AP EAMCET Physics Previous Questions with Key – Test 10

81)A physical quantity 'P' is given by $P = \epsilon_0 L \frac{\Delta V}{\Delta t}$, where ϵ_0 is electric permittivity, L is length, ΔV is potential difference and Δt is time interval. The dimensional formula of P is same as that of

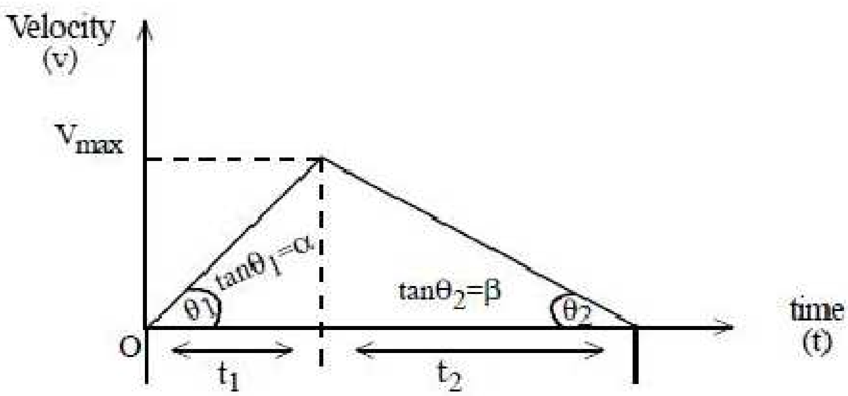
1) Resistance

2) Electric charge

3) Voltage

4) Electric current

82)From the v-t graph, find the total distance covered by the car in time $t=t_1+t_2$



1) $\frac{1}{2}\left(\frac{\alpha\beta}{\alpha+\beta}\right)t^2$

2) $\frac{\alpha\beta t}{\alpha+\beta}$

3) $\alpha t+\frac{1}{2}\left(\frac{\alpha\beta}{\alpha+\beta}\right)t^2$

4) $\frac{1}{2}\left(\frac{\alpha+\beta}{\alpha\beta}\right)t^2$

83)The angle of projection of a projectile for which its initial kinetic energy becomes half at its maximum height is

1)90° 2)60° 3)45° 4)30°

84)At a certain height, a body at rest explodes into two equal fragments with one fragment receiving a horizontal velocity of $10\sqrt{3}ms^{-1}$. The horizontal distance between the two fragments, when their displacement vectors are inclined at 60° relative to each other is($g=10\ ms^{-2}$)

1)$40\sqrt{3}$ m 2)$60\sqrt{3}$ m 3)$240\sqrt{3}$ m 4)$480\sqrt{3}$ m

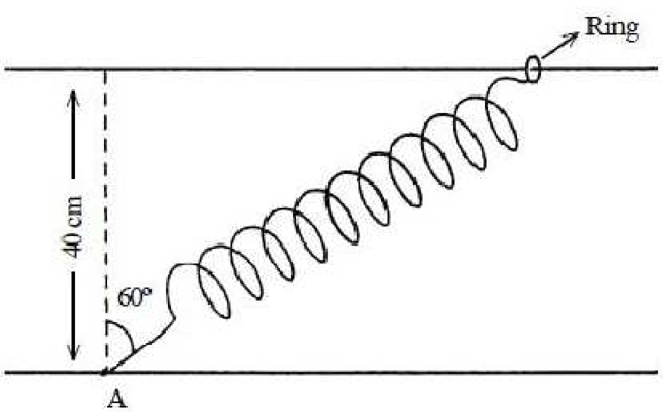
85)The velocity of $\vec{v}$ of a particle of mass 'm' acted upon by a constant force is given by $\vec{v}(A)t = A\left[\cos(Kt)\bar{i} - \sin(Kt)\bar{j}\right]$. Then the angle between the force and the velocity of the particle is (Here A and K are constants)

1)90° 2)0° 3)180° 4)45°

86)The kinetic energy of a particle moving along a circle of radius 'R' depends on the distance 's' as K= as^2 where 'a' is a constant. Then the force acting on the particle is

1)$\frac{2as^2}{R}$ 2)$2as\left[1+\frac{s^2}{R^2}\right]^{\frac{1}{2}}$ 3)2as 4)$2a\left(\frac{R}{s}\right)^{\frac{1}{2}}$

87)One end of a spring of spring constant $80Nm^{-1}$ and unstretched length of 30 cm is fixed at point A and the other end of the spring is fitted with a smooth ring of mass 300g as shown in the figure. The ring is allowed to slide on a horizontal rod fixed at a height of 40 cm. Initially the spring makes an angle of 60° with the vertical and the system of spring and ring is released from rest. The speed of the ring when the spring becomes vertical is —ms^{-1}



1)32 2)24 3)16 4)8

88)A pendulum of length 1m and having a bob of mass 1g is pulled aside through an angle 60° with the vertical and then released. The power delivered by all the forces acting on the bob when the pendulum makes 30° with the vertical is —(g=10ms^{-2})

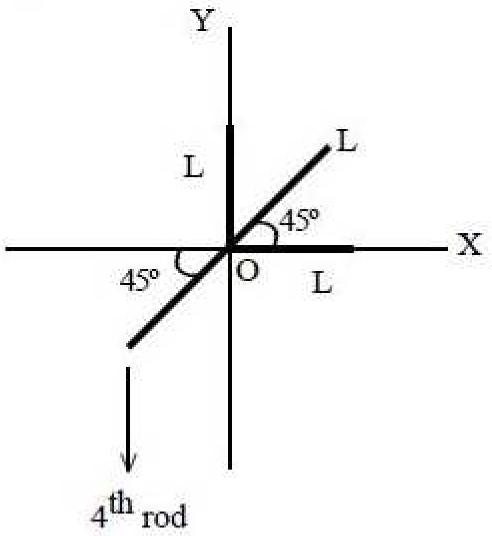
1)13.5 m W

2)7.5 m W

3)17.32 m W

4)24.5 m W

89)Three identical uniform thin rods each of mass 'm' and length 'L' are arranged in the XY plane as shown in the figure. A fourth uniform thin rod of mass '3m' is placed as shown in the figure in the XY plane. The value of length of the fourth rod such that the centre of mass



of all the four rods lies at the origin is

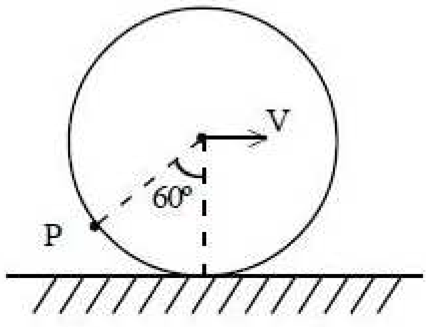
1)3L

2)2L

3)$\frac{L(\sqrt{2}+1)}{3}$

4)$\frac{L(2\sqrt{2}+1)}{2}$

90)A hoop rolls on a horizontal ground without slipping with a linear speed $10ms^{-1}$. Speed of a particle at a point P on the circumference of the hoop as shown in the figure is

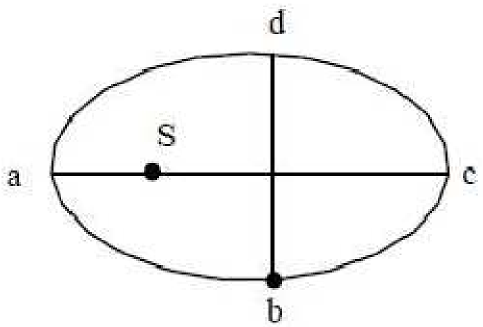


1)$10\ ms^{-1}$
2)$5\ ms^{-1}$
3)$20\ ms^{-1}$
4)$10\sqrt{2}\ ms^{-1}$

91)The displacement of a particle in an oscillatory motion at a time 't' is given by $x = 8\sin\frac{\pi t}{4}$ cm, then its displacement in the time interval t=0 s to t= 2 s is

1)4cm 2)2cm 3)12cm 4)8cm

92)A planet revolving around the sun in an elliptical orbit, whose semi-major axis is double that of its semi – minor axis. When the sun is assumed to be at rest at the midpoint of semi-major axis, planet takes 24 hours to travel through a path bcd as shown in the figure. Then the time taken by the planet to travel along dab is —



1)744 minutes 2)634 minutes 3)804 minutes 4)1440 minutes

93)A 500 g ball is attached to one end of an aluminum wire of area of cross-section $0.5mm^2$ and an unstretched length of 1.4m. The other end of the wire is fixed to the top of a vertical pole. The ball rotates about the pole in a horizontal plane such that the angle between wire and the horizontal is 30°. The increase in the length of the wire is — mm.

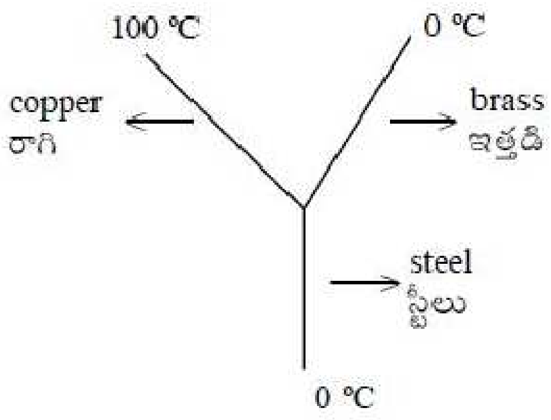
(Young's modulus of aluminum $=0.7\times10^{11}Nm^{-2}$ and acceleration due to gravity = $10\ ms^{-2}$)

1)0.1 2)0.2 3)0.3 4)0.4

94)An aircraft of mass 3×10^5 kg with total wing area $400m^2$ is in a level flight at a speed of 540 km h^{-1}. The density of air at its height is 12 kg m^{-3}. The fractional increase in the speed of the air on the upper surface of its wings relative to the lower surface is — (g= 10 ms^{-2})

1)0.727 2)0.344 3)0.048 4)0.277

95)Three metal rods made of copper, brass and steel each of area of cross-section $4cm^2$ are joined as shown in the figure. Their lengths are respectively 46cm, 13cm and 12 cm. Their coefficients of thermal conductivity are respectively 0.92, 0.26 and 0.12, all in CGS units. The rods are thermally insulated from the surroundings except at the ends. Rate of flow of heat through the copper rod, in cal s^{-1} is



1)2.4
2)6.0
3)4.8
4)8.2

96)one mole of an ideal gas expands adiabatically from the 200K to 250K. If the specific heat of the gas at constant volume is 0.8 kJ kg^{-1} K^{-1}, then the work done by the gas is

1)20 J

2)20 KJ

3)40 J

4)40 KJ

97)Assertion (A) : The temperature of a gas is a result of the Kinetic of its molecules

Reason(R) : Due to kinetic energy, the molecules collide with each other to produce thermal energy

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

2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

3)(A) is true but (R) is false

4)(A) is false but (R) is true

98)The internal energy of an ideal gas is given by U=1.5 PV. It expands from 10cm^3 to 20 cm^3 against a constant pressure of 2×10^5 pa. Heat absorbed by the gas in the process is

1)2 J

2)5 J

3)3 J

4)7 J

99)The average translational kinetic energy of O_2 molecules at a particular temperature is 0.048ev. The average translational kinetic energy of equal number of N_2 molecules at the same temperature is (in e V)

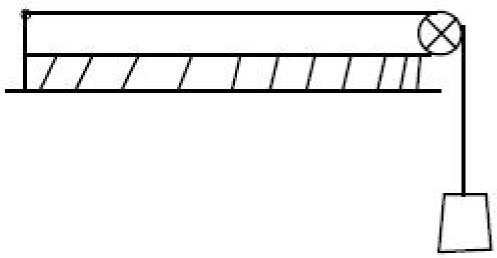
1)0.016

2)0.032

3)0.048

4)0.768

100)As shown in the figure, a block of mass 9kg is hung by a wire of area of cross-section of 1 mm^2 in a lift going up with an acceleration of $2ms^{-2}$. If the speed of the transverse wave on the wire is $120ms^{-1}$, the density of the material of the wire is (Acceleration due to gravity = $10ms^{-2}$)



1)1.5 g cm^{-3}

2)3.5 g cm^{-3}

3)5.5 g cm^{-3}

4)7.5 g cm^{-3}

101)A stationary source of sound A is producing sound of frequency 170 Hz. Another source of sound B producing sound of frequency 240 Hz is moving towards the source A on a straight path with a uniform speed of $20ms^{-1}$. An observer between A and B is moving towards the source A along the straight path BA. If the number of beats heard by the observer is zero, the speed of the observer is — ms^{-1}. (speed of sound in air $=340ms^{-1}$)

1)40

2)34

3)68

4)30

102)Telescope has an objective of focal length 100 cm and an eyepiece of focal length 5 cm. The least distance of distinct vision is 25 cm. The telescope is focused for distinct vision on a scale 3m away from the objective. The magnification produced is —

1)-3 2)1.5 3)-5 4)5

103)A screen is placed 0.5 m away from a single slit which is illuminated by a monochromatic light of wave length 6000 Δ. If the distance between the first and third minima in the diffraction pattern on the screen is 3 mm then the slit width is

1)0.1 mm 2)0.4 mm 3)0.3 mm 4)0.2 mm

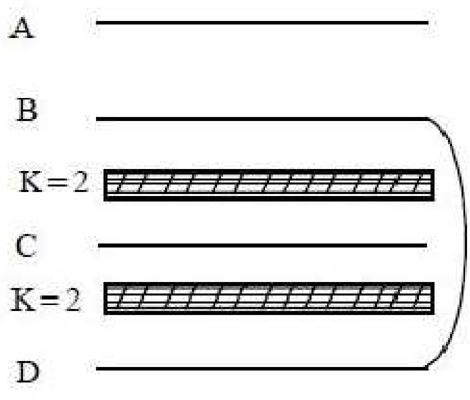
104)When 4C, QC and 1C electrical charges are placed along a straight line of length '*l*' at 0, $\frac{1}{2}$ and *l* respectively. The respective values of Q so that the net force on 4C is zero and 1C is zero separately are (in coulomb)

1)-1, $\frac{1}{4}$ 2)$\frac{-1}{2}$, $\frac{-1}{4}$ 3)$\frac{-1}{4}$,-1 4)$\frac{-1}{4}$, $\frac{-1}{2}$

105)Two charged particles of each of mass 3 g and charge 0.2μC stay in (vacuum) equilibrium on a horizontal surface with a separation of 20 cm. The coefficient of friction is $\left[\frac{1}{4\pi\epsilon_0}=9\times10^9\,Nm^2C^{-2}\right]$ (g= 10 ms^{-2})

1)0.20 2)0.18 3)0.25 4)0.30

106)Four metallic plates A,B,C and D of same size with same separations between them are arranged as shown in the figure. Dielectric slabs of dielectric constant 2 are arranged between B,C and C,D respectively. The effective capacitance between A and C is



1)C 2)$\frac{4}{3}$C 3)$\frac{4}{5}$C 4)3 C

107)A capacitor of resistance 20μF is charged by a battery of potential 24.3V.The capacitor is then disconnected from the battery and is connected to another uncharged capacitor of capacitance 10μF. After sometime, the second capacitor is disconnected, discharged fully and is again connected to the first capacitor. If the process is repeated several times, the charge on the first capacitor at the end of the fifth process is — μC.

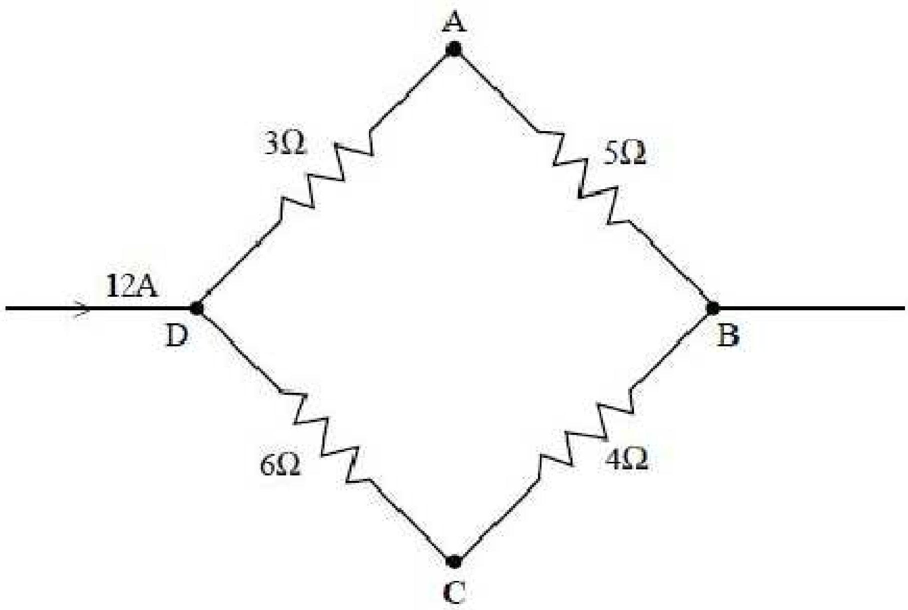
1)256

2)128

3)64

4)32

108)A current of 12 A flows in a system of resistors as shown in figure. The potential difference A and C is



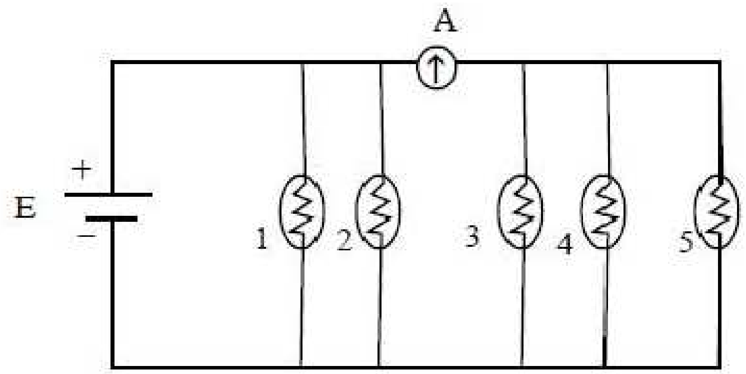
1)6 V

2)12 V

3)21 V

4)6.6 V

109)Five identical electric filament lamps numbered 1 to 5 are joined in parallel across an ideal source as shown in the figure. When all the bulbs are working, reading in the ammeter is 3 A. When lamp '*l* ' is switched off, reading of the ammeter is



1)2 A

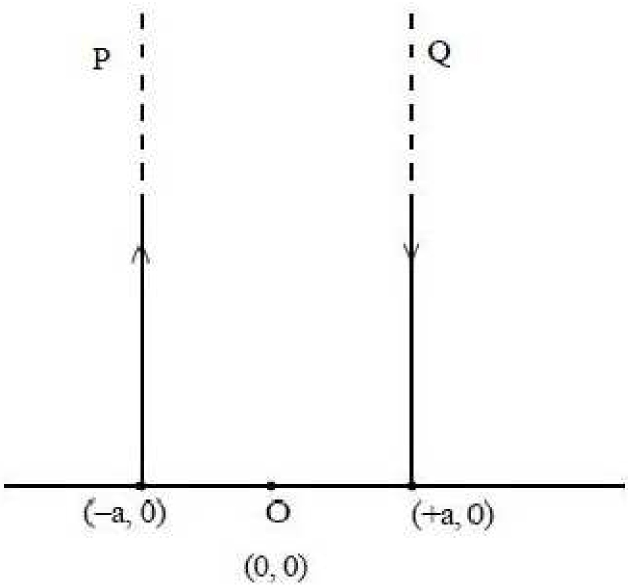
2)3 A

3)1 A

4)0

110)As shown in the figure, two infinitely long straight wires P and Q carrying equal currents in opposite directions are arranged parallel to Y-axis. If the magnetic field due to wire P at the origin 'O' of the co–ordinate system is B, then match the resultant magnetic field at various points given in column A with the points given in column B

Column A	Column B
A) $\frac{B}{4}$	i)(0,0)
B) $\frac{B}{2}$	ii)(a,0)
C) $\frac{2B}{3}$	iii)(2a,0)
D)2B	iV)(3a,0)



The correct answer is

1)A – ii B – iii C – iv D i

2)A – iv B – ii C – iii D i

3)A – i B – iii C – ii D iv

4)A – iii B – ii C – i D iv

111)If a charged particle moves in a gravity free space with uniform velocity, then which of the following is not possible

($\vec{E}$ = electric field, $\vec{B}$ = magnetic field)

1) $\vec{E}=0, \vec{B}=0$

2) $\vec{E}\neq 0, \vec{B}=0$

3) $\vec{E}=0, \vec{B}\neq 0$

4) $\vec{E}\neq 0, \vec{B}\neq 0$

112)A magnetic needle is free to rotate in a vertical plane which makes an angle of 60° with the magnetic meridian. If the needle stays in a direction making an angle of $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$ with horizontal, true dip value at that place is

1)60° 2)30° 3)45° 4)37°

113)A rectangular loop is provided with sliding connector of length 1m and resistance 2Ω. It is placed in a uniform magnetic field of 2T perpendicular to the plane of the loop. The external force required to keep the connector moving with uniform velocity 2 ms^{-1} is

1)6 N

2)4 N

3)2 N

4)1 N

114)An inductor and a resistor are connected in series to an ac source of variable frequency. When the frequency of the applied ac is 50 Hz, the power factor of the circuit is $\frac{\sqrt{3}}{2}$. If the frequency of the ac is increased by 200%, the power factor of the circuit is —

1)0.8

2)0.9

3)0.7

4)0.5

115)A light with an energy flux of 18 W cm^{-2} falls on a non- reflecting surface at normal incidence. If the surface has an area of 20 cm^2, the average force exerted on the surface during a 30 minute time span is — ($c = 3\times10^8$ ms^{-1})

1)1.2×10^{-6} N

2)2.1×10^{-6} N

3)3.1×10^{-6} N

4)4.8×10^{-6} N

116)A point source of light emits photons of energy 4.8 eV at the rate 10^5 photons per second .These photons incident on a photo sensitive sphere of work function 2.8 eV and radius 9 mm. The sphere is initially neutral and the emitted photo electrons are instantly swept away. The time after which the photo electric emission stops is

1)250 s 2)125 s 3)375 s 4)175 s

117)The ratio of acceleration of the electron in singly ionized Helium atom to that of Hydrogen atom (both in ground state) is

1)2

2)4

3)16

4)18

118)In the fusion reaction, $_1H^2 + {}_1H^2 \rightarrow {}_2He^4$ +Q, Q is released. If 'c' is the speed of light and 'm' is the mass of each deuterium nucleus then the mass of the helium nucleus formed is

1) $2m+\frac{Q}{c^2}$

2) $\frac{Q}{mc^2}$

3) $m+\frac{Q}{c^2}$

4) $2m-\frac{Q}{c^2}$

119)In a CE-transistor feedback oscillator circuit, the phase difference between input and output signal is

1)π

2)$\frac{\pi}{4}$

3)$\frac{\pi}{2}$

4)0

120)If two linear antennas having lengths in the ratio 2:3 are emitting radiation of wavelengths in the ratio 8:9, then the ratio of effective powers radiated by them are in the ratio

1)32 : 27 2)27 : 32 3)16 : 27 4)9 : 16

APEAMCET-2018 -- Engineering Stream Final Key Date: 24-04-18 AN (Shift 2)	
81	2
82	3
83	1,2,3,4
84	2
85	3
86	4
87	4
88	1
89	4
90	2
91	3
92	2
93	3
94	1
95	4
96	4
97	4
98	4
99	4
100	2
101	3
102	3
103	2
104	4
105	1
106	3
107	3
108	1
109	4
110	1
111	1
112	4
113	3
114	2
115	1
116	3
117	3
118	1
119	3
120	2