away. When the same source of light is placed 1/2 m away, the number of electrons emitted by photocathode would
(1) decrease by a factor of 4
(2) increase by a factor of 4
(3) decrease by a factor of 2
(4) increase by a factor of 2

Q.31 Starting with a sample of pure ^{66}Cu, 7/8 of it decays into Zn in 15 minutes. The corresponding half-life is
(1) 10 min (2) 15 min (3) 5 min (4) 7½ min

Q.32 If radius of the $^{27}_{13}Al$ nucleus is estimated to be 3.6 Fermi then the radius of $^{125}_{52}Te$ nucleus be nearly
(1) 6 fermi (2) 8 fermi (3) 4 fermi (4) 5 fermi

Q.33 The temperature-entropy diagram of a reversible engine cycle is given in the figure. Its efficiency is



(1) 1/2 (2) 1/4 (3) 1/3 (4) 2/3

Q.28 fdlh fn, x, òksr ls mRlftZr xkek fofdj.kksa dh rhozrk I gSA 36 mm eksVh ySM dh 'khV ls xqtjus ij ;g rhozrk ?kVdj I/8 jg tkrh gSA yM 'khV dh og eksVkbZ tks rhozrk dks ?kVkdj I/2 dj nsxh og gS
(1) 6 mm (2) 9 mm (3) 18 mm (4) 12 mm

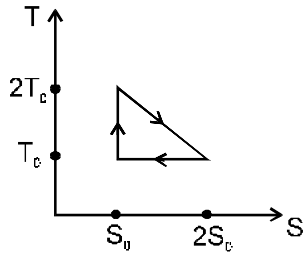
Q.29 tc fdlh v/kZpkyd ij 2480 nm ls de rjaxn/;Z dk fo|qrpqEcdh; fofdj.k vkifrr gksrk gS] rks bldh fo|qr pkydrk c<+ tkrh gSA bl v/kZpkyd dk fyq, cSUM vUrjky (eV esa) gS
(1) 1.1 eV (2) 2.5 eV (3) 0.5 eV (4) 0.7 eV

Q.30 fdlh QksVksly dks 1 mnjh j[kh fdlh NksVs pedhys òksr }kjk inhIr fd;k tkrk gSA tc blh idk'k òksr dks 1/2 mnjh ij j[krs gSa] rks QksVksdSFkksM }kjk mRlftZr byDVªkuksa dh la[;k
(1) 4 dsa x.kd }kjk ?kVs tk,xh
(2) 4 ds x.kd }kjk c<+ tk,xh
(3) 2 ds x.kd }kjk ?kVs tk,xh
(4) 2 ds x.kd }kjk c<+ tk,xh

Q.31 ^{66}Cu ds 'kq) infrn'kZ ls ikjEHk djus ij 15 feuV esa blds viusey dk 7/8 Hkkx Zn esa {kf;r gks tkrk gSA rnuq:ih v/kZ;q gS
(1) 10 feuV (2) 15 feuV (3) 5 feuV (4) 7½ feuV

Q.32 ;fn $^{27}_{13}Al$ ukfHkd dh f=kT;k dk vkdyu 3.6 Qjeh fd;k tkrk gS] rks $^{125}_{52}Te$ ukfHkd dh f=kT;k gksxh yxHkx
(1) 6 Qjeh (2) 8 Qjeh (3) 4 Qjeh (4) 5 Qjeh

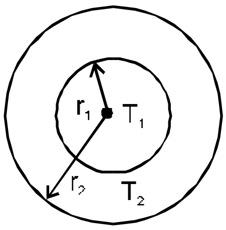
Q.33 vkj[k esa fdlh mRØe.kh; batu pØ dk rki&,UVªkih vkj[k n'kkZ;k x;k gSA bldh n{krk gS



(1) 1/2 (2) 1/4 (3) 1/3 (4) 2/3

Space for Rough Work

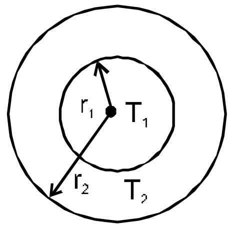
Q.34 The figure shows a system of two concentric spheres of radii r_1 and r_2 and kept at temperatures T_1 and T_2 respectively. The radial rate of flow of heat in a substance between the two concentric spheres is proportional to



(1) $(r_2 - r_1)/(r_1 r_2)$ (2) $\ln\left(\frac{r_2}{r_1}\right)$

(3) $\frac{r_1 r_2}{(r_2 - r_1)}$ (4) $(r_2 - r_1)$

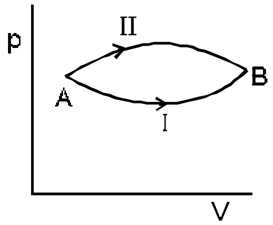
Q.34 vkj[k e r_1 rFkk r_2 f=kT;kvk d nk l dUnh xkyk dk ,d fudk; n'kk;k x;k g ftUg Øe'k% T_1 rFkk T_2 rkik ij j[kk x;k gA nkuk l dUnh xkyk d chp d inkFk e Å"ek d f=kT;h; iokg dh nj l ekuikrh g



(1) $(r_2 - r_1)/(r_1 r_2)$ (2) $\ln\left(\frac{r_2}{r_1}\right)$

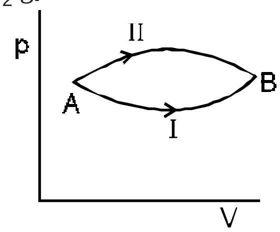
(3) $\frac{r_1 r_2}{(r_2 - r_1)}$ (4) $(r_2 - r_1)$

Q.35 A system goes from A to B via two processes I and II as shown in figure. If ΔU_1 and ΔU_2 are the changes in internal energies in the processes I and II respectively, then



(1) $\Delta U_1 = \Delta U_2$
(2) relation between ΔU_1 and ΔU_2 can not be determined
(3) $\Delta U_2 > \Delta U_1$
(4) $\Delta U_2 < \Delta U_1$

Q.35 dkb fudk; vkj[k e n'kk, vuqlkj nk ifØ;kvk I rFkk II l gkdj A l B dk xeu djrk gA ;fn ifØ;kvk I rFkk II e vkUrfjd Åtkvk e gkus oky ifjoru Øe'k% ΔU_1 rFkk ΔU_2 g] rk



(1) $\Delta U_1 = \Delta U_2$
(2) ΔU_1 rFkk ΔU_2 d chp d lEc/k dk fu/kkZfjr ugh fd;k tk ldrk
(3) $\Delta U_2 > \Delta U_1$
(4) $\Delta U_2 < \Delta U_1$

Q.36 The function $\sin^2(\omega t)$ represents
(1) a periodic, but not simple harmonic motion with a period $2\pi/\omega$
(2) a periodic, but not simple harmonic motion with a period π/ω
(3) a simple harmonic motion with a period $2\pi/\omega$
(4) a simple harmonic motion with a period π/ω

Q.36 Qyu $\sin^2(\omega t)$ fu:fir djrk g
(1) vkorZdky $2\pi/\omega$ dh vkorh xfr] ijUrq ljy vkorZ xfr ugh
(2) vkorZdky π/ω dh vkorh xfr] ijUrq ljy vkorZ xfr ugh
(3) vkorZdky $2\pi/\omega$ dh ljy vkorZ xfr
(4) vkorZdky π/ω dh ljy vkorZ xfr

Space for Rough Work

Q.37 A Young's double slit experiment uses a monochromatic source. The shape of the interference fringes formed on a screen is

(1) hyperbola (2) circle
(3) straight line (4) parabola

Q.38 Two simple harmonic motions are represented by the equations $y_1 = 0.1 \sin\left(100\pi t + \frac{\pi}{3}\right)$ and $y_2 = 0.1 \cos \pi t$. The phase difference of the velocity of particle 1 with respect to the velocity of particle 2 is

(1) $\frac{-\pi}{6}$ (2) $\frac{\pi}{3}$ (3) $\frac{-\pi}{3}$ (4) $\frac{\pi}{6}$

Q.39 A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is 4/3 and the fish is 12 cm below the surface, the radius of this circle in cm is

(1) 36√7 (2) 36/√7 (3) 36√5 (4) 4√5

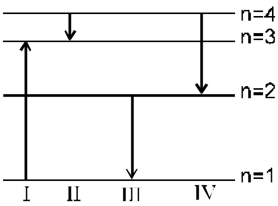
Q.40 Two point white dots are 1 mm apart on a black paper. They are viewed by eye of pupil diameter 3 mm. Approximately, what is the maximum distance at which these dots can be resolved by the eye ? [Take wavelength of light = 500 nm]

(1) 5 m (2) 1 m (3) 6 m (4) 3 m

Q.41 A thin glass (refractive index 1.5) lens has optical power of –5D in air. Its optical power in a liquid medium with refractive index 1.6 will be

(1) 1 D (2) –1 D (3) 25 D (4) –25 D

Q.42 The diagram shows the energy levels for an electron in a certain atom. Which transition shown represents the emission of a photon with the most energy ?



(1) III (2) IV (3) I (4) II

Q.37 ;x d fdlh f} f>jh i;kx e ,do.kh idk'k òksr dk mi;kx fd;k tkrk gA inh ij cuh 0;frdj.k fÝUtk dh vkd fr g

(1) vfrijoy; (2) oÙk
(3) ljy j[kk (4) ijoy;

Q.38 nk ljy vkorh xfr;k dk lehdj.kk $y_1 = 0.1 \sin\left(100\pi t + \frac{\pi}{3}\right)$ rFkk $y_2 = 0.1 \cos \pi t$ }kjk fu:fir fd;k x;k gA d.k 2 d ox d lkis{k d.k 1 d ox e dykUrj g

(1) $\frac{-\pi}{6}$ (2) $\frac{\pi}{3}$ (3) $\frac{-\pi}{3}$ (4) $\frac{\pi}{6}$

Q.39 ikuh d Hkhrj dkbZ eNyh Åij dh vkj ckgjh nfu;k dk o Ùkh; f{kfr t e lek, n[krh gA ;fn ty dk viorukd 4/3 g] rFkk eNyh ty d i"B l 12 cm uhp g] rk o Ùk dh f=kT;k lUVhehVj e g

(1) 36√7 (2) 36/√7 (3) 36√5 (4) 4√5

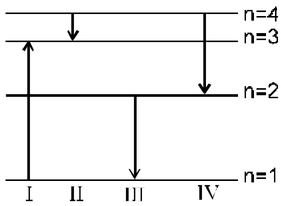
Q.40 fdlh dkyh dkxt ij nk 'or fcUn ,d nlj l 1 mm njh ij vfdr gA bu fcUnvk dk fdlh u=k ftl dh iryh dk 0;kl 3 mm }kjk n[kk tkrk gA og yxHkx vf/kdre njh D;k g ftl ij u=k }kjk bu fcUnvk dk foHknu fd;k tk ldrk g \ [idk'k dh rjxn/;Z = 500 nm]

(1) 5 m (2) 1 m (3) 6 m (4) 3 m

Q.41 fdlh dkp (viorukd 1.5) d iry yl dh ok;q e idkf'kd {kerk –5D gA viorukd 1.6 d no ek/;e e bl yl dh idkf'kd {kerk gksxh

(1) 1 D (2) –1 D (3) 25 D (4) –25 D

Q.42 vkj[k e fdlh fuf'pr ijek.k d fdlh byDVku d Åtk Lrj n'kk, x, gA bue l dku lk lØe.k vf/kdre Åtk l mRlftr QkVku dk fu:fir djrk g \



(1) III (2) IV (3) I (4) II

Space for Rough Work

Q.43 If the kinetic energy of a free election doubles, its deBroglie wavelength changes by the factor

(1) $\frac{1}{2}$ (2) 2 (3) $\frac{1}{\sqrt{2}}$ (4) $\sqrt{2}$

Q.44 In a common base amplifier the phase difference between the input signal voltage and output voltage is

(1) $\frac{\pi}{4}$ (2) π (3) 0 (4) $\frac{\pi}{2}$

Q.45 In a full wave rectifier circuit operating from 50 Hz mains frequency, the fundamental frequency in the ripple would be

(1) 50 Hz (2) 25 Hz (3) 100 Hz (4) 70.7 Hz

Q.46 A nuclear transformation is denoted by $X(n,\alpha)\ {}^{7}_{3}Li$. Which of the following is the nucleus of element of X ?

(1) ${}^{12}C_6$ (2) ${}^{10}_{5}B$ (3) ${}^{9}_{5}B$ (4) ${}^{11}_{4}Be$

Q.47 A moving coil galvanometer has 150 equal divisions. Its current sensitivity is 10 divisions per milliampere and voltage sensitivity is 2 divisions per millivolt. In order that each division reads 1 volt, the resistance in ohms needed to be connected in series with the coil will be

(1) 10^3 (2) 10^5 (3) 99995 (4) 9995

Q.48 Two voltameters, one of copper and another of silver are joined in parallel. When a total charge q flows through the voltameters, equal amount of metals are deposited. If the electrochemical equivalents of copper and silver are z_1 and z_2 respectively the charge which flows through the silver voltameter is

(1) $\frac{q}{1+\frac{z_1}{z_2}}$ (2) $\frac{q}{1+\frac{z_2}{z_1}}$ (3) $q\frac{z_1}{z_2}$ (4) $q\frac{z_2}{z_1}$

Q.43 ;fn fdlh eDr byDVªu dh xfrt Åtk nksxquh gks tk,] rks bldh n&czkXyh rjaxnS/;Z fdl x.kd }kjk ifjofrZr gks tk,xk \

(1) $\frac{1}{2}$ (2) 2 (3) $\frac{1}{\sqrt{2}}$ (4) $\sqrt{2}$

Q.44 fdlh mHk;fu"B vk/kkj izo/kZd esa fuos'kh flXuy oksYVrk rFkk fuxZr oksYVrk ds chp dykUrj gksrk gS

(1) $\frac{\pi}{4}$ (2) π (3) 0 (4) $\frac{\pi}{2}$

Q.45 fdlh i.kZ rjax fn"Vdkjh ifjiFk esa] tks fd 50 Hz vko`fÙk dh eSal }kjk ipkfyr gS] mfeZdkvksa dh ewy vko`fÙk gksxh

(1) 50 Hz (2) 25 Hz (3) 100 Hz (4) 70.7 Hz

Q.46 ,d ukfHkdh; :ikarj.k dks $X(n,\alpha)\ {}^{7}_{3}Li$ ls izn'kZr djrs gSA fuEu esa ls dkSu lk ukfHkd rRo X dk gS ?

(1) ${}^{12}C_6$ (2) ${}^{10}_{5}B$ (3) ${}^{9}_{5}B$ (4) ${}^{11}_{4}Be$

Q.47 fdlh py d.Myh /kkjkekih esa 150 cjkcj Hkkx gSA blds /kkjk lqxzkfgrk 10 Hkkx izfr feyh,Eih;j rFkk oksYVrk lqxzkfgrk 2 Hkkx izfr feyhoksYV gSA ,lk djus ds fy, fd blds izR;sd Hkkx dk ikB;kad 1 oksYV gks] blds d.Myh ds lkFk J.kh Øe esa l;ksftr vko';d izfrjks/k dk] vkse esa] D;k eku gksxk \

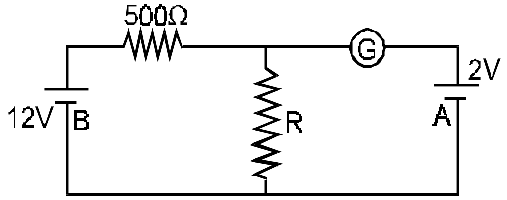
(1) 10^3 (2) 10^5 (3) 99995 (4) 9995

Q.48 nks oksYVkehVjksa] ftuesa ,d dkWij dk rFkk nwljk flYoj dk gS] dks ik'oZ Øe esa la;ksftr fd;k x;k gSA tc buesa oksYVkehVjksa esa dqy vkos'k q izokfgr gksrk gS] rks buesa /kkrqvksa dh leku ek=k fu{ksfir gksrh gSA ;fn dkWij rFkk flYoj ds fo|qr jklk;fud rqY;kad Øe'k% z_1 rFkk z_2 gS] rks flYoj oksYVkehVj ls izokfgr vkos'k gS

(1) $\frac{q}{1+\frac{z_1}{z_2}}$ (2) $\frac{q}{1+\frac{z_2}{z_1}}$ (3) $q\frac{z_1}{z_2}$ (4) $q\frac{z_2}{z_1}$

Space for Rough Work

Q.49 In the circuit, the galvanometer G shows zero deflection. If the batteries A and B have negligible internal resistance, the value of the resistor R will be



(1) 200 Ω (2) 100 Ω (3) 500 Ω (4) 1000 Ω

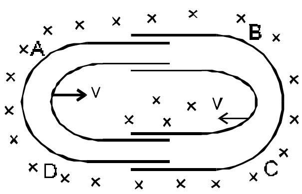
Q.50 Two sources of equal emf are connected to an external resistance R. The internal resistances of the two sources are R_1 and $R_2 (R_2 > R_1)$. If the potential difference across the source having internal resistance R_2 is zero, then

(1) $R = R_2 \times (R_1 + R_2)/(R_2 - R_1)$
(2) $R = R_2 - R_1$
(3) $R = R_1R_2/(R_1 + R_2)$
(4) $R = R_1R_2/(R_2 - R_1)$

Q.51 A fully charged capacitor has a capacitance 'C'. It is discharged through a small coil of resistance wire embedded in a thermally insulated block of specific heat capacity 's' and mass 'm'. If the temperature of the block is raised by 'ΔT', the potential difference 'V' across the capacitance is

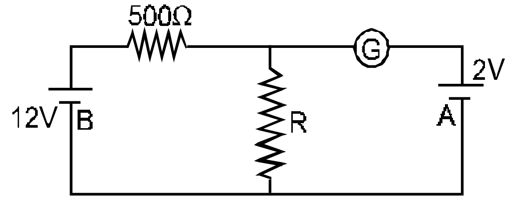
(1) $\sqrt{\frac{2mC\Delta T}{s}}$ (2) $\frac{mC\Delta T}{s}$
(3) $\frac{ms\Delta T}{C}$ (4) $\sqrt{\frac{2ms\Delta T}{C}}$

Q.52 One conducting U tube can slide inside another as shown in figure, maintaining electrical contacts between the tubes. The magnetic field B is perpendicular to the plane of the figure. If each tube moves towards the other at a constant speed V, then the emf induced in the circuit in terms of B, ℓ and V where ℓ is the width of each tube, will be



(1) $B\ell V$ (2) $-B\ell V$ (3) zero (4) $2B\ell V$

Q.49 fn, x, ifjiFk e /kkjkekih G 'kU; fo{ki n'kkrk gA ;fn cVfj;k A rFkk B d vkUrfjd ifrjk/k ux.; g] rk ifrjk/kd R dk eku gkxk



(1) 200 Ω (2) 100 Ω (3) 500 Ω (4) 1000 Ω

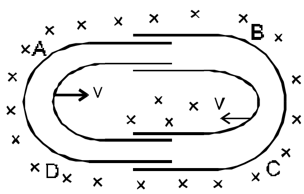
Q.50 leku fo|r okgd cy d nk òkr fdlh cká ifrjk/k R l l;kftr gA nkuk òkrk d vkUrfjd ifrjk/k R_1 rFkk $R_2 (R_2 > R_1)$ gA ;fn vkUrfjd ifrjk/k R_2 okyk òkr d fljk d chp foHkokUrj 'kU; g] rk

(1) $R = R_2 \times (R_1 + R_2)/(R_2 - R_1)$
(2) $R = R_2 - R_1$
(3) $R = R_1R_2/(R_1 + R_2)$
(4) $R = R_1R_2/(R_2 - R_1)$

Q.51 fdlh i.kr% vkof'kr l/kkfj=k dh /kkfjrk 'C' gA bl l/kkfj=k dk fol tu ifrjk/kh rkj dh cuh fdlh ,lh NkVh d.Myh l gkdj fd;k tkrk g] tk n0;eku m rFkk fof'k"V m"ek /kkfjrk s d fdlh Å"ekjk/kh xVd e vr% LFkkfir gA ;fn xVd d rki e o f) 'ΔT' g] rk l/kkfj=k d fljk d chp foHkokUrj g

(1) $\sqrt{\frac{2mC\Delta T}{s}}$ (2) $\frac{mC\Delta T}{s}$
(3) $\frac{ms\Delta T}{C}$ (4) $\sqrt{\frac{2ms\Delta T}{C}}$

Q.52 dkb pkyd U uyh fdlh nljh U-uyh e] pkyd lEid cukdj j[kr g,] vkj[k e n'kk, vulkj] ljd ldrh gA pEcdh; {k=k B vkj[k d ry d yEcor gA ;fn iR;d uyh nljh uyh dh vkj ,d fu;r ox V l xeu djrh g] rk B, ℓ rFkk V d ink e ifjiFk e ifjr fo|r okgd cy] tcfd ℓ iR;d uyh dh pkMkb g] gkxk



(1) $B\ell V$ (2) $-B\ell V$ (3) 'kU; (4) $2B\ell V$

Space for Rough Work

Q.53 A heater coil is cut into two equal parts and only one part is now used in the heater. The heat generated will now be

(1) doubled (2) four times
(3) one fourth (4) halved

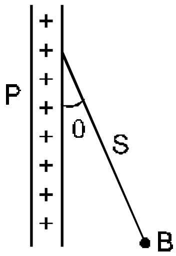
Q.54 Two thin, long, parallel wires, separated by a distance 'd' carry a current of 'i' A in the same direction. They will

(1) attract each other with a force of $\mu_0 i^2/(2\pi d)$
(2) repel each other with a force of $\mu_0 i^2/(2\pi d)$
(3) attract each other with a force of $\mu_0 i^2/(2\pi d^2)$
(4) repel each other with a force of $\mu_0 i^2/(2\pi d^2)$

Q.55 When an unpolarized light of intensity I_0 is incident on a polarizing sheet, the intensity of the light which does not get transmitted is

(1) $\frac{1}{2}I_0$ (2) $\frac{1}{4}I_0$ (3) zero (4) I_0

Q.56 A charged ball B hangs from a silk thread S which makes an angle θ with a large charged conducting sheet P, as shown in the figure. The surface charge density σ of the sheet is proportional to



(1) cos θ (2) cot θ (3) sin θ (4) tan θ

Q.57 Two point charges +8q and –2q are located at x = 0 and x = L respectively. The location of a point on the x axis at which the net electric field due to these two point charges is zero is

(1) 2 L (2) L/4 (3) 8 L (4) 4 L

Q.58 Two thin wire rings each having a radius R are placed at a distance d apart with their axes coinciding. The charges on the two rings are +q and –q. The potential difference between the centres of the two rings is

Q.53 fdlh rkid d.Myh dk nk cjkcj Hkkxk e dkVdj vc mld doy ,d Hkkx dk gh mi;kx ghVj e fd;k tkrk gA ghVj e mRiUu Å"ek vc gk tk,xh

(1) nk xuh (2) pkj xuh
(3) ,d&pkFkkb (4) vk/kh

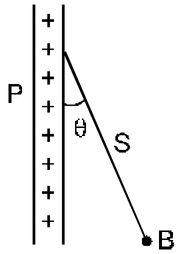
Q.54 nk iry] yEc] lekUrj rkj] ftud chp 'd' njh dk i Fkdu g rFkk ftul ,d gh fn'kk e 'i' ,fEi;j dh /kkjk cg jgh g] ,d nlj dk

(1) $\mu_0 i^2/(2\pi d)$ d cy l vkdf"kr djx
(2) $\mu_0 i^2/(2\pi d)$ d cy l fodf"kr djx
(3) $\mu_0 i^2/(2\pi d^2)$ d cy l vkdf"kr djx
(4) $\mu_0 i^2/(2\pi d^2)$ d cy l fodf"kr djx

Q.55 tc fdlh /ko.k 'khV ij I_0 rhork dk v/kfor idk'k vkifrr gkrk g] tk ml idk'k dh rhork] tk ikjxfer ugh gkrk] ok g

(1) $\frac{1}{2}I_0$ (2) $\frac{1}{4}I_0$ (3) 'kU; (4) I_0

Q.56 dkb vkof'kr xn B fdlh flYd dh Mkjh S l yVdh g] tk vkj[k e n'kk, vulkj] fdlh cMh vkof'kr pkyd 'khV P d lkFk dk.k θ cukrh gA 'khV dk i"Bh; vko'k ?kuro σ fdld lekuikrh g



(1) cos θ (2) cot θ (3) sin θ (4) tan θ

Q.57 +8q rFkk –2q d nk fcUn vko'k Øe'k% x = 0 rFkk x = L ij fLFkr gA x-v{k ij ml fcUn dh fLFkfr] tgk bu nkuk vko'kk d dkj.k uV fo|r {k=k 'kU; g] D;k g \

(1) 2 L (2) L/4 (3) 8 L (4) 4 L

Q.58 iry rkj d nk NYy] ftue iR;d dh f=kT;k R g] viu v{kk dk likrh j[kr g, ,d nlj l d njh ij fLFkr gA bu nkuk NYyk d vko'k +q rFkk –q gA nkuk NYyk d dUnk d chp foHkokUrj g

Space for Rough Work

(1) $QR/4\pi\epsilon_0 d^2$ (2) $\frac{Q}{2\pi\epsilon_0}\left[\frac{1}{R}-\frac{1}{\sqrt{R^2+d^2}}\right]$

(3) zero (4) $\frac{Q}{4\pi\epsilon_0}\left[\frac{1}{R}-\frac{1}{\sqrt{R^2+d^2}}\right]$

Q.59 A parallel plate capacitor is made by stacking n equally spaced plates connected alternatively. If the capacitance between any two adjacent plates is 'C' then the resultant capacitance is

(1) (n – 1)C (2) (n + 1)C
(3) C (4) nC

Q.60 When two tuning forks (fork 1 and fork 2) are sounded simultaneously 4 beats per second are heard. Now, some tape is attached on the prong of the fork 2. When the tuning forks are sounded again, 6 beats per second are heard. If the frequency of fork 1 is 200 Hz, then what was the original frequency of fork 2 ?

(1) 200 Hz (2) 202 Hz (3) 196 Hz (4) 204 Hz

Q.61 If a simple harmonic motion is represented by $\frac{d^2x}{dt^2}+\alpha x = 0$, its time period is

(1) $\frac{2\pi}{\alpha}$ (2) $\frac{2\pi}{\sqrt{\alpha}}$ (3) $2\pi\alpha$ (4) $2\pi\sqrt{\alpha}$

Q.62 The bob of a simple pendulum is a spherical hollow ball filled with water. A plugged hole near the bottom of the oscillating bob gets suddenly unplugged. During observation, till water is coming out, the time period of oscillation would

(1) first increases and then decrease to the original value
(2) first decrease and then increase to the original value
(3) remain unchanged
(4) increase towards a saturation value

(1) $QR/4\pi\epsilon_0 d^2$ (2) $\frac{Q}{2\pi\epsilon_0}\left[\frac{1}{R}-\frac{1}{\sqrt{R^2+d^2}}\right]$

(3) zero (4) $\frac{Q}{4\pi\epsilon_0}\left[\frac{1}{R}-\frac{1}{\sqrt{R^2+d^2}}\right]$

Q.59 fdlh lekUrj ifêdk l/kkfj=k dh jpuk n ifêdkvk dk leku nfj;k ij ,dkUrjr% lEc) djd dh x;h gA ;fn fdUgh nk Øekxr ifêdkvk d chp /kkfjrk 'C' g rk ifj.kkeh /kkfjrk g

(1) (n – 1)C (2) (n + 1)C
(3) C (4) nC

Q.60 tc nk Lofj=k f}Hkt k (f}Hkt 1 rFkk f}Hkt 2) dk ,d gh {k.k ctk;k tkrk g] rk 4 foLiUn ifr ld.M lukbZ nrs gA vc f}Hkt -2 dh Hkt k ij dN Vi fpidk nrs gA bld i'pkr tc bu nkuk f}Hkt k dk fQj ,d lkFk ctkr g] rk vc 6 foLiUn ifr ld.M lukbZ nrs gA ;fn f}Hkt-1 dh vko`fÙk 200 Hz g] rk f}Hkt-2 dh ey vko`fÙk D;k Fkh \

(1) 200 Hz (2) 202 Hz (3) 196 Hz (4) 204 Hz

Q.61 ;fn fdlh ljy vkorh xfr dk $\frac{d^2x}{dt^2}+\alpha x = 0$, }kjk fu:fir fd;k tkrk g] rk bldk vkorZdky g

(1) $\frac{2\pi}{\alpha}$ (2) $\frac{2\pi}{\sqrt{\alpha}}$ (3) $2\pi\alpha$ (4) $2\pi\sqrt{\alpha}$

Q.62 fdlh ljy ykyd dk xkyd ikuh l Hkjk [kk[kyk xkyk gA nkyk;eku xkyd dh ryh ij cu fdlh fNn ij yxh MkV vpkud [ky tkrh gA ml vof/k rd] tc rd fd xkyd l ikuh ckgj fudyrk g] i{k.k dju ij nkyu dk vkorZdky

(1) igy c<rk g vkj fQj viu ey eku rd ?kV tkrk g
(2) igy ?kVrk g vkj fQj viu ey eku rd c< tkrk g
(3) vifjofrZr jgrk g
(4) fdlh lrIr eku dh vkj c<rk g

Space for Rough Work

Q.63 An observer moves towards a stationary source of sound, with a velocity one-fifth of the velocity of sound. What is the percentage increase in the apparent frequency ?

(1) zero (2) 0.5 % (3) 5 % (4) 20 %

Q.64 If I_0 is the intensity of the principle maximum in the single slit diffraction pattern, then what will be its intensity when the slit width is doubled ?

(1) $2I_0$ (2) $4I_0$ (3) I_0 (4) $\frac{I_0}{2}$

Q.65 Two concentric coils each of radius equal to 2πcm are placed at right angles to each other. 3 ampere and 4 ampere are the currents flowing in each coil respectively. The magnetic induction in Weber/m^2 at the centre of the coils will be
($\mu_0 = 4\pi \times 10^{-7}$ Wb/A . m)

(1) 12×10^{-5} (2) 10^{-5}
(3) 5×10^{-5} (4) 7×10^{-5}

Q.66 A coil of inductance 300 mH and resistance 2Ω is connected to a source of voltage 2 V. The current reaches half of its steady state value in

(1) 0.05 s (2) 0.1 s (3) 0.15 s (4) 0.3 s

Q.67 The self inductance of the motor of an electric fan is 10 H. In order to impart maximum power at 50 Hz, it should be connected to a capacitance of

(1) 4μF (2) 8μF (3) 1μF (4) 2μF

Q.68 An energy source will supply a constant current into the load if its internal resistance is

(1) equal to the resistance of the load
(2) very large as compared to the load resistance
(3) zero
(4) non-zero but less than the resistance of the load

Q.69 A circuit has a resistance of 12 ohm and an impedance of 15 ohm. The power factor of the circuit will be

(1) 0.8 (2) 0.4 (3) 1.25 (4) 0.125

Q.63 dkb i{kd fdlh fLFkj /ofu òksr dh vksj /ofu dks ox dk 1/5oka ox ls xfr djrk gSA vkHkklh vko`fÙk esa ifr'kr o`f) D;k gS \

(1) 'kwU; (2) 0.5 % (3) 5 % (4) 20 %

Q.64 ;fn fdlh ,dy f>jh foorZu iSVuZ ds e[; mfPp"B dh rhozrk I_0 gS] rks f>jh dh pkSMkbZ nks xquh djus ij bldh rhozrk D;k gksxh \

(1) $2I_0$ (2) $4I_0$ (3) I_0 (4) $\frac{I_0}{2}$

Q.65 nks ladsUnzh dq.Mfy;ksa] ftuesa iR;sd dh f=kT;k 2πcm gS] ,d&nwljs ds yEcor j[kh gSA buesa ls ,d dq.Myh esa 3 ,fEi;j rFkk nwljh esa 4 ,fEi;j /kkjk izokfgr gks jgh gSA bu dq.Mfy;ksa ds dsUnz ij ocj ifr ,fEi;j ehVj esa pEcdh; iz.kk gksxkA ($\mu_0 = 4\pi \times 10^{-7}$ ocj/,fEi;j ehVj)

(1) 12×10^{-5} (2) 10^{-5}
(3) 5×10^{-5} (4) 7×10^{-5}

Q.66 300 mH ijdRo rFkk 2Ω ifrjks/k dh dkbZ dq.Myh fdlh 2 V oksYVrk ds òksr ls lEc) dh tkrh gSA fo|qr /kkjk viuh LFkk;h voLFkk eku dk vk/kk eku rd igqpus esa fdruk le; yxh \

(1) 0.05 s (2) 0.1 s (3) 0.15 s (4) 0.3 s

Q.67 fdlh fo|qr i[ks dh eksVj dk Loijdro 10 H gSA 50 Hz ij vf/kdre 'kfDr inku djus ds fy,] blls fdruh /kkfjrk ds lkFk la;ksftr fd;k tkuk pkfg, \

(1) 4μF (2) 8μF (3) 1μF (4) 2μF

Q.68 dkbZ ÅtkZ òksr ykM esa fLFkj /kkjk iokfgr djsxk ;fn bldk vkUrfjd ifrjks/k

(1) ykM ds ifrjks/k ds cjkcj gks
(2) ykM ifrjks/k dh rqyuk esa cgqr vf/kd gks
(3) 'kwU; gks
(4) 'kwU;srj ijUrq ykM ds ifrjks/k ls de gks

Q.69 fdlh ifjiFk dk ifrjks/k 12 vkse rFkk ifrck/kk 15 vkse gSA ifjiFk dk 'kfDr x.kkd gksxk

(1) 0.8 (2) 0.4 (3) 1.25 (4) 0.125

Space for Rough Work

Q.70 The phase difference between the alternating current and emf is $\pi/2$. Which of the following cannot be the constituent of the circuit ?
(1) C alone (2) R L (3) L C (4) L alone

Q.71 A uniform electric field and a uniform magnetic field are acting along the same direction in a certain region. If an electron is projected along the direction of the fields with a certain velocity then
(1) its velocity will decrease
(2) its velocity will increase
(3) it will turn towards right of the direction of motion
(4) it will turn towards left of direction of motion

Q.72 A charged particle of mass m and charge q travels on a circular path of radius r that is perpendicular to a magnetic field B. The time taken by the particle to complete one revolution is

(1) $\frac{2\pi mq}{B}$ (2) $\frac{2\pi q^2B}{m}$ (3) $\frac{2\pi qB}{m}$ (4) $\frac{2\pi m}{qB}$

Q.73 In a potentiometer experiment the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2 Ω, the balancing length becomes 120 cm. The internal resistance of the cell is
(1) 1 Ω (2) 0.5 Ω (3) 4 Ω (4) 2 Ω

Q.74 The resistance of hot tungsten filament is about 10 times the cold resistance. What will be the resistance of 100 W and 200 V lamp when not in use ?
(1) 40 Ω (2) 20 Ω (3) 400 Ω (4) 200 Ω

Q.75 A magnetic needle is kept in a non-uniform magnetic field. It experiences
(1) a torque but not a force
(2) neither a force nor a torque
(3) a force and a torque
(4) a force but not a torque

Q.70 iR;korh /kkjk rFkk fo|rokgd cy d chp dykUrj $\pi/2$ gA fuEufyf[kr e l dkSu bl ifjiFk dk vo;o ugh gk ldrk \
(1) dsoy C (2) R L (3) L C (4) dsoy L

Q.71 fdlh fuf'pr {k=k e ,d ,dleku fo|r {k=k rFkk ,d ,dleku pEcdh; {k=k ,d gh fn'kk d vuqfn'k dk;jr gA ;fn dkb byDVku bu {k=kk dh fn'kk d vuqfn'k fdlh fuf'pr ox l i{kfir fd;k tkrk g] rc
(1) bldk ox de gk tk,xk
(2) bldk ox vf/kd gk tk,xk
(3) og viuh xfr dh fn'kk d nk;h vkj eM tk,xk
(4) og viuh xfr dh fn'kk d ck;h vkj eM tk,xk

Q.72 n0;eku m rFkk vko'k q dk dkb vkof'kr d.k fdlh pEcdh; {k=k B d yEcor 'r' f=kT;k d oÙkh; iFk ij xfreku gA ,d ifjØek ijh dju e d.k }kjk fy;k x;k le; g

(1) $\frac{2\pi mq}{B}$ (2) $\frac{2\pi q^2B}{m}$ (3) $\frac{2\pi qB}{m}$ (4) $\frac{2\pi m}{qB}$

Q.73 ikVfU'k;kehVj d i;kx e fdlh ly d lkFk 240 cm yEckb ij lrqyu gkrk gA ly dk 2 Ω ifrjk/k }kjk 'kV fd, tku lrqyu yEckb 120 cm gk tkrh gA ly dk vkUrfjd ifrjk/k g
(1) 1 Ω (2) 0.5 Ω (3) 4 Ω (4) 2 Ω

Q.74 fdlh rIr VxLVu d rUr dk ifrjk/k mld BM ifrjk/k dk yxHkx 10 xuk gA 100 W rFkk 200 V d fdlh yEi dk ifrjk/k tc og mi;kx ugh gk jgk g] D;k gkxk \
(1) 40 Ω (2) 20 Ω (3) 400 Ω (4) 200 Ω

Q.75 dkb pEcdh; lb fdlh vlekku pEcdh; {k=k e j[kh gA ;g vuHko djxh
(1) dkb cy&vk?k.k ijUr dkb cy ugh
(2) u rk dkb cy vkj u gh dkb cy vk?k.k
(3) dkb cy rFkk dkb cy vk?k.k
(4) dkb cy ijUr dkb cy vk?k.k ugh

Space for Rough Work

CHEMISTRY

Q.76 Which of the following is a polyamide ?
(1) Nylon-66 (2) Teflon
(3) Bakelite (4) Terylene

Q.77 For a spontaneous reaction the ΔG, equilibrium constant (K) and E°_{cell} will be respectively –
(1) +ve, > 1, –ve (2) –ve, > 1, –ve
(3) –ve, > 1, –ve (4) – ve, < 1, –ve

Q.78 An ionic compound has a unit cell consisting of A ions at the corners of a cube and B ions on the centres of the faces of the cube. The empirical formula for this compound would be –
(1) A_2B (2) AB (3) A_3B (4) AB_3

Q.79 Hydrogen bomb is based on the principle of –
(1) natural radioactivity (2) nuclear fission
(3) artifical radioactivity (4) nuclear fusion

Q.80 The oxidation state of Cr in $[Cr(NH_3)_4Cl_2]^+$ is –
(1) +2 (2) +3 (3) 0 (4) +1

Q.81 If α is the degree of dissociation of Na_2SO_4, the vant Hoff's factor (i) used for calculating the molecular mass is –
(1) $1 - \alpha$ (2) $1 + \alpha$ (3) $1 - 2\alpha$ (4) $1 + 2\alpha$

Q.82 Which one of the following species is diamagnetic in nature ?
(1) H_2 (2) He_2^+ (3) H_2^- (4) H_2^+

Q.83 Which of the following oxides is amphoteric in character ?
(1) CO_2 (2) CaO (3) SnO_2 (4) SiO_2

Q.84 Due to the presence of an unpaired electron, free radicals are :
(1) Chemically inactive (2) Chemically reactive
(3) Cations (4) Anions

Q.76 fuEufyf[kr esa ls dkSu lk ikWfy,ekbM gS \
(1) ukbykWu-66 (2) V¶ykWu
(3) cSdykbV (4) Vsfjyhu

Q.77 ,d Lor% vfHkfØ;k ds fy, ΔG, lkE; fLFkjkad (K) vkSj E°_{cell} gksxs Øe'k% –
(1) +ve, > 1, –ve (2) –ve, > 1, –ve
(3) –ve, > 1, –ve (4) – ve, < 1, –ve

Q.78 ,d vk;fud ;kSfxd dk ;wfuV lsy esa A vk;u ?ku ds dksuksa ij vkSj B vk;u ?ku ds Qyd ds dsUnzksa ij fLFkr gksrs gSA bl ;kSfxd dk eqykuqikrh lw=k gksxk –
(1) A_2B (2) AB (3) A_3B (4) AB_3

Q.79 gkbMªkstu ce fdl fl)kUr ij vk/kkfjr gS –
(1) ikd`frd jsfM;ks,fDVork (2) ukfHkdh; fo[k.Mu
(3) d`f=ke jsfM;ks,fDVork (4) ukfHkdh; lay;u

Q.80 $[Cr(NH_3)_4Cl_2]^+$ esa Cr dh mip;u voLFkk gS –
(1) +2 (2) +3 (3) 0 (4) +1

Q.81 ;fn Na_2SO_4 dh fo;kstu dkfV α gks rks vkf.od nzO;eku dk ifjdfyr djus ds fy, dke esa vkus okyk oka.V gkWQ dkjd (i) gS –
(1) $1 - \alpha$ (2) $1 + \alpha$ (3) $1 - 2\alpha$ (4) $1 + 2\alpha$

Q.82 fuEufyf[kr Lih'kht esa dkSu lh Lo"Hkko esa izfrpqEcdh; gS ?
(1) H_2 (2) He_2^+ (3) H_2^- (4) H_2^+

Q.83 fuEufyf[kr vkWDlkbMksa esa fdldk 0;ogkj mHk;/kehZ gS ?
(1) CO_2 (2) CaO (3) SnO_2 (4) SiO_2

Q.84 ,d v;qfXer bysDVªku dh mifLFkfr ds dkj.k Ýh jSfMdYl gksrs gS :
(1) jklk;fud :i ls fuf"Ø; (2) jklk;fud :i ls lfØ;
(3) /kuk;u (4) _.kk;u

Space for Rough Work

Q.85 Which one of the following types of drugs reduces fever ?

(1) Antipyretic (2) Analgesic

(3) Tranquiliser (4) Antibiotic

Q.86 Consider an endothermic reaction X → Y with the activation energies E_b and E_f for the backard and forward reactions, respectively. In general

(1) $E_b > E_f$

(2) $E_b < E_f$

(3) there is no definite relation between E_b and E_f

(4) $E_b = E_f$

Q.87 Aluminium oxide may be electrolysed at 1000ºC to furnish aluminium metal (At. Mass = 27 amu ; 1 Faraday = 96,500 Coulombs). The cathode reaction is $Al^{3+} + 3e^{-} \longrightarrow Al^{o}$

To prepare 5.12 kg of aluminium metal by this method would require

(1) 1.83×10^{7} C of electricity

(2) 5.49×10^{7} C of electricity

(3) 5.49×10^{1} C of electricity

(4) 5.49×10^{4} C of electricity

Q.88 The highest electrical conductivity of the following aqueous solution is of

(1) 0.1 M chloroacetic acid

(2) 0.1 M acetic acid

(3) 0.1 M difluoroacetic acid

(4) 0.1 M fluoroacetic acid

Q.89 Lattice energy of an ionic compound depends upon

(1) Size of the ion only

(2) Charge on the ion only

(3) Charge on the ion and size of the ion

(4) Packing of ions only

Q.90 Benzene and toluene form nearly ideal solutions. At 20ºC, the vapour pressure of benzene is 75 torr and that of toluene is 22 torr. The partial vapour pressure of benzene at 20ºC for a solution containing 78 g of benzene and 46 g of toluene in torr is –

(1) 25 (2) 50 (3) 53.5 (4) 37.5

Q.85 fuEufyf[kr izdkj dh vk"kf/k;kse dkSu c[kkj dks de djrk gS ?

(1) Tojjk/kh (2) ihM+kjk/kh

(3) iz'kkard (4) ,UVhck;kfVd

Q.86 Å"ek'kks"kh vfHkfØ;k X → Y ds fy, igrh vfHkfØ;k vkSj vxz vfHkfØ;k ds fy, lfØ;.k ÅtkZ,¡ Øe'k% E_b rFkk E_f gSA lkekU; :i ls

(1) $E_b > E_f$

(2) $E_b < E_f$

(3) E_b vkSj E_f esa dksbZ fuf'pr lEca/k ugha gS

(4) $E_b = E_f$

Q.87 1000ºC ij ,yqehfu;e vkWDlkbM dks oS|qr vi?kVu djus ij ,yqfeuh;e /kkrq izkIr gksrh gS ¼ijek.kq n0;eku Al = 27 amu] QSjkM = 96,500 dwykse) dSFkksM vfHkfØ;k gS

$Al^{3+} + 3e^{-} \longrightarrow Al^{o}$

bl fof/k ls 5.12 kg ,yqfefu;e cukus esa vko';d gksxh fo|qr dh

(1) 1.83×10^{7} C dwyke

(2) 5.49×10^{7} C dwyke

(3) 5.49×10^{1} C dwyke

(4) 5.49×10^{4} C dwyke

Q.88 fuEufyf[kr tyh; foy;uks esa lcls lokZf/kd fo|qr pkydrk okyk foy;u gS

(1) 0.1 M Dyksjks,lhfVd vEy

(2) 0.1 M ,lhfVd vEy

(3) 0.1 M Mkb¶yqvksjks,lhfVd vEy

(4) 0.1 M ¶yqvksjks,lhfVd vEy

Q.89 ,d vk;kfud ;kSfxd dh yfVl ÅtkZ fuHkZj djrh gS

(1) doy vk;u dh lkbt ij

(2) doy vk;u ds pktZ ij

(3) vk;u ij pktZ vkSj vk;u dh lkbt ij

(4) doy vk;uks ds lsfVax ij

Q.90 csathu vkSj VkWyqbu yxHkx vkn'kZ foy;u cukrs gSA 20ºC ij csathu dk ok"i nkc 75 VkWj vkSj VkWyqbu dk 22 VkWj gS ,d foy;u ftlesa 20ºC ij csathu dk 78 g vkSj VkWyqbu dk 46 g feyk gqvk gS rks csUthu dk ok"i nkc VkWj esa gS –

(1) 25 (2) 50 (3) 53.5 (4) 37.5

Space for Rough Work

Q.91 The solubility product of a salt having general formula MX_2, in water is : 4×10^{-12}. The concentration of M^{2+} ions in the aqueous solution of the salt is –

(1) 1.0×10^{-4} M (2) 2.0×10^{-6} M
(3) 4.0×10^{-10} M (4) 1.6×10^{-4} M

Q.92 Which one of the following statements is NOT true about the effect of an increase in temperature on the distribution of molecular speeds in a gas ?

(1) The fraction of the molecules with the most probable speed increases
(2) The most probable speed increases
(3) The area under the distribution curve remains the same as under the lower temperature
(4) The distribution becomes broader

Q.93 The volume of a colloidal particle, V_C as compared to the volume of a solute particle in a true solution V_S, could be –

(1) $\frac{V_C}{V_S} \simeq 10^{23}$ (2) $\frac{V_C}{V_S} \simeq 1$
(3) $\frac{V_C}{V_S} \simeq 10^{3}$ (4) $\frac{V_C}{V_S} \simeq 10^{-3}$

Q.94 Consider the reaction : $N_2 + 3H_2 \longrightarrow 2NH_3$ carried out at constant temperature and pressure. If ΔH and ΔU are the enthalpy and internal energy changes for the reaction, which of the following expressions is true ?

(1) $\Delta H = \Delta U$ (2) $\Delta H = 0$ (3) $\Delta H > \Delta U$ (4) $\Delta H < \Delta U$

Q.95 A reaction involing two different reactants can never be–

(1) first order reaction (2) unimolecular reaction
(3) biomlecular reaction (4) second order reaction

Q.96 Hydrogen ion concentration in mol/L in a soluton of pH = 5.4 will be

(1) 3.88×10^{6} (2) 3.98×10^{8}
(3) 3.98×10^{-6} (4) 3.68×10^{-6}

Q.91 ,d MX_2 lkekU; l=k okyk yo.k dk ty esa foys;rk xq.kkd 4×10^{-12} gSA yo.k ds tyh; foy;u esa M^{2+} vk;uksa dh lkUnzrk gS –

(1) 1.0×10^{-4} M (2) 2.0×10^{-6} M
(3) 4.0×10^{-10} M (4) 1.6×10^{-4} M

Q.92 ,d xSl esa vk.kfod xfr ds forj.k ij rkieku esa o`f) ds izHkko ds lEcU/k esa fuEufyf[kr dFkuksa esa dkSu lk lR; ugha gS?

(1) lokZf/kd lEHkkfor xfr ds lkFk v.kqvksa dk izHkkt c<+rk gS
(2) lokZf/kd lEHkkfor xfr c<+rh gS
(3) forj.k oØ ds uhps dk {ks=k ogh jgrk gS tks fuEu rkieku ds uhps dk gksrk gS
(4) forj.k 0;kid gks tkrk gS

Q.93 okLrfod foy;u esa foys; d.k ds vk;ru , V_S dh rqyuk esa dksykWbMh d.k dk vk;ru V_C gks ldrk gS –

(1) $\frac{V_C}{V_S} \simeq 10^{23}$ (2) $\frac{V_C}{V_S} \simeq 1$
(3) $\frac{V_C}{V_S} \simeq 10^{3}$ (4) $\frac{V_C}{V_S} \simeq 10^{-3}$

Q.94 vfHkfØ;k $N_2 + 3H_2 \longrightarrow 2NH_3$ ij fopkj dhft, tks fLFkj rkieku vkSj fLFkj nkc ij gksrh gSA ;fn vfHkfØ;k ds fy, ΔH vkSj ΔU ,UFkSYih vkSj vkUrfjd ÅtkZ ifjorZu gSa] rks fuEufyf[kr O;atdksa esa dkSu lR; gS ?

(1) $\Delta H = \Delta U$ (2) $\Delta H = 0$ (3) $\Delta H > \Delta U$ (4) $\Delta H < \Delta U$

Q.95 ,d vfHkfØ;k ftlesa nks fHkUu fØ;kdkjd iznkFkZ gksa og dHkh Hkh–

(1) iFke dksfV dh vfHkfØ;k ugha gks ldrh
(2) ,d v.kqd vfHkfØ;k ugha gks ldrh
(3) f}v.kqd vfHkfØ;k ugha gks ldrh
(4) f}rh; dksfV dh vfHkfØ;k ugha gks ldrh

Q.96 foy;u ftlds pH = 5.4 gks mlds H^+ vk;u dh lkanzrk ¼eksy@yhVj½ esa gksxh

(1) 3.88×10^{6} (2) 3.98×10^{8}
(3) 3.98×10^{-6} (4) 3.68×10^{-6}

Space for Rough Work

Q.97 Two solutions of a substance (non electrolyte) are mixed in the following manner. 480 ml of 1.5 M first solution + 520 mL of 1.2 M second solution. What is the molarity of the final mixture ?

(1) 1.50 M (2) 1.20 M (3) 2.70 M (4)1.344 M

Q.98 For the reaction

$2\ NO_{2(g)} \rightleftharpoons 2\ NO_{(g)} + O_{2(g)}$,

($K_c = 1.8 \times 10^{-6}$ at 184ºC)

(R = 0.0831 kJ/(mol.K))

When K_p and K_c are compared at 184ºC it is found that

(1) K_p is less than K_c

(2) K_p is greater than K_c

(3) Whether K_p is greater than, less than or equal to K_c depends upon the total gas pressure

(4) $K_p = K_c$

Q.99 The exothermic formaton of ClF_3 is represented by the equation

$Cl_{2(g)} + 3F_{2(g)} \rightleftharpoons 2\ ClF_{3(g)}$; ΔrH = –329 kJ

Which of the following will increase the quantity of ClF_3 in an equilibrium mixture of Cl_2, F_2 and ClF_3 ?

(1) Removing Cl_2

(2) Increasing the temperature

(3) Adding F_2

(4) Increasing the volume of the container

Q.100

Electrolyt e	KCl	KNO_3	HCl	NaOAc	NaCl
Λ^∞ (Scm^2mol^{-1}):	149.9	145.0	426.2	91.0	126.5

Calculate $\wedge^{\infty}_{HOAc}$ using appropriate molar conductance of the electrolytes listed above at infinite dilution in H_2O at 25ºC

(1) 552.7 (2) 517.2 (3) 217.5 (4)390.7

Q.101 During the process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud'. These are –

(1) Pb and Zn (2) Sn and Ag

(3) Fe and Ni (4) Ag and Au

Q.97 ,d inkFk ¼vui?kV;½ d nk foy;u fuEufyf[kr <x l feyk; tkr gA 1.5 M iFke foy;u dk 480 ml + 1.2 M f}rh; foy;u dk 520 mL vfre feJ.k dh ekyjrk D;k g?

(1) 1.50 M (2) 1.20 M (3) 2.70 M (4)1.344 M

Q.98 vfHkfØ;k

$2\ NO_{2(g)} \rightleftharpoons 2\ NO_{(g)} + O_{2(g)}$,

($K_c = 1.8 \times 10^{-6}$ at 184ºC)

(R = 0.0831 kJ/(mol.K))

tc K_p vkj K_c dh rqyuk dh tkrh g] rk 184ºC ij ik;k tkrk g –

(1) K_p de g K_c l (2) K_p vf/kd g K_c l

(3) K_p vf/kd g] de g ;k cjkcj g K_c d] fuHkj djrk g VkVy xl d nkc ij

(4) $K_p = K_c$

Q.99 ClF_3 dk Å"ek{kih fuek.k lehdj.k&

$Cl_{2(g)} + 3F_{2(g)} \rightleftharpoons 2\ ClF_{3(g)}$; ΔrH = –329 kJ

}kjk iLrr fd;k tkrk g

,d Cl_2, F_2 rFkk ClF_3 d lkE; feJ.k e fuEufyf[kr e dku ClF_3 dh ek=kk c<k,xk ?

(1) Cl_2 dk fu"dklu

(2) rkieku dk c<kuk

(3) F_2 dk feykuk

(4) ik=k d vk;ru dk c<kuk

Q.100

Electrolyt e	KCl	KNO_3	HCl	NaOAc	NaCl
Λ^∞ (Scm^2mol^{-1}):	149.9	145.0	426.2	91.0	126.5

Åij fyf[kr fo|r vi?kV;k dh mi;Dr ekyj pkydrvk dk mi;kx djr g, 25ºC ij ty e vur rurk ij $\wedge^{\infty}_{HOAc}$ dk ifjdyu dhft,

(1) 552.7 (2) 517.2 (3) 217.5 (4)390.7

Q.101 dkij d fo|r vi?kVuh ifj"dj.k d iØe d nkjku dN /kkr, ',uksM eM' d :i e uhp cB tkrh g] ; g –

(1) Pb vkj Zn (2) Sn vkj Ag

(3) Fe vkj Ni (4) Ag vkj Au

Space for Rough Work

Q.102 In a multi-electron atom, which of the following orbitals described by the three quantum members will have the same energy in the absence of magnetic and electric fields ?

(a) $n = 1, \ell = 0, m = 0$ (b) $n = 2, \ell = 0, m = 0$
(c) $n = 2, \ell = 1, m = 1$ (d) $n = 3, \ell = 2, m = 1$
(e) $n = 3, \ell = 2, m = 0$

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

Q.103 If we consider that 1/6, in place of 1/12, mass of carbon atom is taken to be the relative atomic mass unit, the mass of one mole of a substance will –

(1) increase two fold (2) decrease twice
(3) be a function of the molecular mass of the substance
(4) remain unchanged

Q.104 The molecular shapes of SF_4, CF_4, and XeF_4 are –

(1) the same with 1, 1 and 1 lone pair of electrons on the central atoms, respectively
(2) the same with 2, 0 and 1 lone pairs of electrons on the central atom, resectively
(3) different with 1 , 0 and 2 lone pair of electrons on the central atom respectively
(4) different with 0, 1 and 2 lone pairs of electrons on the central atom respectively

Q.105 Heating mixture of Cu_2O and Cu_2S will give –

(1) $Cu + SO_3$ (2) $Cu + SO_2$
(3) Cu_2SO_3 (4) $CuO + CuS$

Q.106 The disperse phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged, respectively. Which of the following statements is NOT correct ?

(1) Sodium sulphate solution causes coagulation in both sols
(2) Magnesium chloride solution coagulates, the gold sol more readily than the iron (III) hydroxide sol.
(3) Coagulation in both sols can be brought about by electrophoresis
(4) Mixing the sols has no effect

Q.102 ,d cgbyDVªkWu ijek.kq esa pEcdh; vkSj oS|qr {ks=kksa dh vuqifLFkfr esa fuEufyf[kr rhu DokW.Ve l[;kvksa }kjk of.kZr dkSu lh vkfcZVyksa dh Åtkk leku gksxh ?

(a) $n = 1, \ell = 0, m = 0$ (b) $n = 2, \ell = 0, m = 0$
(c) $n = 2, \ell = 1, m = 1$ (d) $n = 3, \ell = 2, m = 1$
(e) $n = 3, \ell = 2, m = 0$

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

Q.103 ;fn vkif{kd ijek.kq nzO;eku bdkbZ dk dkcZu ijek.kq ds nzO;eku dk 1/12, dh txg 1/6 eku fy;k tk;s rks ,d inkFkZ ds ,d eksy dk nzO;eku –

(1) nks xquk c<+ tk,xk (2) nks xquk ?kV tk,xk
(3) inkFkZ ds vkf.od nzO;eku dk ,d Qyu gksxk
(4) vifjofrZr jgsxk

Q.104 SF_4, CF_4, vkSj XeF_4 ds vkf.od vkdkj gS –

(1) dsUnzh; ijek.kq ij Øe'k% 1, 1 vkSj 1 byDVªkWuksa ds ,dkdh ;qXeksa ds lkFk leku
(2) dsUnzh; ijek.kq ij Øe'k% 2, 0 vkSj 1 byDVªkWuksa ds ,dkdh ;qXeksa ds lkFk leku
(3) dsUnzh; ijek.kq ij Øe'k% 1 , 0 vkSj 2 byDVªkWuksa ds ,dkdh ;qXeksa ds lkFk fHkUu&fHkUu
(4) dsUnzh; ijek.kq ij Øe'k% 0, 1 vkSj 2 byDVªkWuksa ds ,dkdh ;qXeksa ds lkFk fHkUu fHkUu

Q.105 Cu_2O vkSj Cu_2S ds feJ.k dks rIr djus ij izkIr gksxk –

(1) $Cu + SO_3$ (2) $Cu + SO_2$
(3) Cu_2SO_3 (4) $CuO + CuS$

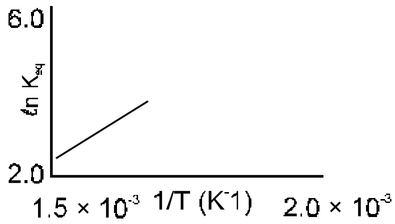
Q.106 ifjf{kIr ikoLFkk dksykbMh vk;ju (III) gkbMªkWDlkbM vkSj dksykbMh xksYM esa Øe'k% /kukRed vkSj _.kkRed vkos'kr gksrk gSA fuEufyf[kr dFkuksa esa dkSu lk lR; ugha gS?

(1) lksfM;e lYQsV foy;u nksuksa lksyksa dks Ldanu djrk gS
(2) eSXuhf'k;e DyksjkbM foy;u vk;ju (III) gkbMªkWDlkbM lkWy dh vis{kk xksYM lkWy dks ljyrk ls Ldanu djrk gS
(3) nksuksa lksyksa dk Ldanu byDVªksQksjsfll }kjk fd;k tk ldrk gS
(4) lksyksa dk feJ.k djus dk dksbZ izHkko ugha gksrk gS

Space for Rough Work

Q.107 Based on lattice energy and other considerations which one of the following alkali metal chlorides is expected to have the highest melting point ?
(1) NaCl (2) LiCl (3) RbCl (4) KCl

Q.108 A schematic plot of $\ell n\ K_{eq}$ verus inverse of temperature for a reaction is shown below



The reaction must be
(1) endothermic (2) exothermic
(3) highly spontaneous at ordinary temperature
(4) one with negligible enthalpy change

Q.109 Calomel (Hg_2Cl_2) on reaction with ammonium hydroxide gives
(1) $NH_2 - Hg - Hg - Cl$ (2) $HgNH_2Cl$
(3) HgO (4) Hg_2O

Q.110 Heating an aqueous solution of aluminium chloride to dryness will give –
(1) Al_2Cl_6 (2) $AlCl_3$ (3) $Al(OH)Cl_2$ (4) Al_2O_3

Q.111 The correct order of the thermal stability of hydrogen halides (H – X) is –
(1) HF > HCl > HBr > HI (2) HI > HBr > HCl > HF
(3) HI > HCl < HF > HBr (4) HCl < HBr > HBr < HI

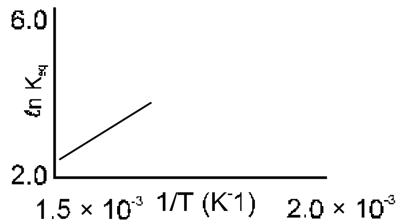
Q.112 The number of hydrogen atoms (s) attached to phosphorus atom in hypophosphorous acid is –
(1) two (2) zero (3) three (4) one

Q.113 What is the conjugate base of OH^- ?
(1) H_2O (2) O_2 (3) O^{2-} (4) O^-

Q.114 The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is –
(1) +6 (2) +4 (3) +3 (4) +2

Q.107 yfV l Åtk vkj vU; dkjdk d vk/kkj ij fuEufyf[kr eVy DykjkbMk e l fdl dk xyukad mPpre gksu dh vi{kk dh tkrh g ?
(1) NaCl (2) LiCl (3) RbCl (4) KCl

Q.108 fdlh vfHkfØ;k d fy, $\ell n\ K_{eq}$ cuke rkieku d ifrykse dk lkdfrd vkdu uhp n'kk;k x;k g



;g vfHkfØ;k vo'; : i e
(1) Å"ek'kks"kh g (2) Å"ek{ksih g
(3) lkekU; rkieku dk vR;f/kd Lor% g
(4) ,lh g ftle ,FkYih ifjorZu ux.; g

Q.109 dSykey (Hg_2Cl_2) vekfu;k gkbMkDlkbM d lkFk vfHkfØ;k djus ij nrk g
(1) $NH_2 - Hg - Hg - Cl$ (2) $HgNH_2Cl$
(3) HgO (4) Hg_2O

Q.110 ,yfeuh;e DykjkbM d tyh; foy;u dk 'kq"drk rd xe djus ij ikIr gksxk –
(1) Al_2Cl_6 (2) $AlCl_3$ (3) $Al(OH)Cl_2$ (4) Al_2O_3

Q.111 gkbMkstu gSykbMk (H – X) d rkih; LFkkf;Ro dk lgh Øe g–
(1) HF > HCl > HBr > HI (2) HI > HBr > HCl > HF
(3) HI > HCl < HF > HBr (4) HCl < HBr > HBr < HI

Q.112 gkbikQkLQksjl vEy e QkLQksjl ijek.kq l layXu gkbMkstu ijek.kvk dh l[;k g –
(1) nks (2) 'kwU; (3) rhu (4) ,d

Q.113 OH^- dk l;Xeh {kkjd dkSu g ?
(1) H_2O (2) O_2 (3) O^{2-} (4) O^-

Q.114 vEyh; iksVf'k;e MkbØkseV foy;u KI d lkFk vfHkfØ;k djrk gA vfre mRikn e Øksfe;e dh mip;u voLFkk fuEu g –
(1) +6 (2) +4 (3) +3 (4) +2

Space for Rough Work

Q.115 The number and type of bonds between two carbon atoms in calcium carbide are –

(1) One sigma, two pi (2) One sigma, one pi
(3) Two sigma, two pi (4) Two sigma, one pi

Q.116 The lanthanide contraction is responsible for the fact that

(1) Zr and Nb have similar oxidation state
(2) Zr and Y have about the same radius
(3) Zr and Zn have the same oxidation state
(4) Zr and Hf have about the same radius

Q.117 Of the following sets which one does NOT contain isoelectronic species ?

(1) CN^-, N_2, C_2^{2-} (2) PO_4^{3-}, SO_4^{2-}, ClO_4^-
(3) BO_3^{3-}, CO_3^{2-}, NO_3^- (4) SO_3^{2-}, CO_3^{2-}, NO_3^-

Q.118 In silicon dioxide

(1) each silicon atom is surrounded by two oxygen atoms and each oxygen atom is bounded to two silicon atoms
(2) each silicon atoms is surrounded by four oxygen atoms and each oxygen atoms is bonded to two silicon atoms
(3) there are double bonds between silicon and oxygen atoms
(4) silicon atom is bonded to two oxygen atoms

Q.119 The IUPAC name of the coordination compound $K_3[Fe(CN)_6]$ is

(1) Potassium hexacyanoferrate (III)
(2) Potassium hexacyanoferrate (II)
(3) Tripotassium hexacyanoiron (II)
(4) Potassium hexacyanoiron (II)

Q.120 In which of the following arrangements the order is NOT according to the property indicated against it ?

(1) B < C < N < O : Increasing first ionization enthalpy
(2) $Al^{3+} < Mg^{2+} < Na^+ < F^-$: Increasing ionic size
(3) Li < Na < K < Rb : Increasing metallic radius
(4) I < Br < F < Cl : Increasing electron gain enthalpy (with negative sign)

Q.115 dfY';e dkckbM e nkuk dkcu ijek.kvk d chp c/k dh l[;k vkj] mudk idkj g –

(1) ,d flXek] nk ikb (2) ,d flXek] ,d ikb
(3) nk flXek] nk ikb (4) nk flXek] ,d ikb

Q.116 yUFkukbM ldpu bl rF; d fy, mÙkjnk;h g]fd

(1) Zr rFkk Nb dh mip;u voLFkk leku g
(2) Zr rFkk Y dh f=kT;k yxHkx ,d tlh g
(3) Zr rFkk Zn dh mip;u voLFkk leku g
(4) Zr rFkk Hf dh f=kT;k yxHkx ,d tlh g

Q.117 fuEu lVk e l fdl e lebyDVkfudh Lih'kht ugh g ?

(1) CN^-, N_2, C_2^{2-} (2) PO_4^{3-}, SO_4^{2-}, ClO_4^-
(3) BO_3^{3-}, CO_3^{2-}, NO_3^- (4) SO_3^{2-}, CO_3^{2-}, NO_3^-

Q.118 flfydku MkbvkDlkbM e

(1) iR;d flfydku ijek.k] nk vkDlhtu ijek.kvk }kjk f?kjk g rFkk iR;d vkDlhtu ijek.k nk flfydku ijek.kvk l vkcfU/kr g
(2) iR;d flfydku ijek.k] pkj vkDlhtu ijek.kvk }kjk f?kjk g rFkk iR;d vkDlhtu ijek.k nk flfydku ijek.kvk l vkcfU/kr g
(3) flfydku rFkk vkDlhtu ijek.kvk d e/; f}vkcU/k g
(4) flfydku ijek.k nk vkDlhtu ijek.kvk l vkfcfU/kr g

Q.119 leUo;h ;kfxd] $K_3[Fe(CN)_6]$ dk vkb;ih,lh (IUPAC) uke g

(1) ikVf'k;e gDlklk;ukQjV (III)
(2) ikVf'k;e gDlk;ukQjV (II)
(3) VkbikVf'k;e gDlk;ukvk;ju (II)
(4) ikVf'k;e gDlk;ukvk;ju (II)

Q.120 fuEufyf[kr 0;oLFkkvk e l fdl d Øe mld lkeu fn;s x, x.k/ke d vuqlkj ugh g ?

(1) B < C < N < O : c<rh iFke vk;uu ,UFkYih
(2) $Al^{3+} < Mg^{2+} < Na^+ < F^-$: c<rh vk;kfud lkbt
(3) Li < Na < K < Rb : c<rh /kkRoh; f=kT;k
(4) I < Br < F < Cl : c<rh byDVku ikfIr ,UFkYih (_.kkRed fpgu d lkFk)

Space for Rough Work

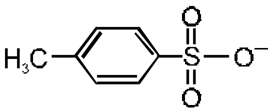
Q.121 The best reagent to convert pent–3–en–2–ol into pent–3–in–2–one is
(1) Acidic dichromate
(2) Acidic permanganate
(3) Pyridinium chloro–chromate
(4) Chromic anhydride in glacial acetic acid

Q.122 Aphoton of hard gamma radiation knocks a proton out of $^{24}_{12}Mg$ nucleus to form –
(1) the isobar of parent nucleus
(2) the isotope of parent nucleus
(3) the isobar of $^{23}_{11}Na$
(4) the nuclide $^{23}_{11}Na$

Q.123 Which of the following compounds shows optical isomerism ?
(1) $[ZnCl_4]^{2-}$ (2) $[Cu(NH_3)_4]^{2+}$
(3) $[Co(CN)_6]^{3-}$ (4) $[Cr(C_2O_4)_3]^{3-}$

Q.124 Which one of the following cyano complexes would exhibit the lowest value of paramagnetic behaviour ?
(1) $[Mn(CN)_6]^{3-}$ (2) $[Cr(CN)_6]^{3-}$
(3) $[Co(CN)_6]^{3-}$ (4) $[Fe(CN)_6]^{3-}$
(At. Nos : Cr = 24, Mn = 25, Fe = 26, Co = 27)

Q.125 2 Methylbutane on reacting with bromine in the presence of sunlight gives mainly
(1) 2–bromo–2–methylbutane
(2) 1–bromo–2–methylbutane
(3) 1–bromo–3–methylbutane
(4) 2–bromo–3–methylbutane

Q.126 The decreasing order of nucleophilicity among the nucleophiles
(a) $CH_3C(=O)-O^-$ (b) CH_3O^-
(c) CN^-
(d)  is
(1) (d), (c) , (b) , (a) (2) (a), (b), (c) , (d)
(3) (c) , (b) , (a) , (d) (4) (b), (c) , (a) , (d)

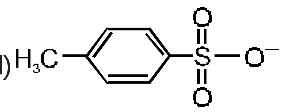
Q.121 i.V–3–bu–2–vky dk i.V–3–bu–2–vku esa ifjofrZr djus ds fy, lokZf/kd mi;Dr vfHkdeZd gS
(1) vEyh; MkbØkseV
(2) vEyh; ijesaxusV
(3) fifjMhfu;e Dyksjks&ØkseV
(4) Xysf'ky ,lhfVd vEy dh mifLFkfr esa Øksfed ,ugkbMªkbM

Q.122 dBksj xkek fofdj.k dk ,d QksVkWu igys ls $^{24}_{12}Mg$ U;wfDy;l ls ,d izksVkWu dks ckgj fudky nsrk gSA blls rSgk tks curk gS og gS –
(1) ewy U;wfDy;l dk leHkkfjd
(2) ewy U;wfDy;l dk leLFkkfud
(3) $^{23}_{11}Na$ lеHkkjhd
(4) $^{23}_{11}Na$ U;wDykbM

Q.123 fuEu esa ls dkSu lk ;kSfxd izdk'kh; leko;ork infZ'kr djrk gS ?
(1) $[ZnCl_4]^{2-}$ (2) $[Cu(NH_3)_4]^{2+}$
(3) $[Co(CN)_6]^{3-}$ (4) $[Cr(C_2O_4)_3]^{3-}$

Q.124 fuEufyf[kr lk;uks dkEIysDlksa esa ls fdlds vuqpqEcdh; O;ogkj dk eku U;wure gksxk ?
(1) $[Mn(CN)_6]^{3-}$ (2) $[Cr(CN)_6]^{3-}$
(3) $[Co(CN)_6]^{3-}$ (4) $[Fe(CN)_6]^{3-}$
(At. Nos : Cr = 24, Mn = 25, Fe = 26, Co = 27)

Q.125 lw;Z izdk'k dh mifLFkfr esa 2&esfFkyC;wVsu czksehu ds lkFk vfHkfØ;k djds eq[;r% D;k nsrk gS
(1) 2–czkseks–2–esfFkyC;wVsu
(2) 1–czkseks–2–esfFkyC;wVsu
(3) 1–czkseks3–esfFkyC;wVsu
(4) 2–czkseks–3–esfFkyC;wVsu

Q.126 ukfHkdLusgh;k
(a) $CH_3C(=O)-O^-$ (b) CH_3O^-
(c) CN^-
(d) 
dk cgh ukfHkd Lusgrk dk ?kVrk gqvk Øe gS
(1) (d), (c) , (b) , (a) (2) (a), (b), (c) , (d)
(3) (c) , (b) , (a) , (d) (4) (b), (c) , (a) , (d)

Space for Rough Work

Q.127 Among the following acids which has the lowest pKa value ?

(1) HCOOH (2) CH_3COOH

(3) CH_3CH_2COOH (4) $CH_3)_2CH–COOH$

Q.128 In both DNA and RNA, heterocylic base and phosphate ester linkages are at –

(1) C_2' and C_5' respectively of the sugar molecule

(2) C_5' and C_2' respectively of the sugar molecule

(3) C_5' and C_1' respectively of the sugar molecule

(4) C_1' and C_5' respectively of the sugar molecule

Q.129 Reaction of one molecule of HBr with one molecule of 1,3–butadiene at 40ºC given predominantly

(1) 1–bromo–2–butene under thermodynamically controlled conditions

(2) 3–bromobutene under kinetically controlled conditions

(3) 1–bromo–2–butene under kinetically controlled conditions

(4) 3–bromobutene under thermodynamically controlled conditions

Q.130 Tertiary alkyl halides are practically inert to substitution by S_{N^2} mechanism because of –

(1) instability (2) insolubility

(3) steric hindrance (4) inductive effect

Q.131 Which types of isomerism is shown by 2,3–dichlorobutane ?

(1) Optical (2) Diastereo

(3) Structural (4) Geometric

Q.132 Amongst the following the most basic compound is–

(1) aniline (2) benzylamine

(3) p–nitroaniline (4) acetanilide

Q.133 Acid catalyzed hydration of alkenes except ethene leads to the formation of –

(1) secondary or tertiary alcohol

(2) primary alcohol

(3) mixture of secondary and tertiary alcohols

(4) mixture of primary and secondary alcohols

Q.127 fuEu vEyksa esa ls fdl dk pKa dk eku fuEure gksxk ?

(1) HCOOH (2) CH_3COOH

(3) CH_3CH_2COOH (4) $CH_3)_2CH–COOH$

Q.128 DNA rFkk RNA, nksuksa esa] fo"kepØh; {kkjd rFkk QkLQsV bLVj cU/k –

(1) 'kdZjk v.kq ds Øe'k% C_2' rFkk C_5' LFkku ij gS

(2) 'kdZjk v.kq ds Øe'k% C_5' rFkk C_2' LFkku ij gS

(3) 'kdZjk v.kq ds Øe'k% C_5' rFkk C_1' LFkku ij gS

(4) 'kdZjk v.kq ds Øe'k% C_1' rFkk C_5' LFkku ij gS

Q.129 40ºC ij HBr ds ,d v.kq dh 1,3–C;wVkMkbu ds ,d v.kq ls vfHkfØ;k eq[;r% :i ls nsrh gS

(1) Å"ekxfrdh; fu;f=kr n'kk esa 1–czkse–2–C;wVhu

(2) xfrdh; fu;f=kr n'kk esa 3–czkseksC;wVhu

(3) xfrdh; fu;f=kr n'kk esa 1–czkse–2–C;wVhu

(4) Å"ekxfrdh; fu;f=kr n'kk esa 3–czkseksC;wVhu

Q.130 Vjf'k;jh ,fYdy gSykbMsa S_{N^2} fØ;kfof/k }kjk ifrLFkkiu ds fy, i;kZIr :i ls fuf"Ø; gksrs gSa D;ksafd –

(1) vfLFkjrk (2) v?kqyu'khyrk

(3) LVsfjd fgUMjsUl (4) bUMfDVo izHkko

Q.131 2,3–MkbDyksjksC;wVsu }kjk fdl izdkj dh leko;ork iznf'kZr dh tkrh gS ?

(1) izdk'kh; (2) MkbLVhfjvks

(3) lajpukRed (4) T;kferh;

Q.132 fuEu esa ls lcls vf/kd {kkjh; ;kSfxd gS –

(1) ,uhyhu (2) csfUty ,ehu

(3) p–ukbVªks,uhyhu (4) ,flVsuhykbM

Q.133 ,Ydhu ds vEy mRizsfjr tyh;dj.k ls ,Fkhu ds vfrfjDr curk gS –

(1) f}rh;d vFkok Vjf'k;jh ,YdksgkWy

(2) izkFkfed ,YdksgkWy

(3) f}rh;d rFkk Vjf'k;jh ,YdksgkWy dk feJ.k

(4) izkFkfed rFkk f}rh;d ,YdksgkWy dk feJ.k

Space for Rough Work

Q.134 Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is –
(1) 2, 3–dimethylbutane (2) n–hexane
(3) 2–methylpentane (4) 2, 2–dimethylbutane

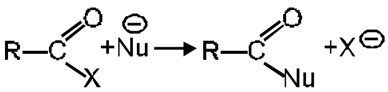
Q.135 Alkyl halides react with dialkyl copper reagents to give
(1) alkyl copper halides (2) alkenes
(3) alkenyl halides (4) alkanes

Q.136 Which of the following is fully fluorinated polymer ?
(1) Teflon (2) Neoprene
(3) PVC (4) Thiokol

Q.137 Which one of the following methods is neither meant for the synthesis nor for separation of amines ?
(1) Hofmann method (2) Hinsberg method
(3) Curtius reaction (4) Wurtz reaction

Q.138 Equimolar solutions in the same solvent have –
(1) Same freezing point but different boiling point
(2) Same boling point but different freezing point
(3) Different boiling and different freezing point
(4) Same boiling and same freezing points

Q.139 The reaction



is fastest when X is –
(1) NH_2 (2) Cl (3) OCOR (4) OC_2H_5

Q.140 Elimination of bromine from 2–bromobutane results in the formation of –
(1) predominantly 2–butene
(2) equimolar mixture of 1 and 2–butene
(3) predominantly 2–butyne
(4) predominantly 1–butene

Q.141 Which of the following factors may be regarded as the main cause of lanthanide contraction ?
(1) Effective shielding of one of 4f electrons by another in the subshell
(2) Poor shielding of one of 4f eletron by another in the subshell
(3) Greater shielding of 5d electron by 4f electrons
(4) Poorer shielding of 5d electron by 4f electrons

Q.134 ikp leko;oh gDlUl esa leko;o tks nks ekukDyksfjuVsM ;kSfxd nsrk gS og gS –
(1) 2, 3–MkbesfFky C;Vu (2) n–gDlu
(3) 2–esfFkyisUVsu (4) 2–MkbesfFky C;Vu

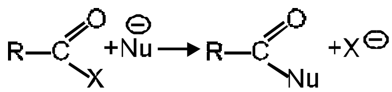
Q.135 ,fYdy gSykbMksa MkbZ,fYdy dkWij vfHkdeZdksa ds lkFk vfHkfØ;k djds nsrs gSa
(1) ,fYdy dkWij gSykbM (2) ,Ydhu
(3) ,fYdfuy gSykbM (4) ,Ydsu

Q.136 fuEu esa ls dkSu i.kZ :i ls ¶yksfjhuhd`r cgqyd gS ?
(1) VsV¶ykWu (2) fuvksizhu
(3) ihohlh (4) FkkW;ksdkWy

Q.137 fuEu esa ls dkSu lh ,d fof/k] u rks ehuksa ds la'ys"k.k vkSj ugha muds i`FkDdj.k ds dke esa vkrh gS ?
(1) gkQeku fof/k (2) fgalcxZ fof/k
(3) dfV;l vfHkfØ;k (4) cqVZl vfHkfØ;k

Q.138 ,d gh foyk;d esa leeksyj; foy;uksa dk gksxk –
(1) ,d gh fgekad ijUrq fHkUu DoFkukad
(2) ,d gh DoFkukad ijUrq fHkUu fgekad
(3) fHkUu DoFkukad rFkk fHkUu fgekad
(4) ,d gh DoFkukad rFkk ,d gh fgekad

Q.139 vfHkfØ;k



rhoore xfr ls gksrh gS] tc X gS –
(1) NH_2 (2) Cl (3) OCOR (4) OC_2H_5

Q.140 2–czkseksC;wVsu ls czksehu ds foyksiu ls curk gS
(1) 2–C;wVhu eq[;r% :i ls
(2) 1 rFkk 2–C;wVhu dk leeksyh; feJ.k
(3) 2–C;wVkbu eq[;r% :i ls
(4) 1–C;wVhu eq[;r% :i ls

Q.141 fuEufyf[kr dkjdksa esa fdldks ySFksukbM ladqpu dk eq[; dkj.k ekuk tk ldrk gS ?
(1) mi dks'k esa ,d 4f bysDVªku dk nwljs }kjk iHkkoh ifjj{k.k
(2) 4f mi dks'k esa ,d bysDVªku dk nwljs }kjk detksj ifjj{k.k
(3) 5d bysDVªkWu esa ,d dk 4f d ,d bysDVªku }kjk iHkkoh ifjj{k.k
(4) 5d bysDVªkWuksa ,d dk 4f d ,d bysDVªku }kjk detksj ifjj{k.k

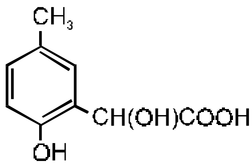
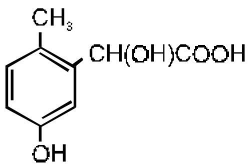
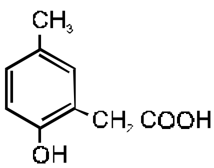
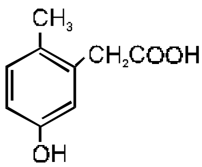
Space for Rough Work

Q.142 The value of the 'spin only' magnetic moment for one of the following configurations is 2.84 BM. The correct one is –
(1) d^4 (in weak ligand field)
(2) d^4 (in strong ligand field)
(3) d^5 (in strong ligand field)
(4) d^3 (in weak as well as in strong fields)

Q.143 The structure of diborane (B_2H_6) contains –
(1) two 2c-2e bonds and four 3c-2e bonds
(2) four 2c-2e bonds and two 3c-2e bonds
(3) four 2c-2e bonds and four 3c-2e bonds
(4) two 2c-2e bonds and two 3c-3e bonds

Q.144 Which of the following statements in relation to the hydrogen atom is correct ?
(1) 3p orbital is lower in energy than 3d orbital
(2) 3s orbital is lower in energy than 3p orbital
(3) 3s, 3p and 3d orbital all have the same energy
(4) 3s and 3p orbitals are of lower energy than 3d orbital

Q.145 p–cresol reacts with chloroform in alkaline medium to give the compound A which adds hydrogen cyanide to form, the compound. B The latter on acidic hydrolysis gives chiral carboxylic acid. The structure of the carboxylic acid is

(1) 
(2) 
(3) 
(4) 

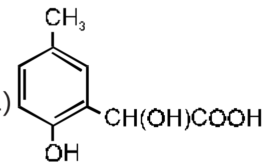
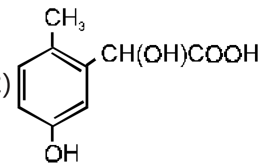
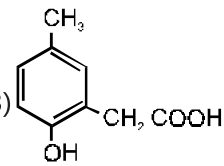
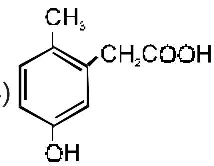
Q.146 Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound if water during the reaction is continuously removed. The compound formed is generally known as –
(1) an enamine (2) a Schiff's base
(3) an amine (4)an imine

Q.142 fuEu esa ls ,d foU;kl dk 'fLiu&vkuyh' pEcdh; vk?k.k dk eku 2.84 BM gSA buesa lgh gS –
(1) d^4 (ncZy fyxSUM {ks=k esa)
(2) d^4 (icy fyxSUM {ks=k esa)
(3) d^5 (icy fyxSUM {ks=k esa)
(4) d^3 (ncZy rFkk lkFk gh icy {ks=k esa)

Q.143 Mkbcksju (B_2H_6) dh lajpuk esa gksrs gS –
(1) nks 2c-2e vkcU/k rFkk pkj 3c-2e vkcU/k
(2) pkj 2c-2e vkcU/k rFkk nks 3c-2e vkcU/k
(3) pkj 2c-2e vkcU/k rFkk pkj 3c-2e vkcU/k
(4) nks 2c-2e vkcU/k rFkk nks 3c-3e vkcU/k

Q.144 gkbMªkstu ijek.kq ds lEcU/k esa fuEu esa ls dkSu lk dFku lgh gS ?
(1) 3p d{kd dh rqyuk esa 3d d{kd dh ÅtkZ de gS
(2) 3s d{kd dh rqyuk esa 3p d{kd dh ÅtkZ de gS
(3) 3s, 3p rFkk 3d lHkh d{kd dh ÅtkZ leku gS
(4) 3d d{kd dh rqyuk esa 3s rFkk 3p d{kdks dh ÅtkZ de gS

Q.145 p–Øhlky {kkjh; ek/;e esa DyksjkQkeZ ds lkFk vfHkfØ;k djds ;kSfxd A cukrk gS tks gkbMªkstu lk;ukbM ds lkFk l;qDr gksdj ;kSfxd B nsrk gS B vEyh; ek/;e esa ty&vi?kfVr gksdj ,d dhjy dkcksZfDlfyd vEy nsrk gSA dkcksZfDlfyd vEy dh lajpuk gS

(1) 
(2) 
(3) 
(4) 

Q.146 ,d ,flM dh mRizsjdh; ek=kk dh mifLFkfr esa lk;DyksgsDlkuksu dh MkbesfFky ,ehu ds lkFk vfHkfØ;k djus ij] ;fn vfHkfØ;k ds chp ikuh yxkrkj gVk;k tkrk jgs rks ,d ;kSfxd curk gSA cuus okyk ;kSfxd lkekU;r% fuEu uke ls tkuk tkrk gS –
(1) ,d bUesfeu (2) ,d f'kQ cs l
(3) ,d ,ehu (4) ,d behu

Space for Rough Work

Q.147 An amount of solid NH_4HS is placed in a flask already containing ammonia gas at a certain temperature and 0.50 atm pressure. Ammonium hydrogen sulphide decomposes to yield NH_3 and H_2S gases in the flask. When the decomposition reaction reaches equilibrium, the total pressure in the flask rises to 0.84 atm ? The equilibrium constant for NH_4HS decomposition at this temperature is –

(1) 0.18 (2) 0.30 (3) 0.11 (4) 0.17

Q.148 $t_{\frac{1}{4}}$ can be taken as the time taken for the concentration of a reactant to drop to $\frac{3}{4}$ of its initial value. If the rate constant for a first order reaction is K, $t_{\frac{1}{4}}$ can be written as –

(1) 0.29/K (2) 0.10/K (3) 0.75/K (4) 0.69/K

Q.149 If the bond dissociation energies of XY, X_2 and Y_2 (all diatomic molecules) are in the ratio of 1 : 1 : 0.5 and Δ_fH for the formation of XY is –200 kJ mol^{-1}. The bond dissociation energy of X_2 will be

(1) 200 kJ mol^{-1} (2) 100 kJ mol^{-1}
(3) 400 kJ mol^{-1} (4) 300 kJ mol^{-1}

Q.150 An organic compound having molecular mass 60 is found to contain C = 20%, H = 6.67 % and N = 46.67 % while rest is oxygen. On heating it gives NH_3 alongwith a solid residue. The solid residue give violet colour with alkaline copper sulphate solution. The compound is –

(1) CH_3CONH_2 (2) CH_3NCO
(3) $CH_3CH_2CONH_2$ (4) $(NH_2)_2CO$

Q.147 ,d ¶ykLd esa ftlesa igys ls fdlh fuf'pr rkieku vkSj 0.50 ok;e.Myh; nkc ij veksfu;k xSl gS Bksl NH_4HS dh ,d ek=kk j[kh tkrh gA veksfu;e gkbMªkstu lYQkbM ¶ykLd esa NH_3 rFkk H_2S xSlksa esa fo?kfVr gkrh gA tc fo?kVu vfHkfØ;k lkE; ij igqprh g rks ¶ykLd esa VksVy nkc c<dj 0.84 ok;e.Myh; gks tkrk gA bl rkieku ij NH_4HS ds fo?kVu ds fy;s rY; fLFkjkad g –

(1) 0.18 (2) 0.30 (3) 0.11 (4) 0.17

Q.148 $t_{\frac{1}{4}}$ dks ml le; ds fy;s fy;k tkrk g ftlesa vfHkdkjd dk ikjfEHkd eku dk $\frac{3}{4}$ 'ks"k jg tkrk gA ;fn iFke dksfV dh vfHkfØ;k ds fy;s nj fLFkjkad K,g] rks $t_{\frac{1}{4}}$ dks bl idkj fy[kk tk ldrk g –

(1) 0.29/K (2) 0.10/K (3) 0.75/K (4) 0.69/K

Q.149 ;fn XY, X_2 vkSj Y_2 (lHkh f}ijek.kfod v.kq) dh cU/k fo;kstu Åtk,¡ 1 : 1 : 0.5 ds vuqikr esa g vkSj XY ds fuek.k ds fy;s Δ_fH –200 kJ mol^{-1} gks rks X_2 dh c/k fo;kstu Åtk gksxh

(1) 200 kJ mol^{-1} (2) 100 kJ mol^{-1}
(3) 400 kJ mol^{-1} (4) 300 kJ mol^{-1}

Q.150 ,d dkcfud ;kfxd ftlds v.kqHkkj 60 g blesa C = 20%, H = 6.67 % rFkk N = 46.67 % ,oa vo'ks"k vkfDlhtu gA xje djus ij ;g NH_3 rFkk ,d Bksl vo'ks"k nsrk gA Bksl vo'ks"k {kkjh; dkij lYQsV foy;u ds lkFk cSxuh jax nsrk gA ;kfxd g –

(1) CH_3CONH_2 (2) CH_3NCO
(3) $CH_3CH_2CONH_2$ (4) $(NH_2)_2CO$

Space for Rough Work

Code

C

AIEEE PAPER -2005

MATHEMATICS

Dated : 8 - 5 - 05

Q.1 If $A^2 - A + I = 0$, then the inverse of A is -
(1) A + I (2) A (3) A – I (4) I – A
[AIEEE-2005]

Q.2 If the cube roots of unity are 1, ω, ω^2 then the roots of the equation $(x-1)^3 + 8 = 0$, are - **[AIEEE-2005]**
(1) $-1, -1 + 2\omega, -1 - 2\omega^2$
(2) –1, –1, –1
(3) $-1, 1 - 2\omega, 1 - 2\omega^2$
(4) $-1, 1 + 2\omega, 1 + 2\omega^2$

Q.3 Let R = {(3, 3), (6, 6), (9, 9), (12, 12), (6, 12), (3, 9), (3, 12), (3, 6)} be relation on the set A = {3, 6, 9, 12}. The relation is - **[AIEEE-2005]**
(1) reflexive and transitive only
(2) reflexive only
(3) an equilvalence relation
(4) reflexive and symmetric only

Q.4 Area of the greatest rectangle that can be inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is - **[AIEEE-2005]**
(1) 2ab (2) ab (3) $\sqrt{ab}$ (4) $\frac{a}{b}$

Q.5 The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c > 0, is a parameter, is of order and degree as follows - **[AIEEE-2005]**
(1) order 1, degree 2 (2) order 1, degree 1
(3) order 1, degree 3 (4) order 2, degree 2

Q.6 $\lim\limits_{n\to\infty}\left[\frac{1}{n^2}\sec^2\frac{1}{n^2} + \frac{2}{n^2}\sec^2\frac{4}{n^2} + ... + \frac{1}{n}\sec^2 1\right]$ equals - **[AIEEE-2005]**
(1) $\frac{1}{2}$ sec 1 (2) $\frac{1}{2}$ cosec 1
(3) tan 1 (4) $\frac{1}{2}$ tan 1

Q.1 ;fn $A^2 - A + I = 0$ g, rk A dk ifryke g -
(1) A + I (2) A (3) A – I (4) I – A
[AIEEE-2005]

Q.2 ;fn 1, ω rFkk ω^2 ?kuey g 1 d] rk lehdj.k $(x-1)^3 + 8 = 0$, d ey g - **[AIEEE-2005]**
(1) $-1, -1 + 2\omega, -1 - 2\omega^2$
(2) –1, –1, –1
(3) $-1, 1 - 2\omega, 1 - 2\omega^2$
(4) $-1, 1 + 2\omega, 1 + 2\omega^2$

Q.3 ekuk R = {(3, 3), (6, 6), (9, 9), (12, 12), (6, 12), (3, 9), (3, 12), (3, 6)} lePp; A = {3, 6, 9, 12} ij ,d lEcU/k gA ;g lEcU/k - **[AIEEE-2005]**
(1) LorY; rFkk lØked g
(2) doy LorY; g
(3) ,d rY;rk lc/k g
(4) LorY; rFkk lefer g

Q.4 ml cMh l cMh vk;r] tk nh?koÙk $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ d vUrxr cuk;h tk ldrh g] dk {k=kQy g - **[AIEEE-2005]**
(1) 2ab (2) ab (3) $\sqrt{ab}$ (4) $\frac{a}{b}$

Q.5 oØ dy $y^2 = 2c(x + \sqrt{c})$, tgk c > 0 ,d ikpy g] dk inf'kr dju oky vody lehdj.k dh dkfV (order) rFkk ?kkr (degree) fuEu g - **[AIEEE-2005]**
(1) dkfV 1, ?kkr 2 (2) dkfV 1, ?kkr 1
(3) dkfV 1, ?kkr 3 (4) dkfV 2, ?kkr 2

Q.6 $\lim\limits_{n\to\infty}\left[\frac{1}{n^2}\sec^2\frac{1}{n^2} + \frac{2}{n^2}\sec^2\frac{4}{n^2} + ... + \frac{1}{n}\sec^2 1\right]$ dk eku g - **[AIEEE-2005]**
(1) $\frac{1}{2}$ sec 1 (2) $\frac{1}{2}$ cosec 1
(3) tan 1 (4) $\frac{1}{2}$ tan 1

Space for Rough Work

Q.7 ABC is a triangle. Forces $\vec{P}$, $\vec{Q}$, $\vec{R}$ acting along IA, IB and IC respectively are in equilibrium, where I is the incentre of ΔABC. Then P : Q : R is -

(1) sin A : sin B : sin C

(2) $\sin\frac{A}{2} : \sin\frac{B}{2} : \sin\frac{C}{2}$

(3) $\cos\frac{A}{2} : \cos\frac{B}{2} : \cos\frac{C}{2}$

(4) cos A : cos B : cos C **[AIEEE-2005]**

Q.8 If in a frequency distribution, the mean and median are 21 and 22 respectively, then its mode is approximately - **[AIEEE-2005]**

(1) 22.0 (2) 20.5 (3) 25.5 (4) 24.0

Q.9 Let P be the point (1, 0) and Q a point on the curve $y^2 = 8x$. The locus of mid point of PQ is -

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

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

[AIEEE-2005]

Q.10 If C is the mid point of AB and P is any point outside AB, then - **[AIEEE-2005]**

(1) $\overrightarrow{PA} + \overrightarrow{PB} = 2\overrightarrow{PC}$

(2) $\overrightarrow{PA} + \overrightarrow{PB} = \overrightarrow{PC}$

(3) $\overrightarrow{PA} + \overrightarrow{PB} + 2\overrightarrow{PC} = \vec{0}$

(4) $\overrightarrow{PA} + \overrightarrow{PB} + \overrightarrow{PC} = \vec{0}$

Q.11 If the coefficients of rth, (r + 1)th and (r + 2)th terms in the binomial expansion of $(1 + y)^m$ are in A.P., then m and r satisfy the equation - **[AIEEE-2005]**

(1) $m^2 - m(4r - 1) + 4r^2 - 2 = 0$

(2) $m^2 - m(4r + 1) + 4r^2 + 2 = 0$

(3) $m^2 - m(4r + 1) + 4r^2 - 2 = 0$

(4) $m^2 - m(4r - 1) + 4r^2 + 2 = 0$

Q.12 In a triangle PQR, $\angle R = \frac{\pi}{2}$, If $\tan\left(\frac{P}{2}\right)$ and $\tan\left(\frac{Q}{2}\right)$ are the roots of $ax^2 + bx + c = 0$, $a \neq 0$ then - **[AIEEE-2005]**

(1) a = b + c (2) c = a + b

(3) b = c (4) b = a + c

Q.7 ABC ,d f=kHkqt gS] ftlds fy, IA, IB rFkk IC ij Øe'k% cy $\vec{P}$, $\vec{Q}$ rFkk $\vec{R}$ yx jgs gSa tks lUrqyu esa gSa] tgk¡ I f=kHkqt ABC dk vUr%dsUnz gS] rks P : Q : R dk vuqikr gS -

(1) sin A : sin B : sin C

(2) $\sin\frac{A}{2} : \sin\frac{B}{2} : \sin\frac{C}{2}$

(3) $\cos\frac{A}{2} : \cos\frac{B}{2} : \cos\frac{C}{2}$

(4) cos A : cos B : cos C **[AIEEE-2005]**

Q.8 ;fn fdlh ckjackjrk caVu dk ekè; rFkk ekf/;d Øe'k% 21 rFkk 22 gS] rks mlds cgqyd dk vuqekfur eku gS - **[AIEEE-2005]**

(1) 22.0 (2) 20.5 (3) 25.5 (4) 24.0

Q.9 ekuk fcUnq P dk funsZ'kkad (1, 0) gS rFkk Q ,d fcUnq oØ $y^2 = 8x$ ij fLFkr gSA PQ ds eè; fcUnq dk fcUnqiFk gS -

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

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

[AIEEE-2005]

Q.10 ;fn C, AB dk eè; fcUnq gS rFkk P dksbZ Hkh ,d fcUnq gS tks AB ds ckgj gS] rks - **[AIEEE-2005]**

(1) $\overrightarrow{PA} + \overrightarrow{PB} = 2\overrightarrow{PC}$

(2) $\overrightarrow{PA} + \overrightarrow{PB} = \overrightarrow{PC}$

(3) $\overrightarrow{PA} + \overrightarrow{PB} + 2\overrightarrow{PC} = \vec{0}$

(4) $\overrightarrow{PA} + \overrightarrow{PB} + \overrightarrow{PC} = \vec{0}$

Q.11 ,d f}in $(1 + y)^m$ ds izlkj esa ;fn r oas (r + 1) oas rFkk (r + 2) oas inksa ds xq.kkad lekUrj Js.kh esa gSa] rks m rFkk r fuEu lehdj.k dks lUrq"V djrs gSa - **[AIEEE-2005]**

(1) $m^2 - m(4r - 1) + 4r^2 - 2 = 0$

(2) $m^2 - m(4r + 1) + 4r^2 + 2 = 0$

(3) $m^2 - m(4r + 1) + 4r^2 - 2 = 0$

(4) $m^2 - m(4r - 1) + 4r^2 + 2 = 0$

Q.12 ,d f=kHkqt PQR esa, $\angle R = \frac{\pi}{2}$ gSA ;fn $\tan\left(\frac{P}{2}\right)$ rFkk $\tan\left(\frac{Q}{2}\right)$, lehdj.k $ax^2 + bx + c = 0$, $a \neq 0$ ds ewy gSa] rks - **[AIEEE-2005]**

(1) a = b + c (2) c = a + b

(3) b = c (4) b = a + c

Space for Rough Work

Q.13 The system equations

$\alpha x + y + z = \alpha - 1$
$x + \alpha y + z = \alpha - 1$
$x + y + \alpha z = \alpha - 1$

has no solution, if α is - **[AIEEE-2005]**

(1) –2 (2) either –2 or 1
(3) not – 2 (4) 1

Q.14 The value of a for which the sum of the squares of the roots of the equation $x^2 - (a - 2)x - a - 1 = 0$ assume the least value is - **[AIEEE-2005]**

(1) 1 (2) 0 (3) 3 (4) 2

Q.15 If the roots of the equation $x^2 - bx + c = 0$ be two consecutive integers, then $b^2 - 4c$ equals -

(1) –2 (2) 3 (3) 2 (4) 1 **[AIEEE-2005]**

Q.16 If the letters of the word SACHIN are arranged in all possible ways and these words are written out as in dictionary, then the word SACHIN appears at serial number - **[AIEEE-2005]**

(1) 601 (2) 600 (3) 603 (4) 602

Q.17 The value of $^{50}C_4 + \sum_{r=1}^{6} {}^{56-r}C_3$ is - **[AIEEE-2005]**

(1) $^{55}C_4$ (2) $^{55}C_3$ (3) $^{56}C_3$ (4) $^{56}C_4$

Q.18 If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then which one of the following holds for all $n \geq 1$, by the principle of mathematical induction - **[AIEEE-2005]**

(1) $A^n = nA - (n - 1) I$ (2) $A^n = 2^{n-1} A - (n - 1) I$
(3) $A^n = nA + (n - I) I$ (4) $A^n = 2^{n-1}A + (n - 1) I$

Q.19 If the coefficient of x^7 in $\left[ax^2 + \left(\frac{1}{bx}\right)\right]^{11}$ equals the coefficient of x^{-7} in $\left[ax - \left(\frac{1}{bx^2}\right)\right]^{11}$, then a and b satisfy the relation - **[AIEEE-2005]**

(1) $a - b = 1$ (2) $a + b = 1$
(3) $\frac{a}{b} = 1$ (4) $ab = 1$

Q.13 lehdj.k fudk;

$\alpha x + y + z = \alpha - 1$
$x + \alpha y + z = \alpha - 1$
$x + y + \alpha z = \alpha - 1$

dk dkbZ gy ugha gS ;fn α dk eku - **[AIEEE-2005]**

(1) –2 gS (2) –2 vFkok 1 gS
(3) – 2 ugha gS (4) 1 gS

Q.14 lehdj.k $x^2 - (a - 2)x - a - 1 = 0$ ds ewyksa ds oxksZa ds ;ksx dk U;wure gksus ds fy;s a dk eku gS - **[AIEEE-2005]**

(1) 1 (2) 0 (3) 3 (4) 2

Q.15 ;fn lehdj.k $x^2 - bx + c = 0$ ds ewy nks Øekxr iw.kkZad gS] rks $b^2 - 4c$ dk eku gS - **[AIEEE-2005]**

(1) –2 (2) 3 (3) 2 (4) 1

Q.16 ;fn SACHIN 'kCn ds v{kjksa ls lHkh lEHko 'kCn cuk;s tk;s vkSj bu 'kCnksa dks vxzsth ds 'kCndks'k ds vuqlkj Øec) fd;k tk;s] rks SACHIN 'kCn dk Øe gksxk - **[AIEEE-2005]**

(1) 601 (2) 600 (3) 603 (4) 602

Q.17 $^{50}C_4 + \sum_{r=1}^{6} {}^{56-r}C_3$ dk eku gS - **[AIEEE-2005]**

(1) $^{55}C_4$ (2) $^{55}C_3$ (3) $^{56}C_3$ (4) $^{56}C_4$

Q.18 ;fn $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ rFkk $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ gS, rks xf.krh; vkxeu }kjk Kkr dhft, fd $n \geq 1$ ds fy, fuEu esa ls dkSu lk lR; gS - **[AIEEE-2005]**

(1) $A^n = nA - (n - 1) I$ (2) $A^n = 2^{n-1} A - (n - 1) I$
(3) $A^n = nA + (n - I) I$ (4) $A^n = 2^{n-1}A + (n - 1) I$

Q.19 ;fn $\left[ax^2 + \left(\frac{1}{bx}\right)\right]^{11}$ ds izlkj esa x^7 dk xq.kkad $\left[ax - \left(\frac{1}{bx^2}\right)\right]^{11}$ ds izlkj esa x^{-7} ds xq.kkad ds cjkcj gS] rks a vkSj b esa lEcU/k gS - **[AIEEE-2005]**

(1) $a - b = 1$ (2) $a + b = 1$
(3) $\frac{a}{b} = 1$ (4) $ab = 1$

Space for Rough Work

Q.20 Let f : (–1, 1) $\to$ B, be a function defined by $f(x) = \tan^{-1}\dfrac{2x}{1-x^2}$, then f is both one-one and onto when B is the interval - **[AIEEE-2005]**

(1) $\left(0, \frac{\pi}{2}\right)$ (2) $\left[0, \frac{\pi}{2}\right)$

(3) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ (4) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Q.21 If z_1 and z_2 are two non-zero complex numbers such that $|z_1 + z_2| = |z_1| + |z_2|$, then arg z_1 – arg z_2 is equal to - **[AIEEE-2005]**

(1) $\frac{\pi}{2}$ (2) $-\pi$

(3) 0 (4) $\frac{-\pi}{2}$

Q.22 If $w = \dfrac{z}{z - \frac{1}{3}i}$ and $|w| = 1$, then z lies on -

(1) an ellipse (2) a circle
(3) a straight line (4) a parabola
[AIEEE-2005]

Q.23 If $a^2 + b^2 + c^2 = -2$ and

$$f(x) = \begin{vmatrix} 1+a^2x & (1+b^2)x & (1+c^2)x \\ (1+a^2)x & 1+b^2x & (1+c^2)x \\ (1+a^2)x & (1+b^2)x & 1+c^2x \end{vmatrix}$$ then f(x) is a polynomial of degree - **[AIEEE-2005]**

(1) 1 (2) 0 (3) 3 (4) 2

Q.24 The normal to the curve $x = a(\cos\theta + \theta\sin\theta)$, $y = a(\sin\theta - \theta\cos\theta)$ at any point 'θ' is such that -
(1) it passes through the origin
(2) it makes anlge $\frac{\pi}{2} + \theta$ with the x-axis
(3) it passes through $\left(a\frac{\pi}{2}, -a\right)$
(4) it is at a constant distance from the origin.
[AIEEE-2005]

Q.20 ekuk f : (–1, 1) $\to$ B fuEu }kjk ifjHkkf"kr g : $f(x) = \tan^{-1}\dfrac{2x}{1-x^2}$ Qyu f ,d dh rFkk vkPNknd g] rk vUrjky B fuEu g - **[AIEEE-2005]**

(1) $\left(0, \frac{\pi}{2}\right)$ (2) $\left[0, \frac{\pi}{2}\right)$

(3) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ (4) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Q.21 ;fn z_1 vkj z_2 nk 'kU;rj lfEeJ l[;k;s bl idkj g] fd $|z_1 + z_2| = |z_1| + |z_2|$ rc arg z_1 – arg z_2 cjkcj g - **[AIEEE-2005]**

(1) $\frac{\pi}{2}$ (2) $-\pi$

(3) 0 (4) $\frac{-\pi}{2}$

Q.22 ;fn $w = \dfrac{z}{z - \frac{1}{3}i}$ rFkk $|w| = 1$, rc z fLFkr g -

(1) ,d nh?k o`Ùk ij (2) ,d o`Ùk ij
(3) ,d j[kk ij (4) ,d ijoy; ij
[AIEEE-2005]

Q.23 ;fn $a^2 + b^2 + c^2 = -2$ rFkk

$$f(x) = \begin{vmatrix} 1+a^2x & (1+b^2)x & (1+c^2)x \\ (1+a^2)x & 1+b^2x & (1+c^2)x \\ (1+a^2)x & (1+b^2)x & 1+c^2x \end{vmatrix}$$ rk f(x) ,d ,lk cgin g] ftl dh ?kkr g - **[AIEEE-2005]**

(1) 1 (2) 0 (3) 3 (4) 2

Q.24 oØ $x = a(\cos\theta + \theta\sin\theta)$, $y = a(\sin\theta - \theta\cos\theta)$ d fcUn 'θ' ij [khpk x;k vfHkyEc ,lk g] fd-
(1) og ey fcUn l gkdj tkrk g
(2) og x-v{k d lkFk $\frac{\pi}{2} + \theta$ dk dk.k cukrk g
(3) og fcUn $\left(a\frac{\pi}{2}, -a\right)$ l gkdj tkrk g
(4) og ey fcUn l vpj njh ij g
[AIEEE-2005]

Space for Rough Work

Q.25 A function is matched below against an interval whre it is supposed to be increasing. Which of the follownig pairs is incorrectly matched ?

interval	function
(1) $(-\infty, \infty)$	$x^3 - 3x^2 + 3x + 3$
(2) $[2, \infty)$	$2x^3 - 3x^2 - 12x + 6$
(3) $\left(-\infty, \frac{1}{3}\right]$	$3x^2 - 2x + 1$
(4) $(-\infty, -4]$	$x^3 + 6x^2 + 6$

[AIEEE-2005]

Q.26 Let α and β be the distinct roots of $ax^2 + bx + c = 0$, then $\lim_{x\to\alpha} \frac{1-\cos(ax^2+bx+c)}{(x-\alpha)^2}$ is equal to -

(1) $\frac{a^2}{2}(\alpha-\beta)^2$ (2) 0

(3) $\frac{-a^2}{2}(\alpha-\beta)^2$ (4) $\frac{1}{2}(\alpha-\beta)^2$

[AIEEE-2005]

Q.27 Suppose f(x) is differentiable at x = 1 and $\lim_{h\to 0} \frac{1}{h} f(1+h) = 5$, then $f'(1)$ equals -

(1) 3 (2) 4 (3) 5 (4) 6

[AIEEE-2005]

Q.28 Let f be differentiable for all x. If f(1) = – 2 and $f'(x) \ge 2$ for $x \in [1, 6]$, then - **[AIEEE-2005]**

(1) $f(6) \ge 8$ (2) $f(6) < 8$

(3) $f(6) < 5$ (4) $f(6) = 5$

Q.29 If f is a real-valued differentiable function satisfying $|f(x) - f(y)| \le (x-y)^2$, $x, y \in R$ and f(0) = 0, then f(1) equals - **[AIEEE-2005]**

(1) –1 (2) 0 (3) 2 (4) 1

Q.30 If x is so small that x^3 and higher power of x may be neglected, then $\frac{(1+x)^{3/2} - \left(1+\frac{1}{2}x\right)^3}{(1-x)^{1/2}}$ may be approximated as - **[AIEEE-2005]**

(1) $1 - \frac{3}{8}x^2$ (2) $3x + \frac{3}{8}x^2$

(3) $-\frac{3}{8}x^2$ (4) $\frac{x}{2} - \frac{3}{8}x^2$

Q.25 uhp fn; x, Qyuk dk mudk lkeu fn; x; vUrjkyk l feyku fd;k x;k g] ftue Qyu o/keku gA fuEu ;Xek e l dku l ;Xe dk feyku Bhd ugh g ?

vUrjky	Qyu
(1) $(-\infty, \infty)$	$x^3 - 3x^2 + 3x + 3$
(2) $[2, \infty)$	$2x^3 - 3x^2 - 12x + 6$
(3) $\left(-\infty, \frac{1}{3}\right]$	$3x^2 - 2x + 1$
(4) $(-\infty, -4]$	$x^3 + 6x^2 + 6$

[AIEEE-2005]

Q.26 ;fn α vkj β lehdj.k $ax^2 + bx + c = 0$ d nk vleku ey g] rk $\lim_{x\to\alpha} \frac{1-\cos(ax^2+bx+c)}{(x-\alpha)^2}$ dk eku g -

(1) $\frac{a^2}{2}(\alpha-\beta)^2$ (2) 0

(3) $\frac{-a^2}{2}(\alpha-\beta)^2$ (4) $\frac{1}{2}(\alpha-\beta)^2$

[AIEEE-2005]

Q.27 ekuk f(x) fcUn x = 1 ij vodyuh; g rFkk $\lim_{h\to 0} \frac{1}{h} f(1+h) = 5$ rk $f'(1)$ dk eku g -

(1) 3 (2) 4 (3) 5 (4) 6

[AIEEE-2005]

Q.28 ekuk f lHkh x d fy, vodyuh; gA ;fn f(1) = – 2 rFkk $x \in [1, 6]$ d fy, $f'(x) \ge 2$, rk - **[AIEEE-2005]**

(1) $f(6) \ge 8$ (2) $f(6) < 8$

(3) $f(6) < 5$ (4) $f(6) = 5$

Q.29 ;fn f ,d okLrfod Qyu g] tk vodyuh; g rFkk $|f(x) - f(y)| \le (x-y)^2$, $x, y \in R$ dk lUr"V djrk g rFkk f(0) = 0 g, rk f(1) dk eku g - **[AIEEE-2005]**

(1) –1 (2) 0 (3) 2 (4) 1

Q.30 ;fn x bruk NkVk g] fd x^3 rFkk x dh mPp ?kkrk dh mi{kk dh tk ldrh g] rk $\frac{(1+x)^{3/2} - \left(1+\frac{1}{2}x\right)^3}{(1-x)^{1/2}}$ dk yxHkx eku g - **[AIEEE-2005]**

(1) $1 - \frac{3}{8}x^2$ (2) $3x + \frac{3}{8}x^2$

(3) $-\frac{3}{8}x^2$ (4) $\frac{x}{2} - \frac{3}{8}x^2$

Space for Rough Work

Q.31 If $x = \sum_{n=0}^{\infty} a^n$, $y = \sum_{n=0}^{\infty} b^n$, $z = \sum_{n=0}^{\infty} c^n$ where a, b, c are in A.P. and | a | < 1, | b | < 1, | c | < 1 then x, y, z are in - **[AIEEE-2005]**

(1) GP
(2) AP
(3) arithmetic - geometric progression
(4) HP

Q.32 In a triangle ABC, let $\angle C = \frac{\pi}{2}$. If r is the in-radius and R is the circumradius of the triangle ABC, then 2(r + R) equals - **[AIEEE-2005]**

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

Q.33 If $\cos^{-1}x - \cos^{-1}\frac{y}{2} = \alpha$, then $4x^2 - 4xy\cos\alpha + y^2$ is equal to - **[AIEEE-2005]**

(1) $2 \sin 2\alpha$ (2) 4
(3) $4 \sin^2 \alpha$ (4) $-4 \sin^2 \alpha$

Q.34 If in a ΔABC, the altitudes from the vertices A, B, C on opposite sides are in H.P., then sin A, sin B, sin C are in - **[AIEEE-2005]**

(1) G.P.
(2) A.P.
(3) Arithmetic – Geometric progression
(4) H.P.

Q.35 If $I_1 = \int_0^1 2^{x^2} dx$, $I_2 = \int_0^1 2^{x^3} dx$,

$I_3 = \int_1^2 2^{x^2} dx$ and $I_4 = \int_1^2 2^{x^3} dx$ then - **[AIEEE-2005]**

(1) $I_2 > I_1$ (2) $I_1 > I_2$
(3) $I_3 = I_4$ (4) $I_3 > I_4$

Q.36 The area enclosed between the curve $y = \log_e(x + e)$ and the coordinate axes is - **[AIEEE-2005]**

(1) 1 (2) 2 (3) 3 (4) 4

Q.31 ;fn $x = \sum_{n=0}^{\infty} a^n$, $y = \sum_{n=0}^{\infty} b^n$, $z = \sum_{n=0}^{\infty} c^n$ tcfd a, b, c lekUrj J.kh esa gSa rFkk | a | < 1, | b | < 1 rFkk | c | < 1 rks x, y rFkk z **[AIEEE-2005]**

(1) xq.kksÙkj J.kh esa g
(2) lekUrj J.kh esa g
(3) lekUrj xq.kksÙkj J.kh esa g
(4) gjkRed J.kh esa g

Q.32 ,d f=kHkqt ABC esa, ekuk $\angle C = \frac{\pi}{2}$, ;fn r f=kHkqt d vUr%o`Ùk dh f=kT;k rFkk R f=kHkqt d ifjo`Ùk dh f=kT;k gS] rks 2(r + R) dk eku g - **[AIEEE-2005]**

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

Q.33 ;fn $\cos^{-1}x - \cos^{-1}\frac{y}{2} = \alpha$, rks $4x^2 - 4xy\cos\alpha + y^2$ dk eku g - **[AIEEE-2005]**

(1) $2 \sin 2\alpha$ (2) 4
(3) $4 \sin^2 \alpha$ (4) $-4 \sin^2 \alpha$

Q.34 ;fn ΔABC esa, 'kh"kZ A, B rFkk C ls lEe[k Hkqtkvksa ij Mky x, 'kh"kZ yEc gjkRed J.kh esa g] rks sin A, sin B rFkk sin C **[AIEEE-2005]**

(1) xq.kksÙkj J.kh esa g
(2) lekUrj J.kh esa g
(3) lekUrj xq.kksÙkj J.kh esa g
(4) gjkRed J.kh esa g

Q.35 ;fn $I_1 = \int_0^1 2^{x^2} dx$, $I_2 = \int_0^1 2^{x^3} dx$,

$I_3 = \int_1^2 2^{x^2} dx$ rFkk $I_4 = \int_1^2 2^{x^3} dx$ rks - **[AIEEE-2005]**

(1) $I_2 > I_1$ (2) $I_1 > I_2$
(3) $I_3 = I_4$ (4) $I_3 > I_4$

Q.36 ml {ks=kQy] tks fd oØ $y = \log_e(x + e)$ vkSj v{kksa d chp esa cuk g] ml dk eku gksxk - **[AIEEE-2005]**

(1) 1 (2) 2 (3) 3 (4) 4

Space for Rough Work

Q.37 The parabolas $y^2 = 4x$ and $x^2 = 4y$ divide the square region bounded by the lines x = 4, y = 4 and the coordinate axes. If S_1, S_2, S_3 are respectively the areas of these parts numbered from top to bottom; then $S_1 : S_2 : S_3$ is - **[AIEEE-2005]**

(1) 1 : 2 : 1 (2) 1 : 2 : 3
(3) 2 : 1 : 2 (4) 1 : 1 : 1

Q.38 If $x \frac{dy}{dx} = y (\log y - \log x + 1)$, then the solution of the equation is - **[AIEEE-2005]**

(1) $y \log \left(\frac{x}{y}\right) = cx$ (2) $x \log \left(\frac{y}{x}\right) = cy$

(3) $\log \left(\frac{y}{x}\right) = cx$ (4) $\log \left(\frac{x}{y}\right) = cy$

Q.39 The line parallel to the x-axis and passing through the intersection of the lines ax + 2by + 3b = 0 and bx – 2ay – 3a = 0, where $(a, b) \neq (0, 0)$ is -

(1) below the x-axis at a distance of $\frac{3}{2}$ from it
(2) below the x-axis at a distance of $\frac{2}{3}$ from it
(3) above the x-axis at a distance of $\frac{3}{2}$ from it
(4) above the x-axis at a distance of $\frac{2}{3}$ from it

[AIEEE-2005]

Q.40 A spherical iron ball 10 cm in radius is coated with a layer of ice of uniform thickness that melts at a rate of 50 cm^3/min. When the thickness of ice is 5 cm, then the rate of which the thickness of ice decreases, is - **[AIEEE-2005]**

(1) $\frac{1}{36\pi}$ cm/min. (2) $\frac{1}{18\pi}$ cm/min.
(3) $\frac{1}{54\pi}$ cm/min. (4) $\frac{5}{6\pi}$ cm/min.

Q.37 ijoy; $y^2 = 4x$ rFkk $x^2 = 4y$, j[kkvk x = 4, y = 4 rFkk fun'kkd v{kk l f?kj oxkdkj {k=k dk ckVr gA ;fn Åij l uhp rd rhu [k.Mk d Øe'k {k=kQy S_1, S_2 rFkk S_3 g] rk $S_1 : S_2 : S_3$ dk eku g - **[AIEEE-2005]**

(1) 1 : 2 : 1 (2) 1 : 2 : 3
(3) 2 : 1 : 2 (4) 1 : 1 : 1

Q.38 ;fn $x \frac{dy}{dx} = y (\log y - \log x + 1)$, rk bl lehdj.k dk gy g - **[AIEEE-2005]**

(1) $y \log \left(\frac{x}{y}\right) = cx$ (2) $x \log \left(\frac{y}{x}\right) = cy$

(3) $\log \left(\frac{y}{x}\right) = cx$ (4) $\log \left(\frac{x}{y}\right) = cy$

Q.39 x-v{k d lekUrj rFkk j[kkvk ax + 2by + 3b = 0 rFkk bx – 2ay – 3a = 0, tgk $(a, b) \neq (0, 0)$ d ifrPNnu fcUn l gkdj tku okyh j[kk -

(1) x-v{k l uhp g rFkk ml l $\frac{3}{2}$ dh njh ij g
(2) x-v{k l uhp g rFkk ml l $\frac{2}{3}$ dh njh ij g
(3) x-v{k l Åij g rFkk ml l $\frac{3}{2}$ dh njh ij g
(4) x-v{k l Åij g rFkk ml l $\frac{2}{3}$ dh njh ij g

[AIEEE-2005]

Q.40 ,d xkykdkj ykg dk xn] ftl dh f=kT;k 10 lseh g] cQ dh ,d leku eksVkbZ dh ijr l <dk g] tk 50 lseh^3/feuV dh nj l fi?ky jgh gA tc cQ dh ijr dh eksVkbZ 5 lseh g, og nj ftl l cQ dh ijr dh eksVkbZ de gk jgh g] g- **[AIEEE-2005]**

(1) $\frac{1}{36\pi}$ lseh@fe- (2) $\frac{1}{18\pi}$ lseh@fe-
(3) $\frac{1}{54\pi}$ lseh@fe- (4) $\frac{5}{6\pi}$ lseh@fe-

Space for Rough Work

Q.41 $\int \left\{ \frac{(\log x - 1)}{1 + (\log x)^2} \right\}^2 dx$ is equal to - **[AIEEE-2005]**

(1) $\frac{\log x}{(\log x)^2 + 1} + C$ (2) $\frac{x}{x^2 + 1} + C$

(3) $\frac{xe^x}{1 + x^2} + C$ (4) $\frac{x}{(\log x)^2 + 1} + C$

Q.42 Let $f : R \to R$ be a differentiable function having $f(2) = 6, f'(2) = \left(\frac{1}{48}\right)$. Then $\underset{x \to 2}{\text{Lt}} \int_6^{f(x)} \frac{4t^3}{x - 2} dt$ equals -

(1) 24 (2) 36 (3) 12 (4) 18

[AIEEE-2005]

Q.43 Let f (x) be a non-negative continuous function such that the area bounded by the curve y = f (x), x-axis and the ordinates $x = \frac{\pi}{4}$ and $x = \beta > \frac{\pi}{4}$ is $\left(\beta \sin\beta + \frac{\pi}{4}\cos\beta + \sqrt{2}\beta\right)$. Then $f\left(\frac{\pi}{2}\right)$ is -

(1) $\left(\frac{\pi}{4} + \sqrt{2} - 1\right)$ (2) $\left(\frac{\pi}{4} - \sqrt{2} + 1\right)$

(3) $\left(1 - \frac{\pi}{4} - \sqrt{2}\right)$ (4) $\left(1 - \frac{\pi}{4} + \sqrt{2}\right)$

[AIEEE-2005]

Q.44 The locus of a point P(α, β) moving under the condition that the line y = αx + β is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is - **[AIEEE-2005]**

(1) an ellipse (2) a circle

(3) a parabola (4) a hyperbola

Q.45 If the angle θ between the line $\frac{x+1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$ and the plane $2x - y + \sqrt{\lambda}\, z + 4 = 0$ is such that $\sin\theta = \frac{1}{3}$ the value of λ is - **[AIEEE-2005]**

(1) $\frac{5}{3}$ (2) $\frac{-3}{5}$ (3) $\frac{3}{4}$ (4) $\frac{-4}{3}$

Q.41 $\int \left\{ \frac{(\log x - 1)}{1 + (\log x)^2} \right\}^2 dx$ dk eku g - **[AIEEE-2005]**

(1) $\frac{\log x}{(\log x)^2 + 1} + C$ (2) $\frac{x}{x^2 + 1} + C$

(3) $\frac{xe^x}{1 + x^2} + C$ (4) $\frac{x}{(\log x)^2 + 1} + C$

Q.42 ekuk $f : R \to R$,d vodyuh; Qyu g] ftld fy, $f(2) = 6, f'(2) = \left(\frac{1}{48}\right)$ g] rk $\underset{x \to 2}{\text{Lt}} \int_6^{f(x)} \frac{4t^3}{x - 2} dt$ cjkcj g-

(1) 24 (2) 36 (3) 12 (4) 18

[AIEEE-2005]

Q.43 ekuk f (x) ,d bl idkj dk v_.kkRed lrr Qyu g] fd oØ y = f (x), x-v{k rFkk j[kkvk $x = \frac{\pi}{4}$ rFkk $x = \beta > \frac{\pi}{4}$ l vkc) {k=k dk {k=kQy $\left(\beta \sin\beta + \frac{\pi}{4}\cos\beta + \sqrt{2}\beta\right)$ g] rk $f\left(\frac{\pi}{2}\right)$ dk eku g -

(1) $\left(\frac{\pi}{4} + \sqrt{2} - 1\right)$ (2) $\left(\frac{\pi}{4} - \sqrt{2} + 1\right)$

(3) $\left(1 - \frac{\pi}{4} - \sqrt{2}\right)$ (4) $\left(1 - \frac{\pi}{4} + \sqrt{2}\right)$

[AIEEE-2005]

Q.44 fcUnq P(α, β), tk bl ifrcU/k d vUrxr ?ke jgk g] fd y = αx + β vfrijoy; $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ dh Li'k j[kk g] dk fcUnq-iFk - **[AIEEE-2005]**

(1) ,d nh?ko Ùk g (2) ,d o Ùk g

(3) ,d ijoy; g (4) ,d vfrijoy; g

Q.45 ;fn j[kk $\frac{x+1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$ rFkk ry $2x - y + \sqrt{\lambda}\, z + 4 = 0$ d chp dk.k θ ,lk g] fd $\sin\theta = \frac{1}{3}$ g] rk λ dk eku g - **[AIEEE-2005]**

(1) $\frac{5}{3}$ (2) $\frac{-3}{5}$ (3) $\frac{3}{4}$ (4) $\frac{-4}{3}$

Space for Rough Work

Q.46 The angle between the lines 2x = 3y = – z and 6x = – y = – 4z is - **[AIEEE-2005]**

(1) 0º (2) 90º (3) 45º (4) 30º

Q.47 If the plane 2ax – 3ay + 4az + 6 = 0 passes through the midpoint of the line joining the centres of the spheres $x^2 + y^2 + z^2 + 6x – 8y – 2z = 13$ and $x^2 + y^2 + z^2 – 10x + 4y – 2z = 8$ then a equals -

(1) –1 (2) 1 (3) –2 (4) 2

[AIEEE-2005]

Q.48 The distance between the line

$\vec{r} = 2\hat{i} - 2\hat{j} + 3\hat{k} + \lambda(\hat{i} - \hat{j} + 4\hat{k})$ and the plane

$\vec{r}.(\hat{i} + 5\hat{j} + \hat{k}) = 5$ is - **[AIEEE-2005]**

(1) $\frac{10}{9}$ (2) $\frac{10}{3\sqrt{3}}$ (3) $\frac{3}{10}$ (4) $\frac{10}{3}$

Q.49 For any vector $\vec{a}$, the value of

$(\vec{a} \times \hat{i})^2 + (\vec{a} \times \hat{j})^2 + (\vec{a} \times \hat{k})^2$ is equal to -

(1) $3\vec{a}^2$ (2) $\vec{a}^2$ (3) $2\vec{a}^2$ (4) $4\vec{a}^2$

[AIEEE-2005]

Q.50 If non-zero numbers a, b, c are in H.P., then the straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point. that point is - **[AIEEE-2005]**

(1) (–1, 2) (2) (–1, –2)

(3) (1, – 2) (4) $\left(1, -\frac{1}{2}\right)$

Q.51 If a vertex of a triangle is (1, 1) and the mid points of two sides through this vertex are (–1, 2) and (3, 2), then the centroid of the triangle is - **[AIEEE-2005]**

(1) $\left(-1, \frac{7}{3}\right)$ (2) $\left(\frac{-1}{3}, \frac{7}{3}\right)$

(3) $\left(1, \frac{7}{3}\right)$ (4) $\left(\frac{1}{3}, \frac{7}{3}\right)$

Q.46 j[kkvk 2x = 3y = – z rFkk 6x = – y = – 4z d chp d dk.k dk eku g - **[AIEEE-2005]**

(1) 0º (2) 90º (3) 45º (4) 30º

Q.47 ;fn ry 2ax – 3ay + 4az + 6 = 0 nk xkyk $x^2 + y^2 + z^2 + 6x – 8y – 2z = 13$ rFkk $x^2 + y^2 + z^2 – 10x + 4y – 2z = 8$ d dUnk dk feykus oky j[kk[k.M d e/; fcUn l gkdj tkrk g] rk a dk eku g -

(1) –1 (2) 1 (3) –2 (4) 2

[AIEEE-2005]

Q.48 j[kk $\vec{r} = 2\hat{i} - 2\hat{j} + 3\hat{k} + \lambda(\hat{i} - \hat{j} + 4\hat{k})$ rFkk ry $\vec{r}.(\hat{i} + 5\hat{j} + \hat{k}) = 5$ d chp dh njh g - **[AIEEE-2005]**

(1) $\frac{10}{9}$ (2) $\frac{10}{3\sqrt{3}}$ (3) $\frac{3}{10}$ (4) $\frac{10}{3}$

Q.49 fdlh Hkh lfn'k $\vec{a}$ d fy,

$(\vec{a} \times \hat{i})^2 + (\vec{a} \times \hat{j})^2 + (\vec{a} \times \hat{k})^2$ dk eku fuEu e l fdl d cjkcj g -

(1) $3\vec{a}^2$ (2) $\vec{a}^2$ (3) $2\vec{a}^2$ (4) $4\vec{a}^2$

[AIEEE-2005]

Q.50 ;fn 'kU;rj l[;k, a, b, c gjkRed J.kh e g] rk j[kk $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ lnk ,d fLFkj fcUn l xtjrh gA og fcUn g - **[AIEEE-2005]**

(1) (–1, 2) (2) (–1, –2)

(3) (1, – 2) (4) $\left(1, -\frac{1}{2}\right)$

Q.51 ;fn f=kHkt dk ,d 'kh"k (1, 1) g rFkk ml 'kh"k l gkdj tku okyh nk Hkktvk d e/; fcUn (–1, 2) rFkk (3, 2) g] rk ml f=kHkt dk dUnd g - **[AIEEE-2005]**

(1) $\left(-1, \frac{7}{3}\right)$ (2) $\left(\frac{-1}{3}, \frac{7}{3}\right)$

(3) $\left(1, \frac{7}{3}\right)$ (4) $\left(\frac{1}{3}, \frac{7}{3}\right)$

Space for Rough Work

Q.52 If the circles $x^2 + y^2 + 2ax + cy + a = 0$ and $x^2 + y^2 - 3ax + dy - 1 = 0$ intersect in two distinct point P and Q then the line $5x + by - a = 0$ passes through P and Q for - **[AIEEE-2005]**
(1) exactly one value of a
(2) no value of a
(3) infinitely many values of a
(4) exactly two values of a

Q.53 A circle touches the x-axis and also touches the circle with centre at (0, 3) and radius 2. The locus of the centre of the circle is - **[AIEEE-2005]**
(1) an ellipse (2) a circle
(3) a hyperbola (4) a parabola

Q.54 If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = p^2$ orthogonally, then the equation of the locus of its centre is - **[AIEEE-2005]**
(1) $x^2 + y^2 - 3ax - 4by + (a^2 + b^2 - p^2) = 0$
(2) $2ax + 2by - (a^2 - b^2 + p^2) = 0$
(3) $x^2 + y^2 - 2ax - 3by + (a^2 - b^2 - p^2) = 0$
(4) $2ax + 2by - (a^2 + b^2 + p^2) = 0$

Q.55 An ellipse has OB as semi minor axis, F and F′ its focii and the angle FBF′ is a right angle. Then the eccentricity of the ellipse is - **[AIEEE-2005]**
(1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{2}$ (3) $\frac{1}{4}$ (4) $\frac{1}{\sqrt{3}}$

Q.56 Let a, b and c be distinct non-negative numbers. If the vectors $a\hat{i} + a\hat{j} + c\hat{k}$, $\hat{i} + \hat{k}$ and $c\hat{i} + c\hat{j} + b\hat{k}$ lie in a plane, then c is - **[AIEEE-2005]**
(1) the Geometric Mean of a and b
(2) the Arithmetic Mean of a and b
(3) equal to zero
(4) the Harmonic Mean of a and b

Q.57 If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors and λ is a real number then $[\lambda(\vec{a}+\vec{b})\ \ \lambda^2\vec{b}\ \ \lambda\vec{c}] = [\vec{a}\ \ \vec{b}+\vec{c}\ \ \vec{b}]$ for -
(1) exactly one value of λ
(2) no value of λ
(3) exactly three values of λ
(4) exactly two values of λ **[AIEEE-2005]**

Q.52 ;fn oÙk $x^2 + y^2 + 2ax + cy + a = 0$ rFkk $x^2 + y^2 - 3ax + dy - 1 = 0$ nks fHkUu fcUnvksa P rFkk Q ij izfrPNsn djrs gSa rks js[kk $5x + by - a = 0$, fcUnqvksa P rFkk Q ls gksdj tkrh gS - **[AIEEE-2005]**
(1) a ds doy ,d eku ds fy,
(2) a ds fdlh eku ds fy, ugha
(3) a ds vuUr ekuksa ds fy,
(4) a ds doy nks ekuksa ds fy,

Q.53 ,d oÙk x-v{k dks Li'kZ djrk gS vkSj ,d nwljs oÙk dks Hkh Li'kZ djrk gS ftldk dsUnz (0, 3) gS rFkk f=kT;k 2 gSA ml oÙk ds dsUnz dk fcUnqiFk dks lehdj.k fuEu esa ls D;k gS- **[AIEEE-2005]**
(1) ,d nh?kZoÙk (2) ,d oÙk
(3) ,d vfrijoy; (4) ,d ijoy;

Q.54 ;fn ,d oÙk (a, b) fcUnq ls xqtjrk gS rFkk nwljs oÙk $x^2 + y^2 = p^2$ dks ledks.k ij dkVrk gS] rks mlds dsUnz ds fcUnqiFk dk lehdj.k gksxk - **[AIEEE-2005]**
(1) $x^2 + y^2 - 3ax - 4by + (a^2 + b^2 - p^2) = 0$
(2) $2ax + 2by - (a^2 - b^2 + p^2) = 0$
(3) $x^2 + y^2 - 2ax - 3by + (a^2 - b^2 - p^2) = 0$
(4) $2ax + 2by - (a^2 + b^2 + p^2) = 0$

Q.55 ,d nh?kZoÙk dk OB ,d v/kZ y?kq-v{k gS] F rFkk F′ mlds ukfHk;k¡ rFkk dks.k FBF′ ledks.k gSA ml nh?kZoÙk dh mRdsUnzrk gS - **[AIEEE-2005]**
(1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{2}$ (3) $\frac{1}{4}$ (4) $\frac{1}{\sqrt{3}}$

Q.56 ekuk a, b rFkk c fHkUu v_.kkRed la[;k,¡ gSA ;fn lfn'k $a\hat{i} + a\hat{j} + c\hat{k}$, $\hat{i} + \hat{k}$ rFkk $c\hat{i} + c\hat{j} + b\hat{k}$,d ry esa gS] rks c dk eku gS - **[AIEEE-2005]**
(1) a rFkk b dk xq.kksÙkj ek/;
(2) a rFkk b dk lekUrj ek/;
(3) 'kwU;
(4) a rFkk b dk gjkRed ek/;

Q.57 ;fn $\vec{a}, \vec{b}$ rFkk $\vec{c}$ vleryh; lfn'k gS rFkk λ ,d okLrfod la[;k gS] rks $[\lambda(\vec{a}+\vec{b})\ \ \lambda^2\vec{b}\ \ \lambda\vec{c}] = [\vec{a}\ \ \vec{b}+\vec{c}\ \ \vec{b}]$
(1) λ ds doy ,d eku ds fy,
(2) λ ds fdlh eku ds fy, ugha
(3) λ ds doy rhu ekuksa ds fy,
(4) λ ds doy nks ekuksa ds fy, **[AIEEE-2005]**

Space for Rough Work

Q.58 Let $\vec{a} = \hat{i} - \hat{k}$, $\vec{b} = x\hat{i} + \hat{j} + (1 - x)\hat{k}$ and $\vec{c} = y\hat{i} + x\hat{j} + (1 + x - y)\hat{k}$. Then $[\vec{a}, \vec{b}, \vec{c}]$ depends on - **[AIEEE-2005]**

(1) only y (2) only x
(3) both x and y (4) neither x nor y

Q.59 Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that alll the three apply for the same house is -

(1) $\frac{2}{9}$ (2) $\frac{1}{9}$ (3) $\frac{8}{9}$ (4) $\frac{7}{9}$

[AIEEE-2005]

Q.60 A random variable X has Poisson distribution with mean 2. Then $P(X > 1.5)$ equals - **[AIEEE-2005]**

(1) $\frac{2}{e^2}$ (2) 0 (3) $1 - \frac{3}{e^2}$ (4) $\frac{3}{e^2}$

Q.61 Let A and B be two events such that $P(\overline{A \cup B}) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ and $P(\overline{A}) = \frac{1}{4}$, where $\overline{A}$ stands for complement of event A. Then events A and B are - **[AIEEE-2005]**

(1) equally likely and mutually exclusive
(2) equally likely but not independent
(3) independent but not equally likely
(4) mutually exclusive and independent

Q.62 A lizard, at an initial distance of 21 cm behind an insect, moves from rest with an acceleration of 2 cm/s^2 and pursues the insect which is crawling uniformly along a straight line at a speed of 20 cm/s. Then the lizard will catch the insect after -

(1) 20 second (2) 1 second
(3) 21 second (4) 24 second

[AIEEE-2005]

Q.63 Two points A and B move from rest along a straight line with constant acceleration f and f′ respectively. If A takes m sec. more than B and describes 'n' units more than B in qcquiring the same speed then-

(1) $(f - f')m^2 = ff'n$ (2) $(f + f')m^2 = ff'n$
(3) $\frac{1}{2}(f + f')m = ff'n^2$ (4) $(f' - f)n = \frac{1}{2}ff'm^2$

[AIEEE-2005]

Q.58 ;fn $\vec{a} = \hat{i} - \hat{k}$, $\vec{b} = x\hat{i} + \hat{j} + (1 - x)\hat{k}$ rFkk $\vec{c} = y\hat{i} + x\hat{j} + (1 + x - y)\hat{k}$ g] rks $[\vec{a}, \vec{b}, \vec{c}]$ fuHkZj djrk g - **[AIEEE-2005]**

(1) doy y ij (2) doy x ij
(3) x vkSj y nksuks ij (4) u x ij vkSj u y ij

Q.59 fdlh LFkku (locality) ij rhu ?kj miyC/k gSaA rhu O;fDr mu ?kjksa ds fy, izkFkZuk i=k Hkstrs gSaA izR;sd nwljs ds ijke'k ds fcuk] ,d ?kj ds fy, izkFkZuk i=k Hkstrk gSA izkf;drk fd rhuksa dk izkFkZuk i=k ,d gh ?kj ds fy, gksxk] g -

(1) $\frac{2}{9}$ (2) $\frac{1}{9}$ (3) $\frac{8}{9}$ (4) $\frac{7}{9}$

[AIEEE-2005]

Q.60 ,d ;kn`PN pj X dk Ikokla cVu gS ftldk ek/; 2 g] rks $P(X > 1.5)$ cjkcj g - **[AIEEE-2005]**

(1) $\frac{2}{e^2}$ (2) 0 (3) $1 - \frac{3}{e^2}$ (4) $\frac{3}{e^2}$

Q.61 ekuk A rFkk B ,lh nks ?kVuk,a g] fd $P(\overline{A \cup B}) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ rFkk $P(\overline{A}) = \frac{1}{4}$ g, tgka $\overline{A}$, ?kVuk A dh ijd ?kVuk g] rks A rFkk B **[AIEEE-2005]**

(1) leizkf;d rFkk ijLij viothZ ?kVuk,a g
(2) leizkf;d yfdu Lora=k ?kVuk,a ugha g
(3) Lora=k yfdu leizkf;d ?kVuk,a ugha g
(4) ijLij vioth rFkk Lora=k ?kVuk,a g

Q.62 ,d fNidyh] tks ikjEHk e ,d dhM l 21 lseh ihN g] fojke l pydj 2 lseh/l-^{2} d Roj.k l ml dhM d ihN pyrh g] tks 20 lseh/l- dh ,d leku xfr l ,d js[kk e py jgk gSA fNidyh ml dhM dks idM+ yxh -

(1) 20 l- d ckn (2) 1 l- d ckn
(3) 21 l- d ckn (4) 24 l- d ckn

[AIEEE-2005]

Q.63 nks fcUnq A rFkk B, fojke l ikjEHk dj] ,d ljy js[kk e Øe'k% vpj Roj.k f rFkk f′ l py jg gSaA ;fn A. N l m lsdUM vf/kd ysdj B l 'n' ,dd vf/kd r; dj] nksuks ,d tSlh xfr ikrs g] rks -

(1) $(f - f')m^2 = ff'n$ (2) $(f + f')m^2 = ff'n$
(3) $\frac{1}{2}(f + f')m = ff'n^2$ (4) $(f' - f)n = \frac{1}{2}ff'm^2$

[AIEEE-2005]

Space for Rough Work

Q.64 A and B are two like parallel forces. A couple of moment H lies in the plane of A and B and is contained with them. The resultant of A and B after combining is displaced through a distance - **[AIEEE-2005]**

(1) $\frac{2H}{A-B}$ (2) $\frac{H}{A+B}$

(3) $\frac{H}{2(A+B)}$ (4) $\frac{H}{A-B}$

Q.65 The resultant R of two forces acting on a particle is at right angles to one of them and its magnitude is one third of the other force. The ratio of larger force to smaller one is - **[AIEEE-2005]**

(1) 2 : 1 (2) 3 : $\sqrt{2}$

(3) 3 : 2 (4) 3 : 2$\sqrt{2}$

Q.66 The sum of the series

$1 + \frac{1}{4.2!} + \frac{1}{16.4!} + \frac{1}{64.6!} + ...$ ad inf. is -

(1) $\frac{e-1}{\sqrt{e}}$ (2) $\frac{e+1}{\sqrt{e}}$ (3) $\frac{e-1}{2\sqrt{e}}$ (4) $\frac{e+1}{2\sqrt{e}}$

[AIEEE-2005]

Q.67 The value of $\int_{-\pi}^{\pi}\frac{\cos^2 x}{1+a^x}dx, a > 0$, is- **[AIEEE-2005]**

(1) $a\pi$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{a}$ (4) 2π

Q.68 The plane x + 2y – z = 4 cuts the sphere $x^2 + y^2 + z^2 - x + z - 2 = 0$ in a circle of radius -

(1) 3 (2) 1 (3) 2 (4) $\sqrt{2}$

[AIEEE-2005]

Q.69 If the pair of lines $ax^2 + 2(a + b)xy + by^2 = 0$ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the area of another sector then -

(1) $3a^2 - 10ab + 3b^2 = 0$
(2) $3a^2 - 2ab + 3b^2 = 0$
(3) $3a^2 + 10ab + 3b^2 = 0$
(4) $3a^2 + 2ab + 3b^2 = 0$ **[AIEEE-2005]**

Q.70 Let $x_1, x_2, ... x_n$ be n observations such that $\sum x_i^2 = 400$ and $\sum x_i = 80$. Then a possible value of n among the following is -

(1) 15 (2) 18 (3) 9 (4) 12

[AIEEE-2005]

Q.64 A rFkk B nks lefn'k lekUrj cy gSA H vk?kw.kZ dk ,d cy-;qXe A rFkk B ds ry esa fLFkr gS A rFkk B ds lkFk tqM+k gS A rFkk B dks la;qDr djus ds ckn buds ifj.kkeh dh nwjh ij foLFkkfir gksrk gS - **[AIEEE-2005]**

(1) $\frac{2H}{A-B}$ (2) $\frac{H}{A+B}$

(3) $\frac{H}{2(A+B)}$ (4) $\frac{H}{A-B}$

Q.65 nks cyksa] tks ,d d.k ij dk;Z djrs gSa] dk ifj.kkeh R ,d cy ij yEcor gS rFkk mldk ifjek.k nwljs cy dk ,d frgkbZ gSA cM+s cy dk NksVs cy ls vuqikr gS - **[AIEEE-2005]**

(1) 2 : 1 (2) 3 : $\sqrt{2}$

(3) 3 : 2 (4) 3 : 2$\sqrt{2}$

Q.66 vuUr Js.kh $1 + \frac{1}{4.2!} + \frac{1}{16.4!} + \frac{1}{64.6!} + ...$ vuUr rd dk ;ksx gS -

(1) $\frac{e-1}{\sqrt{e}}$ (2) $\frac{e+1}{\sqrt{e}}$ (3) $\frac{e-1}{2\sqrt{e}}$ (4) $\frac{e+1}{2\sqrt{e}}$

[AIEEE-2005]

Q.67 $\int_{-\pi}^{\pi}\frac{\cos^2 x}{1+a^x}dx, a > 0$, dk eku gS - **[AIEEE-2005]**

(1) $a\pi$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{a}$ (4) 2π

Q.68 ry $x + 2y - z = 4$,d xksys $x^2 + y^2 + z^2 - x + z - 2 = 0$ dks ftl o`Ùk esa ifrPNsn djrk gS] mldh f=kT;k gS -

(1) 3 (2) 1 (3) 2 (4) $\sqrt{2}$

[AIEEE-2005]

Q.69 ;fn js[kk ;qXe $ax^2 + 2(a + b)xy + by^2 = 0$,d o`Ùk ds O;klksa ds vuqfn'k gS rFkk o`Ùk dks pkj o`Ùk [k.Mksa esa foHkkftr djrs gSa] fd buesa ls ,d o`Ùk[k.M dk {ks=kQy ,d vU; o`Ùk[k.M ds {ks=kQy dk frxquk gS] rks -

(1) $3a^2 - 10ab + 3b^2 = 0$
(2) $3a^2 - 2ab + 3b^2 = 0$
(3) $3a^2 + 10ab + 3b^2 = 0$
(4) $3a^2 + 2ab + 3b^2 = 0$ **[AIEEE-2005]**

Q.70 ekuk $x_1, x_2, ... x_n$, n izs{k.k gSa] fd $\sum x_i^2 = 400$ rFkk $\sum x_i = 80$ rks fuEu esa ls n dk ,d lEHkkfor eku gS -

(1) 15 (2) 18 (3) 9 (4) 12

[AIEEE-2005]

Space for Rough Work

Q.71 A particle is projected from a point O with velocity u at an angle of 60º with the horizontal. When it is moving in a direction at right angles to its direction at O, its velocity then is given by - **[AIEEE-2005]**

(1) $\frac{u}{3}$ (2) $\frac{u}{2}$ (3) $\frac{2u}{3}$ (4) $\frac{u}{\sqrt{3}}$

Q.72 If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5, then k lies in the interval - **[AIEEE-2005]**

(1) (5, 6) (2) $(6, \infty)$
(3) $(-\infty, 4)$ (4) [4, 5]

Q.73 If $a_1, a_2, a_3, ..., a_n, ...$ are in G.P. then the determinant

$$\Delta = \begin{vmatrix} \log a_n & \log a_{n+1} & \log a_{n+2} \\ \log a_{n+3} & \log a_{n+4} & \log a_{n+5} \\ \log a_{n+6} & \log a_{n+7} & \log a_{n+8} \end{vmatrix}$$ is equal to -

(1) 1 (2) 0 (3) 4 (4) 2
[AIEEE-2005]

Q.74 A real valued function f(x) satisfies the functional equation $f(x - y) = f(x) f(y) - f(a - x) f(a + y)$ where a is a given constant and f(0) = 1, then f(2a – x) is equal to - **[AIEEE-2005]**

(1) –f(x) (2) f(x)
(3) f(a) + f(a – x) (4) f(–x)

Q.75 If the equation
$a_nx^n + a_{n-1} x^{n-1} + ... + a_1x = 0$
$a_1 \neq 0, n \geq 2$, has a positive root $x = \alpha$, then the equation
$na_nx^{n-1} + (n - 1) a_{n-1} x^{n-2} + ... + a_1 = 0$ has a positive root, which is - **[AIEEE-2005]**

(1) greater than α
(2) smaller than α
(3) greater than or equal to α
(4) equal to α

Q.71 ,d d.k fcUnq O l u osx l {kfrt js[kk d lkFk 60º dk dk.k cukr g, i{kfir fd;k x;kA tc ;g O ij g] rk d.k dh fn'kk d yEcor fn'kk e xfr'khy g] rk mldh xfr fuEu }kjk inf'kr g - **[AIEEE-2005]**

(1) $\frac{u}{3}$ (2) $\frac{u}{2}$ (3) $\frac{2u}{3}$ (4) $\frac{u}{\sqrt{3}}$

Q.72 ;fn f}?kkrh; lehdj.k $x^2 - 2kx + k^2 + k - 5 = 0$ d nksuks ey 5 l de g] rk fuEu vrjky e k fLFkr g- **[AIEEE-2005]**

(1) (5, 6) (2) $(6, \infty)$
(3) $(-\infty, 4)$ (4) [4, 5]

Q.73 ;fn $a_1, a_2, a_3, ..., a_n, ...$ x.kkÙkj Js.kh e g] rk

lkjf.kd $$\Delta = \begin{vmatrix} \log a_n & \log a_{n+1} & \log a_{n+2} \\ \log a_{n+3} & \log a_{n+4} & \log a_{n+5} \\ \log a_{n+6} & \log a_{n+7} & \log a_{n+8} \end{vmatrix}$$ dk eku g-

(1) 1 (2) 0 (3) 4 (4) 2
[AIEEE-2005]

Q.74 ,d okLrfod eku Qyu f(x) idk;d lehdj.k $f(x - y) = f(x) f(y) - f(a - x) f(a + y)$ dk lUrq"V djrk g] tgk a ,d fn;k x;k vpj g rFkk f(0) = 1, rk f(2a – x) dk eku g - **[AIEEE-2005]**

(1) –f(x) (2) f(x)
(3) f(a) + f(a – x) (4) f(–x)

Q.75 ;fn lehdj.k $a_nx^n + a_{n-1} x^{n-1} + ... + a_1x = 0$
$a_1 \neq 0, n \geq 2$ dk ,d /kukRed ey $x = \alpha$ g, rk lehdj.k $na_nx^{n-1} + (n - 1) a_{n-1} x^{n-2} + ... + a_1 = 0$ dk ,d /kukRed ey gksxk tk fd - **[AIEEE-2005]**

(1) α l cMk g
(2) α l NkVk g
(3) α l cMk g ;k cjkcj g
(4) α d cjkcj g

Space for Rough Work

PHYSICS

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ans.	4	4	1	3	4	3	3	B	4	3	4	1	2	4	4	1	3	4	2	1	1	2	1	3	3
Ques.	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Ans.	4	2	4	3	2	3	1	3	3	1	4	1	1	2	1	B	1	3	3	3	2	4	2	2	2
Ques.	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	4	4	1	1	1	4	1	2	1	3	2	1	4	2	3	2	3	2	1	2	1	4	4	1	3

CHEMISTRY

Ques.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ans.	1	2	4	4	2	4	1	3	2	1	2	2	3	3	2	1	3	3	4	2	3	4	2	3	4
Ques.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
Ans.	4	3	3	3	2	2	1	2	2	4	1	1	3	3	1	4	4	2	1	1	4	4	4	3	1
Ques.	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Ans.	4	1	B	1	3	1	2	3	1	4	1	4	4	2	1	4	2	2	3	1	1	3	1	3	4

MATHEMATICS

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ans.	4	3	1	1	3	4	3	4	1	1	3	2	1	1	4	1	4	1	4	4	3	3	4	2, 4	3
Ques.	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Ans.	1	3	1	2	3	4	2	3	2	2	1	4	3	1	2	4	4	4	4	1	2	3	2	3	3
Ques.	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	3	2	4	4	1	1	2	4	2	3	3	3	4	2	4	4	2	2	4	2	4	3	2	1	2

Space for Rough Work