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# PHYSICS

# BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

# AP EAMCET ( ONLINE QUESTION PAPER 2018 SOLVED)



**1.** If A represents Boltzmann constant B represents Planck's constant and C represents speed of light in vacuum then the quantity having the dimensions of  $A^4B^{-3}C^{-2}$  is

A. universal gas constant

B. specific heat capacity

C. stefan's constant

D. heat energy

### Answer: C



2. The motion of a particle along a straight line is described by the function  $x = (2t - 3)^2$ where x is in metres and t is in seconds . The acceleration of the particle at =2s is

A. 
$$1ms^{-2}$$
  
B.  $4ms^{-2}$   
C.  $8ms^{-2}$   
D.  $7ms^{-2}$ 

#### Answer: C



**3.** A particle moves in the xy - plane with velocity v =  $x\hat{i} + yt\hat{j}$ .  $Att = \frac{x\sqrt{3}}{y}$  the magnitudes of tangential and normal accelerations respectively are

A. 
$$\frac{\sqrt{3y}}{2}, \frac{y}{2}$$
  
B.  $\frac{\sqrt{2y}}{3}, \frac{\sqrt{3y}}{2}$   
C.  $\frac{\sqrt{3y}}{2}, \frac{5y}{2}$ 

D. 
$$2\sqrt{3y}, \frac{11y}{\sqrt{3}}$$

Answer: A

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**4.** Assertion (A) The speed of a body in uniform circular motion is constant.Reason (R) In uniform circular motion, the

acceleration of the body is constant .

A. Both (A) and (R) are true and (R) is the

correct explanation of (A).

B. Both (A) and (R) are true but (R) is not

the correct explanation of ( A).

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: C

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**5.** One end of a light string is fixed to a clamp on the ground and the other end passes over a fixed frictionless pulley as shown in the figure. It makes an angle of  $30^\circ$  with the ground . The clamp can tolerate a vertical force of 40 N . If a monkey of mass 5 kg were to climb up the rope then the maximum acceleration in the upward direction with

which it can climb safely is (g=10  $ms^{-2}$ )



A.  $2ms^{-2}$ 

- B.  $4ms^{-2}$
- C.  $6ms^{-2}$
- D.  $8ms^{-2}$

#### Answer: C



**6.** In the arrangement shown in the figure if the blocks of masses m and 2m are released from the state of rest tension in the string is (  $\mu$  = coefficient of friction string is massless and inextensible pulley is frictionless )



C. 
$$\frac{2\sqrt{2}mg}{3}$$
D. 
$$\frac{\sqrt{2}mg}{3}$$

 $\mathbf{P}$   $\sqrt{2}$  mg

### Answer: C

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7. A stone of mass 2 kg tied to a light inextensible string of length  $\frac{5}{3}$  m is whirling in a circular path in a vertical plane. If the ration of the maximum tension to the minimum tension in the string is 4 then the

speed of the stone at the highest point of the

circle is (g=  $10ms^{-2}$ )

A. 
$$20 m s^{\,-\,1}$$

B. 
$$10\sqrt{3}ms^{-1}$$

C. 
$$\sqrt{50}ms^{-1}$$

D. 
$$10ms^{-1}$$

#### Answer: C



8. A ball falls freely from a height of 180 m on to a hard horizontal floor and repectedly bounces . If the coefficient of restitution is 0.5 the average speed and aberage velocity of the ball before it ceases to rebound are respectively ( acceleration due to gravity =  $10 \text{ms}^{-2}$ )

A. 
$$10 m s^{-1}, \, 10 m s^{-1}$$

B. 
$$50ms^{-1}, \frac{50}{3}ms^{-1}$$

C. 
$$rac{50}{3}ms^{-1}, 10ms^{-1}$$

D. 
$$rac{20}{3}ms^{-1}, rac{50}{3}ms^{-1}$$

### Answer: C



**9.** A circular disc of radius R is removed from a bigger circular disc of radius 2R such that the circumferences of the discs touch. The centre of mass of the new disc is at a distance aR from the centre of the bigger disc. The value of a is

A.  $\frac{1}{2}$ 

B. 
$$\frac{1}{3}$$
  
C.  $\frac{1}{4}$   
D.  $\frac{1}{6}$ 

### Answer: B

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**10.** In the figure shown acceleration with which the mass m falls down when released is ( consider the string to be massless gacceleration due to gravity)



A. 
$$\frac{2g}{3}$$
  
B.  $\frac{g}{2}$   
C.  $\frac{5g}{6}$ 

D. g

#### Answer: B



**11.** At t=0 a particle exeucting SHM with a time period 3 s is in phase with another particle executing SHM. The time period of the second particle is T (less than 3 s). If they are again in the same phase for the third time after 45 s, then the value of T is  $\cdots$ . B. 1.5 s

C. 2 s

D. 2.5 s

#### Answer: D

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**12.** A body is projected vertically upwards from the surface of the earth with a velocity sufficient to carry it to infinity . The time taken by it to reach a height of three times the radius of the earth is ( acceleration due to gravity = 9.8  $ms^{-2}$ and radius of the earth = 6400 km)

A. 44.44 min

B. 22.22 min

C. 18.76 min

D. 37.52 min

#### Answer: A

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**13.** A copper wire of cross -sectional area 0.01  $cm^2$  is under a tension of 22N. Find the percentage change in the cross- sectional area.

(Young's modulus of copper $=1.1 imes10^{11}N/m^2$  and Poisson's ratio = 0.32 )

A.  $0.128 imes 10^{-6} cm^2$ 

B.  $128 imes 10^{-6} cm^2$ 

C.  $12.8 imes0^{-6}cm^2$ 

D.  $128 imes 10^{-6} cm^2$ 

#### Answer: D



**14.** When a soap bubble of radius 0.2 mm is charged it experiences an outward electrostatic pressure of magnitude  $rac{\sigma^2}{2arepsilon_{2arepsilon}}$  , where  $\sigma = 20 \mu Cm^{-2}$  is the surface charge density. If the excess pressure inside the soap bubble due to the tension is same as this electrostatic pressure then the surface

tension of the soap solution is

$$ig(arepsilon_0=8.85 imes 10^{-12}C^2N^{-1}m^{-1}ig)$$

A. 
$$8.85 imes 10^{-4} Nm^{-1}$$

B.  $12.4 imes 10^{-4} Nm^{-1}$ 

C.  $11.3 imes 10^{-4} Nm^{-1}$ 

D. 
$$90 imes 10^{-4} Nm^{-1}$$

#### Answer: C

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**15.** The temperature of a spherical black body is inversely proportional to its radius . If its radius is doubled then the power radiating from it will be

A. doubled

B. 
$$rac{1}{4}$$
 times of initial value

C. halved

D. four times of initial value

#### Answer: B



**16.** A metal sphere immersed in water weighs  $w_1$  at  $0^\circ C$  and  $w_2$  at  $50^\circ C$ . The coefficient of cubical expansion of the metal is less than that of water. Then

A. 
$$w_1 > w_2$$
  
B.  $w_1 < w_2$   
C.  $w_1 = w_2$   
D.  $w_1 = 2w_2$ 

#### Answer: B



**17.** A reversible Carnot heat engine converts  $\frac{1}{4}$  th of its input heat into work. When the temperature of the sink is reduced by 50 K its efficiency becomes  $33\frac{1}{3}$ %. The initial temperatures of the source and the sink respectively are

A. 600 K, 550 K

B. 600 K, 450 K

C. 300 K, 150 K

D. 450 K, 350 K

Answer: B

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**18.** An ideal monoatomic gas is carried along the ABCDA as shown in the figure. The total

heat absorbed during this process is



A.  $10.5P_0V_0$ 

B.  $7.5p_0V_0$ 

 $C. 2.5 P_0 V_0$ 

# D. $1.5P_0V_0$

#### Answer: A



19. The ratio of the sound in a monatomic gas at  $27^{\circ}C$  and rms speed of the molecules of the same gas at a temperature of  $127^{\circ}$  C is

A. 1:2

- $\mathsf{B.}\,\sqrt{5}\!:\!\sqrt{12}$
- C.3:4



#### Answer: B



**20.** Two unifrom strectched strings A and B, made of steel, are vibrating under the same tension. If the first overtone of A is equal to the second overtone of B and if the radius of A is twice that of B, the ratio of the lengths of the strings is B. 0

C. 
$$\frac{A}{\sqrt{2}}$$
  
D.  $\frac{\sqrt{3}A}{2}$ 

#### Answer: C

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**21.** A open pipe of length l is vibrating in 3rd overtone with maximum amplitude A. The amplitude at a distance of  $\frac{l}{16}$  from any open

end is

A. A

B. 0

C. 
$$\frac{A}{\sqrt{2}}$$
  
D.  $\frac{\sqrt{3A}}{2}$ 

#### Answer: C



**22.** Magnifying power of an astronomical telescope for normal adjustment is 10 and length of the teescope is 110 cm. Magnifying

power of the same telescope when the image

is formed at the near point is

A. 14

B. 18

C. 23

D. 26

Answer: A



**23.** In Young 's double slit experiment th two slits are illuminated by a light beam consisting of wavelenghts 4200 Å and 5040 Å. If the distance between the slits is 2.4 mm and the distance between the slits and the screen is 200 cm the minimum distance from the central bright fringe to teh point where the bright fringes due to both the wavelengths coincide is

A. 0.7 mm

C. 2.1 mm

D. 2.8 mm

#### Answer: C



# 24. Flux coming out from a positive charge of

8C placed in a medium of dielectric constant 4

is

A. 
$$\frac{2}{2\varepsilon_0}$$

 $\mathsf{B.}\,\frac{2}{\varepsilon_0}$ 

C.  $8\varepsilon_0$ 

D.  $32\varepsilon_0$ 

## Answer: B

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**25.** Two charged particles each of mass 9.8 g and charges + 20  $\mu$  C and  $-20\mu$  C are attached to the two ends of a massless and rigid uniform non-conducting rod of length 50

cm. This arrangement is held in a uniform electric field of 12.1  $NC^{-1}$  such that the rod makes a very small angle with the field direction. If the rod is set free the minimum time needed for the rod to become parallel to the direction of the electric field is .......

A. 5

B. 8

C. 12

D. 17

#### Answer: A



**26.** Four capacitors of capacitances  $2\mu F$ ,  $3\mu F$ ,  $4\mu F$  and  $x\mu F$  are connected to a battery of emf 6 V and of negligible internal resistance as shown in the figure. If the ratio of the charges on  $x\mu F$  and  $4\mu F$  capacitances





A. 2

B. 5

C. 3

D. 8

#### Answer: B

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**27.** The plates of a parallel plate capacitor are charged upto 100 V. A 2 mm thich insulator sheet is inserted between the plates . Then to maintain the same potential difference the distance between the plates is increased by 1.6 mm. The dielectric constant of the insulator is

A. 6

B. 8

C. 5

D. 4

Answer: C

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28. In the given circuit current I is independent of the resistance  $R_6$  . Then



A. 
$$R_1 R_2 R_5 = R_3 R_4 R_6$$

B. 
$$rac{1}{R_5}+rac{1}{R_6}=rac{1}{R_1+R_2}+rac{1}{R_3+R_4}$$
C.  $R_1R_4=R_2R_3$ 

D.  $R_1R_3=R_2R_4$ 

## Answer: C

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**29.** A fuse wire of radius 0.2 mm blows off with a current of 5 a . The fuse wire of same material but of radius 0.3 mm will blow off with a current of

A. 
$$\frac{15}{2}A$$
  
B.  $\frac{5\sqrt{3}}{2}A$   
C.  $\frac{5\sqrt{3}}{2}A$   
D.  $5\sqrt{\frac{27}{8}}A$ 

### Answer: C



**30.** A circular loop and an infinitely long straight conductor carry equal currents, as shown in the figure . The net magnetic field at the centre of the loop is  $B_1$  when the current in the loop is clockwise and  $B_2$  when the current in the loop is anti - clockwise . Then

 $rac{B_1}{B_2}$  is





#### Answer:

**31.** Two circular loops of diameters 0.6 cm and 40 cm are kept coaxially with a separation of 15 cm between their centres . If a current 2 A flows through the smaller loop then the flux linked with the bigger loop is (approximately )

A.  $9 imes 10^{-11}$  wb

 $\texttt{B.}\,0.9\times10^{-11}Wb$ 

 $\text{C.}\,1.8\times10^{-11}\,\text{Wb}$ 

D.  $2.7 imes 10^{-11}$  Wb

#### Answer:

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**32.** In the magnetic meridian of a certain place the vertical component of the earth's magnetic field is 0.3464 G and the dip angle is  $30^{\circ}$ . The horizontal component of the earth 's magnetic field at this location is B. 0.6 G

C. 0.7 G

D. 0.8 G

Answer: B

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**33.** A current carrying circular loop is perpendicular to a magnetic field of induction  $10^{-4}$  T . If the radius of the loop starts shrinking at a uniform rate of 2  $mms^{-1}$  then

the emf induced in the loop at the instant

#### when its radius is 20 cm will be

A. 0.02  $\pi\mu V$ 

B.  $0.08\pi\mu V$ 

 $\mathsf{C.}\,0.03\pi\mu V$ 

D.  $0.05\pi\mu V$ 

**Answer: B** 



**34.** A resistor and an inductor are connected in series to an AC source of voltage 150 sin  $(100\pi t + \pi)$  volt. If the current in the circuit is 5 sin  $\left(100\pi t + \frac{2\pi}{3}\right)$  ampere then the average power dissipated and the resistance of the resistor are respectively

A.  $187.5W30\Omega$ 

 $\mathsf{B}.\,187.5W15\Omega$ 

C.  $375W30\Omega$ 

D.  $375W15\Omega$ 

#### Answer: B



**35.** An electromagnetic wave of frequency 45 MHz travels in free space along X -axis . At some point and at some instant the electric field has a maximum value of 750  $NC^{-1}$  along Y -axis . The magnetic field at this position and time is

A.  $2.5 imes 10^{-6} \hat{j}$ 

B.  $5 imes 10^{-6} \hat{k} T$ 

C.  $2.5 imes 10^{-6} \hat{k}T$ 

D.  $2.5 imes 10^{-6} \hat{i}T$ 

#### Answer: C

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**36.** When light of frequency  $\nu$  incidents on two metallic plates A and B photo electrons are emitted . If the work function of A is more than that of B the correct curve of the following

curves drawn between stopping potential V

and incident frequency  $\nu$  is



#### Answer: D



**37.** The approximate value of principal quantum number for a circular orbit of hydrogen atom of radius 530 nm is

A. 26

B. 100

C. 200

D. 21

### Answer: B

**38.** A radioactive element X converts into another stable element Y . Half life of X is 2 hours. Initially only X is present . After a time t if the ratio of atoms of X to Y is 1:4 then the value of t is

A. 2 hours

B.4 hours

C. between 4 hours and 6 hours

# D. 6 hours

### Answer: C

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## 39. Match the following List I and List II.

	List		List II
Α.	Small Scale Integration (SSI)	١.	Logic gates < 100
Β.	Medium Scale Integration (MSI)	II.	Logic gates > 1000
C.	Large Scale Integration (LSI)	111.	Logic gates ≤ 10
D.	Very Large Scale Integration (VLSI)	IV.	Logic gates < 1000

# The correct answer is

A.
$$A$$
 $B$  $C$  $D$  $I$  $III$  $I$  $IV$ B. $A$  $B$  $C$  $D$  $IV$  $I$  $II$  $III$ C. $A$  $B$  $C$  $D$  $I$  $IV$  $IV$  $III$  $II$ D. $A$  $B$  $C$  $D$  $III$  $I$  $I$  $IV$  $II$ 

#### Answer: D



40. A modulated signal is given by  $C_m(t) = A_c \sin \omega_c t + \mu A_c \sin \omega_m t \sin \omega_c t$  where  $\mu$  is modulation index . To keep the

signal without distortion the value of  $\mu$  should

#### be

- A. > 1
- B.  $\geq 1$
- $\mathsf{C.}\ =1$
- D.  $\leq 1$

## Answer: D

