

AP EAMCET Physics Previous Questions with Key – Test 8

81) Assertion (A): Energy per unit volume and angular momentum can be added dimensionally.

Reason (R): Physical quantities having same dimensions can be added or subtracted.

- 1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- 2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- 3) (A) is true but (R) is false
- 4) (A) is false but (R) is true

82) A body is projected vertically upwards with a velocity 'u' from the top of a tower. Time taken by it to reach the grounds is 'n' times the time taken by it to reach the highest point in its path. Height of the tower is

1) $\frac{nu^2(n-1)}{2g}$ 2) $\frac{nu^2(n-2)}{g}$ 3) $\frac{nu^2(n-2)}{2g}$ 4) $\frac{u^2}{2g}(n+1)$

83) A body is projected horizontally from the top of a tower of height 180m with a velocity of 20ms^{-1} . If acceleration due to gravity is 10ms^{-2} then match the following.

List – I

List-II

A) velocity of the body after 1 second (in ms^{-1})

I) 5

B) Horizontal displacement of the body after 1 second (in meters)

II) 20

C) Vertical displacement of the body after 1 second (in meters)

III) 10

D) vertical velocity of the body after 1 second (in ms^{-1})

IV) 22.4

The correct answer is

- 1) A – IV; B – II; C – III; D – I 2) A – I; B – II; C – III; D – IV
- 3) A – IV; B – II; C – I; D – III 4) A – II; B – IV; C – I; D – III

84) Two towers A and B, each of height 20m are situated a distance 200m apart. A body thrown horizontally from the top of the tower A with a velocity 20ms^{-1} towards the tower B hits the ground at point P and another body thrown horizontally from the top of tower B with a velocity 30ms^{-1} towards the tower A hits the ground at point Q. If a car starting from rest from P reaches Q in 10 seconds, the acceleration of the car is _____

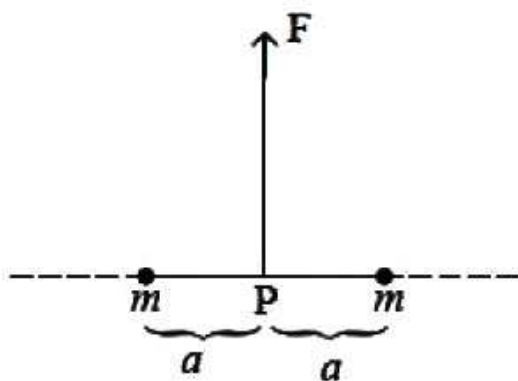
(Acceleration due to gravity = 10ms^{-2})

- 1) 1ms^{-2} 2) 2ms^{-2} 3) 3ms^{-2} 4) 4ms^{-2}

85) A particle of mass $4M$ which is initially at rest explodes into three pieces of masses M , M and $2M$. The equal masses move along X-and Y-axes with velocities 4ms^{-1} and 6ms^{-1} respectively. The magnitude of the velocity of the heavier mass is

- 1) $\sqrt{17}\text{ms}^{-1}$ 2) $2\sqrt{13}\text{ms}^{-1}$ 3) $\sqrt{13}\text{ms}^{-1}$ 4) $\frac{\sqrt{13}}{2}\text{ms}^{-1}$

86) As shown in the figure, two particles, each of mass 'm' tied at the ends of a light string of length $2a$ are kept on a frictionless horizontal surface. When the mid point (P) of the string is pulled vertically upwards with a small but constant force F, the particles move towards each other on the surface. Magnitude of acceleration of each particle, when the separation between them becomes $2x$ is



- 1) $\frac{F}{2m} \frac{a}{\sqrt{a^2 - x^2}}$ 2) $\frac{F}{2m} \frac{x}{\sqrt{a^2 - x^2}}$ 3) $\frac{F}{2m} \frac{x}{a}$ 4) $\frac{F}{2m} \frac{\sqrt{a^2 - x^2}}{x}$

87) A particle is released from a height H . At a certain height its kinetic energy is half of its potential energy with reference to the surface of the earth. Height and speed of the particle at that instant are respectively

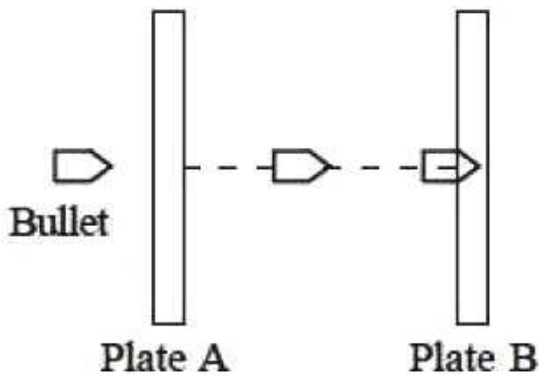
1) $\frac{H}{3}, \sqrt{\frac{2gH}{3}}$

2) $\frac{H}{3}, 2\sqrt{\frac{gH}{3}}$

3) $\frac{2H}{3}, \sqrt{2gH}$

4) $\frac{2H}{3}, \sqrt{\frac{2gH}{3}}$

88) A bullet of mass 10g pierces through a plate A of mass 500g and then gets embedded into a second plate B of mass 1.49kg as shown in the figure. Initially the two plates A and B are at rest and move with same velocity after collision. The percentage loss in the initial kinetic energy of the bullet when it is between the plates A and B is _____
(Neglect any loss of material of the plates during the collision)



1) 25

2) 56.25

3) 43.75

4) 75

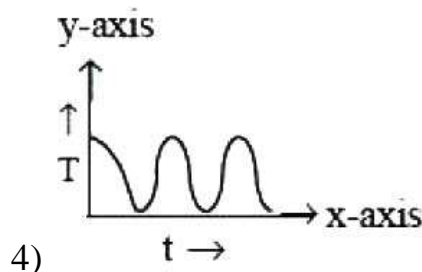
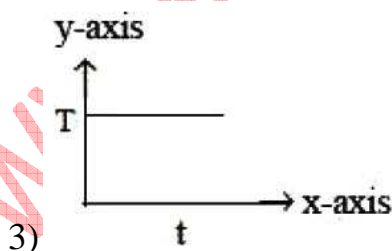
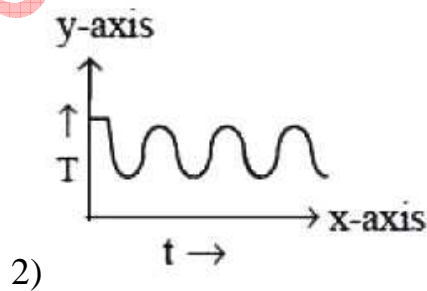
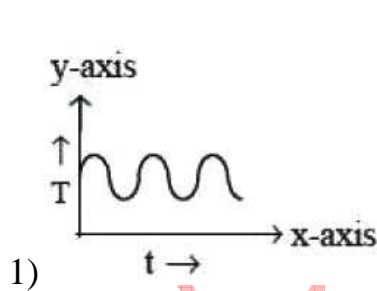
89) The moment of inertia of a body about a given axis is 12kgm^2 . Initially the body is at rest. In order to produce a rotational kinetic energy of 15000 J , an angular acceleration of 10 rads^{-2} must be applied about that axis for a duration of

- 1) 2 s
- 2) 4 s
- 3) 10 s
- 4) 5 s

90) A light rope is wound around a hollow cylinder of mass 4kg and radius 40cm . If the rope is pulled with a force of 40N , its angular acceleration is _____

- 1) 0.40 rads^{-2}
- 2) 0.25 rads^{-2}
- 3) 25 rads^{-2}
- 4) 40 rads^{-2}

91) In the case of a simple pendulum executing SHM, at $t = 0$, the bob is not at the mean position. The graph drawn between the tension (T) in the string and time (t) is



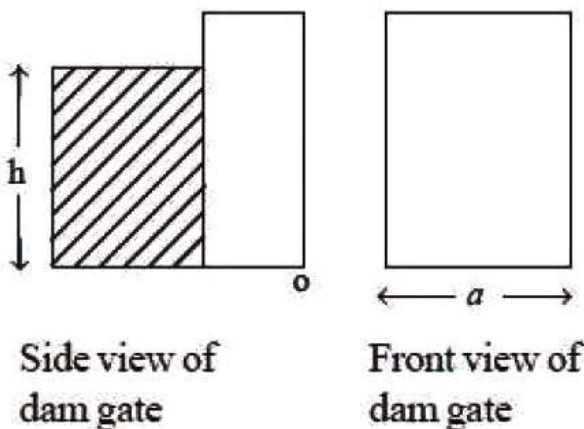
92) An artificial satellite of mass 'm' is moving along an elliptical path around the earth. The areal velocity of the satellite is proportional to

- 1) m
- 2) m^{-1}
- 3) m^0
- 4) $m^{1/2}$

93) A rubber cube of side 5cm has one face fixed while a tangential force 1800N is applied on its opposite face. If modulus of rigidity of rubber is $2.4 \times 10^6 \text{ Nm}^{-2}$ then the lateral displacement of the strained face is _____

- 1) 3 mm
- 2) 5 mm
- 3) 15 mm
- 4) 1.5 mm

94) Water stands upto height 'h' behind the dam as shown in the figure, The front view of the dam gate is also shown in the adjoining figure. Density of water is 'ρ' and acceleration due to gravity is 'g'. If atmospheric pressure force is also considered, the point of application of total force acting on the dam due to water above 'O' is _____

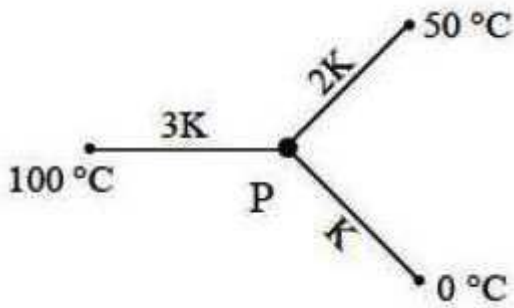


- 1) $\frac{h}{4}$
- 2) $\frac{h}{3}$
- 3) h
- 4) $\frac{h}{2}$

95) The time taken for a calorimeter containing 75g of water at 62°C to cool to 58°C is 9 minutes. When the calorimeter contains 105g of water, it takes 12 minutes to cool from 62°C to 58°C. The water equivalent of the calorimeter is _____

- 1) 10 g
- 2) 15 g
- 3) 20 g
- 4) 30 g

96) Three rods of same dimensions have thermal conductivities 3K, 2K and K. They are arranged as shown in the figure below. Then in the steady state the temperature of the junction 'P' is



- 1) $\frac{200}{3}^{\circ}\text{C}$
- 2) $\frac{100}{3}^{\circ}\text{C}$
- 3) 75°C
- 4) $\frac{50}{3}^{\circ}\text{C}$

97) Freezing compartment of a refrigerator is 0°C and room temperature is 27.3°C. Work done by the refrigerator to freeze 1g of water at 0°C is
($L_{\text{ice}} = 80 \text{ cal g}^{-1}$)

- 1) 336J
- 2) 33.6 J
- 3) 3.36 J
- 4) 40 J

98) Tyre of a bicycle has volume $2 \times 10^{-3} \text{m}^3$. Initially the tube is filled 75% of its volume by air at atmospheric pressure 10^5Nm^{-2} . When a rider is on the bicycle, the area of contact of tyre with road is $24 \times 10^{-4} \text{M}^2$. The mass of rider with bicycle is 120kg. If a pump delivers a volume 500cm^3 of air in each stroke then the number of strokes required to inflate the tyre is ($g = 10 \text{ms}^{-2}$)

- 1)10
- 2)11
- 3)21
- 4)20

99) A diatomic gas consisting of rigid molecules is at a temperature of 87°C . If the moment of inertia of the rotating diatomic rigid molecule is $2.76 \times 10^{-39} \text{gcm}^2$ then the rms angular speed of the molecule is (Boltzmann constant = $1.38 \times 10^{-23} \text{JK}^{-1}$)

- 1) $6 \times 10^{12} \text{rads}^{-1}$
- 2) $3 \times 10^{12} \text{rads}^{-1}$
- 3) $6 \times 10^{13} \text{rads}^{-1}$
- 4) $3 \times 10^{13} \text{rads}^{-1}$

100) If the length of a stretched string is shortened by $x\%$ and the tension is increased by 44%, then the ratio of the final and initial fundamental frequencies is 1:2, the value of 'x' is

- 1)20
- 2)30
- 3)40
- 4)60

101) A small source of sound vibrating at a frequency 500Hz is rotated along a circle of radius $\frac{100}{\pi} \text{cm}$ at a constant angular speed of 5 revolutions per second. The minimum and maximum frequency of the sound observed by a listener situated in the plane of the circle is (Speed of sound is 332ms^{-1})

- 1)338.5 Hz, 612.5 Hz
- 2)485.4 Hz, 536.6 Hz
- 3)435.3 Hz, 565.6 Hz
- 4)485.4 Hz, 515.5 Hz

102) A lens forms real and virtual images of an object when the object is at U_1 and U_2 distances respectively. If the size of the virtual image is double that of the real image, then the focal length of the lens is (Take the magnification of the real image as 'm')

1) $\left(\frac{u_1 + u_2}{2}\right)m$

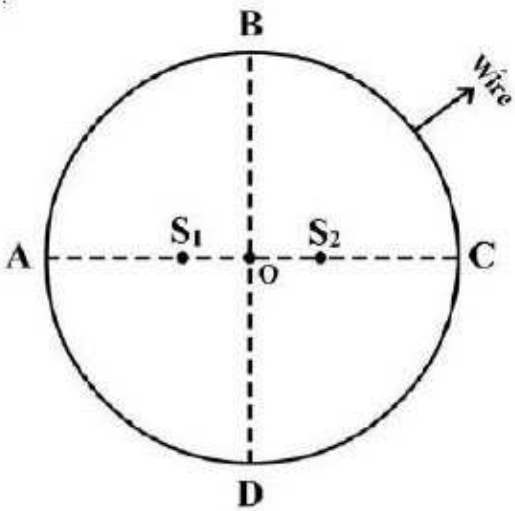
2) $\left(\frac{u_1 - u_2}{3}\right)2m$

3) $\left(\frac{u_1 - u_2}{2}\right)3m$

4) $\left(\frac{u_1 + u_2}{3}\right)2m$

103) Two point sources S_1 and S_2 separated by a distance $10\mu\text{m}$ emit light waves of wavelength $4\mu\text{m}$ in phase. A circular wire of radius $40\mu\text{m}$ is placed around the sources as shown in figure, then

(O is the centre of the circle and $OS_1 = OS_2$)



- 1) Points A and B are dark and points C and D are bright
- 2) Points A and B are bright and point C and D are dark
- 3) Points A and C are dark and points B and D are bright
- 4) Points A and C are bright and points B and D are dark

104) Two equally charged metal spheres A and B repel each other with a force of $4 \times 10^{-5} \text{N}$. Another identical uncharged sphere C is touched to A and then placed at the midpoint of the line joining the spheres A and B. The net electric force on the sphere C is

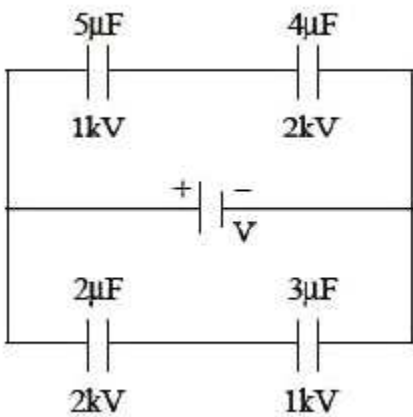
- 1) $4 \times 10^{-5} \text{N}$ from C to A
- 2) $4 \times 10^{-5} \text{N}$ from C to B
- 3) $8 \times 10^{-5} \text{N}$ from C to A
- 4) $8 \times 10^{-5} \text{N}$ from C to B

105) Four positive point charges $+q$ are kept at the four corners of a square of side 'l'. The net electric field at the midpoint of any one side of the square is _____

$\left(\text{take } \frac{1}{4\pi\epsilon_0} = k \right)$

- 1) $\frac{4kq}{l^2}$
- 2) $\frac{16kq}{5\sqrt{5}l^2}$
- 3) $\frac{8kq}{\sqrt{5}l^2}$
- 4) $\frac{kq}{l^2}$

106) Four capacitors marked with capacitances and break down voltages are connected as shown in the figure. The maximum emf of the source so that no capacitor breaks down is _____

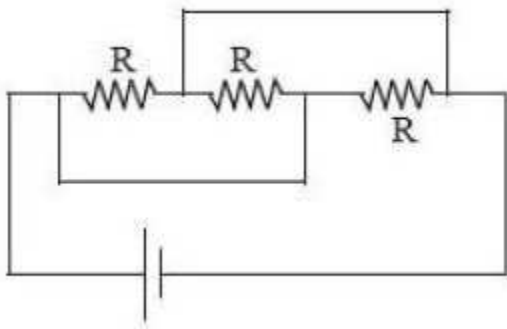


- 1) 10.5kV
- 2) 5.25kV
- 3) 2.25kV
- 4) 1.25kV

107) A Van de Graff generator has a spherical metal shell as an electrode which is at a potential $15 \times 10^6 \text{V}$. If the dielectric strength of the surrounding medium is $5 \times 10^7 \text{Vm}^{-1}$ then the diameter of the shell is

- 1) 30 cm
- 2) 15 cm
- 3) 60 cm
- 4) 120 cm

108) A dc source with internal resistance R_0 is connected to three identical resistors each of resistance R as shown in the figure. If the thermal power generated in the circuit is highest, then

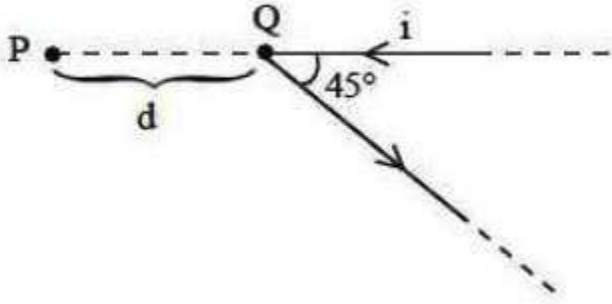


- 1) $R = 2R_0$
- 2) $R = 3R_0$
- 3) $R = \frac{R_0}{3}$
- 4) $R = R_0$

109) In a potentiometer, a wire of length 10m having resistance 50Ω is used. A battery of 5 V and a resistor of 450Ω are connected in series to the wire. If an unknown battery of emf 'E' balances the potentiometer at 450cm, then the value of E is

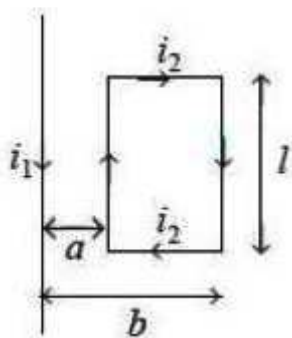
- 1) 0.225 V
- 2) 1.25 V
- 3) 2.25 V
- 4) 0.0225 V

110) A long straight wire carrying electric current 'i' is bent at its mid point to form an angle of 45° as shown in the figure. Magnetic field at a point P at a distance d from the point Q of bending is -----



- 1) $\frac{\mu_0 i}{4\pi d} [\sqrt{2} - 1]$
- 2) $\frac{\mu_0 i}{2\pi d} [\sqrt{2} - 1]$
- 3) $\frac{\mu_0 i}{4\pi d}$
- 4) $\frac{\mu_0 i}{2\pi d}$

111) A current carrying square loop is placed near a straight infinitely long current carrying wire as shown in figure. The torque acting on the loop is



- 1) $\frac{\mu_0 i_1 i_2 l}{2\pi ab}$
- 2) $\frac{\mu_0 i_1 i_2 l}{2\pi a(a+b)}$
- 3) $\frac{\mu_0 i_1 i_2 l (b-a)}{2\pi ab}$
- 4) 0

112) At a certain place, the horizontal component of earth's magnetic field is $\frac{1}{\sqrt{3}}$ times the vertical component. The angle of dip at that place is

- 1) 30°
- 2) 45°
- 3) 60°
- 4) 90°

113) The energies required to set up in a cube of side 10cm

(a) a uniform electric field of 10^7 Vm^{-1} and

(b) a uniform magnetic field of 0.25 Wbm^{-2} are respectively about

($\mu_0 = 4\pi \times 10^{-7} \text{ Hm}^{-1}$, $\epsilon_0 = 8.9 \times 10^{-12} \text{ Fm}^{-1}$)

- 1) 0.445 J, 25 J
- 2) 4.45 J, 2.5 J
- 3) 44.5 J, 25 J
- 4) 0.44 J, 2.5 J

114) The rms value of emf given by $E = (8 \sin \omega t + 6 \cos \omega t)$ volt is

- 1) $5\sqrt{2} \text{ V}$
- 2) $7\sqrt{2} \text{ V}$
- 3) 10 V
- 4) $10\sqrt{2} \text{ V}$

115) An electromagnetic radiation has an energy 14.4 KeV. To which region of the electromagnetic spectrum it belongs

- 1) Infrared
- 2) Visible
- 3) Ultraviolet
- 4) X-ray

116) An α - Particle and a proton are accelerated from rest by the same potential, then the ratio of their de-Broglie wavelengths is _____

- 1) $2\sqrt{2} : 1$
- 2) $1 : 2\sqrt{2}$
- 3) $1 : 2$
- 4) $2 : 1$

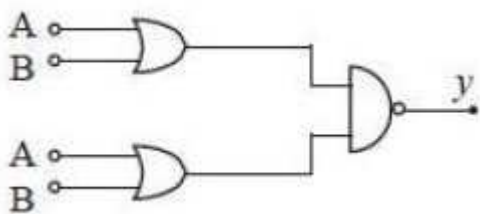
117) The difference between the radii of n^{th} and $(n + 1)^{\text{th}}$ orbits of hydrogen atom is equal to the radius of $(n-1)^{\text{th}}$ orbit of hydrogen. The angular momentum of the electron in the n^{th} orbit is ____ (h is plank's constant)

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

118) The maximum potential energy due to electrostatic repulsion between two hydrogen nuclei is nearly (radius of the nucleus = 1.1 fermi) $\left[\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2 \text{ C}^{-2} \right]$

- 1) 0.65 MeV
- 2) 2.09 MeV
- 3) 3.31 MeV
- 4) 0.92 MeV

119) For the combination of logic gates shown in the figure, the equivalent logic gate is



- 1) AND 2) NOT 3) NAND 4) NOR

120) A TV transmitter has a range of 50km. The height of the TV transmitter is _____ (Radius of the earth $R_e = 6.4 \times 10^6 \text{ m}$)

- 1) 195.3 m 2) 186.5 m 3) 206 m 4) 175 m

APEAMCET-2018 -- Engineering Stream Final Key Date: 23-04-18 FN (Shift 1)	
81	4
82	3
83	3
84	2
85	3
86	2
87	4
88	3
89	4
90	3
91	1
92	3
93	3
94	2
95	2
96	1
97	2
98	3
99	1
100	3
101	4
102	2
103	3
104	1
105	2
106	3
107	3
108	2
109	1
110	1
111	4
112	3
113	1
114	1
115	4
116	2
117	2
118	1
119	4
120	1