



## PHYSICS

# **BOOKS - TS EAMCET PREVIOUS YEAR PAPERS**

## **QUESTION PAPER 2015**

### **Physics**

**1.** The pressure on a circular plate is measured by measuring the force on the plate and the radius of the plate. If the errors in measurement of the force and the radius are 5% and 3% respectively, the percentage of error in the measurement of pressure is

A. 8

B. 14

C. 11

D. 12

#### Answer: C



**2.** A body is projected vertically from the surface of the earth of radius 'R' with a velocity equal t half of the escape velocity . The maximum heign reached by the body is

A. 
$$\frac{R}{2}$$
  
B.  $\frac{R}{3}$   
C.  $\frac{R}{4}$   
D.  $\frac{R}{5}$ 

#### Answer: B



**3.** A particle aimed at a target, projected with an angle  $15^0$  with the horizontal is short of the target by 10 m. If projected with an angle of 45° is away from the target by 15 m, then the angle of projection to hit the target

A. 
$$\frac{1}{2}\sin^{-1}\left(\frac{1}{10}\right)$$
  
B. 
$$\frac{1}{2}\sin^{-1}\left(\frac{3}{10}\right)$$
  
C. 
$$\frac{1}{2}\sin^{-1}\left(\frac{9}{10}\right)$$
  
D. 
$$\frac{1}{2}\sin^{-1}\left(\frac{7}{10}\right)$$

#### Answer: D



**4.** A man running at a speed of 5 kmph finds that the rain falls vertically. When he stops running, he finds that the rain is falling at an angle of 60° with the horizontal. The velocity of rain with respect to running man is

A. 
$$\frac{5}{\sqrt{3}} km/h$$
  
B.  $\frac{5\sqrt{3}}{2} km/h$   
C.  $\frac{4\sqrt{3}}{2} km/h$ 

D. 
$$5\sqrt{3}km/h$$

#### Answer: D



**5.** A horizontal force just sufficient to move body of mass 4 kg lying on a rough horizontal surface, is applied on it. Coeficients of static and kinetic frictions are 0.8 and 0.6 respectively. If the force continues to act

even after the body has started moving, the acceleration of the body is  $\left(g=10ms^{-2}
ight)$ 

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

D. 4  $ms^{-2}$ 

#### Answer: C

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**6.** A force  $\left(2\hat{I}+\hat{j}-\hat{k}\right)N$  acts on a body which is initially at rest. At the end of 20 sec the velocity of the

body is  $ig(4\hat{i}+2\hat{j}\!\!-\!2\hat{k}ig)ms^{-1}$  ,then mass of the body is

A. 8 kg

B. 10 kg

C. 5 kg

D. 4.5 kg

**Answer: B** 



7. A man of weight 50 kg carries an object to a height

of 20m in a time of 10 sec. The power used by the man

in this process is 2000W, then find the weight of the object carried by the man [assume  $g=10ms^{-2}$ ]

A. 100 kg

B. 25 kg

C. 50 kg

D. 10 kg

Answer: C

Watch Video Solution

**8.** A ball P moving with a speed of  $vms^{-1}$  collides directly with another identical ball Q moving with a

speed  $10ms^{-1}$  in the opposite direction. P comes to rest after the collision. If the coefficient of restitution is 0.6, the value of v is

A. 30  $ms^{-1}$ 

B. 40  $ms^{-1}$ 

C. 50  $ms^{-1}$ 

D. 60  $ms^{-1}$ 

#### **Answer: B**



**9.** A particle of mass m=5 units is moving with uniform speed  $V = 3\sqrt{2}$  units in the XY plane along the line Y = X + 4. The magnitude of the angular momentum about origin is,

A. zero

B. 60 units

C. 7.5 units

D. 40 units

Answer: B

**10.** Determine the kinetic energy of a circular disc rotating with a speed of 60 rpm about an axis passing through a point on its circumference and perpendicular to its plane. The circular disc has a mass of 5 kg and radius 1 m.

A. 170 J

B. 160 J

C. 150 J

D. 140 J

Answer: C

**11.** The amplitude of a simple pendulum is 10cm. When the pendulum is at a displacement of 4cm from the mean position, the ratio of kinetic and potential enegies at that point is,

A. 5.25

B. 2.5

C. 4.5

D. 7.5

Answer: A

**12.** A satellite revolving around a planet has orbit velocity 10km/s . The additional velocity required for the satellite to escape from the gravitational field of the planet is

A. 14.14 km/s

B. 11.2 km/s

C. 4.14 km/s

D. 41.4 km/s

#### Answer: C

**13.** The length og two metal wire is  $l_1$  when the tension in it is  $F_1$  and  $l_2$  when the tension is  $F_2$  .then the original length of the wire is

A. 
$$rac{l_1F_1+l_2F_2}{F_1+F_2}$$
  
B.  $rac{l_2-l_1}{F_2-F_1}$   
C.  $rac{l_1F_2-l_2F_1}{F_2-F_1}$   
D.  $rac{l_1F_1-l_2F_2}{F_2-F_1}$ 

#### Answer: C



14. the average depth of indian ocean is about 3000m.Thevalue of frictional compression  $\left(\frac{\Delta V}{V}\right)$  of water at the bottom of the ocean is (given that the bulk modulus of water is  $ig(2.2 imes 10^9 Nm^{-2}, g=9.8ms^{-2}, PH_2O=1000 kg.\,m^{-3}ig)$ A.  $3.4 \times 10^{-2}$ B.  $1.34 \times 10^{-2}$  $C.4.13 \times 10^{-2}$ D.  $13.4 \times 10^{-2}$ 

#### Answer: B

**15.** The ratio of energies of emtiled radiation by a black body at 600 K and 900 K when the surrounding temperature is 300, is

A. 
$$\frac{5}{16}$$
  
B.  $\frac{7}{16}$   
C.  $\frac{3}{16}$   
D.  $\frac{9}{16}$ 

#### Answer: C



16. The specific heat of helium at constant volume is  $12.6Jmol^{-1}K^{-1}$ . The specific heat of helium at constant pressure in  $Jmol^{-1}K^{-1}$  is about (Assume the temperature of the gas is moderate, universal gas constant,  $R = 8.314Jmol^{-1}K^{-1}$ 

A. 12.6

B. 16.8

C. 18.9

D. 21

Answer: D

**17.** A gas does 4.5 J of external work during adiabatic expansion. If its temperature falls by 2 K, then its internal energy will be

A. increased by 4.5 J

B. decreased by 4.5 J

C. decreased by 2.25 J

D. increased by 9.0 J

Answer: B



**18.** The relation between efficiency ' $\eta$ ' of a heat engine and the co-efficient of performance ' $\alpha$  of a refrigerator is

A. 
$$\eta = rac{1}{1-lpha}$$
  
B.  $\eta = rac{1}{1+lpha}$   
C.  $\eta = 1+lpha$ 

D. 
$$\eta = 1 - lpha$$

#### Answer: B

**19.** A flask contains argon and chlorine in the ratio of 2:1 by mass. The temperature of the mixture is  $27^{\circ}C$ . The ratio of average kinetic energies of two gases per molecule is

- A.1:1
- B. 2:1
- C.3:1

D.6:1

#### Answer: A



**20.** A tanserve wave is repsemted by the equation  $y = 2\sin(30t - 40x)$  and the measurments of distances are in meters, then the velocity of propagation is

A. 15  $ms^{-1}$ 

B. 0.75  $ms^{-1}$ 

C. 3.75  $ms^{-1}$ 

D. 300  $ms^{-1}$ 

**Answer: B** 



**21.** Two closed pipes have the same fundamental frequency. One is filled with oxygen and the other with hydrogen at the same temperature. Ratio of their lengths respectively is

A. 1:4

**B**. 4:1

C. 1:2

D. 2:1

Answer: A

**22.** An image is formed at a distance of 100 cm from the glass surface when light from point source in air falls on a spherical glass surface with refractive index 1.5. The distance of the light source from the glass surface is 100 cm. The radius of curvature is

A. 20 cm

B. 40 cm

C. 30 cm

D. 50 cm

Answer: A

**23.** Two coherent sources of intensity ratio 9:4 produce interference. The intensity ratio of maxima and minima of the interference pattern is

A. 13:6

B.5:1

C.25:1

D. 3:2

Answer: C



**24.** The energy of a parallel plate capacitor when connected to a battery is E. With the battery still in connection, if the plates of the capacitor are separated so that the distance between them is twice the original distance, then the electrostatic energy becomes

A. 2E

B. 
$$\frac{E}{4}$$
  
C.  $\frac{E}{2}$ 

D. 4E

Answer: C



**25.** Two point charger  $+8\mu$  and  $+12\mu$  repel each other with a force of 48 N. When an additional charge of  $-10\mu$  is given to each of these charges (the distance between the charges is unaltered) then the new force is

A. repulsive force of 24 N

B. attractive force of 24 N

C. repulsive force of 12 N

D. attractive force of 2 N

Answer: C



A. 
$$\frac{\varepsilon_0}{3}$$
  
B.  $3\varepsilon_0$   
C.  $\frac{4}{3}\varepsilon_0$   
D.  $\frac{3}{4}\varepsilon_0$ 

#### Answer: A



27. In a region of uniform electric field of n intencity E, an electron of mass  $m_e$  is released from rest. The distance travelled by the eloctron in a time t is

A. 
$$\frac{2m_et^2}{e}$$
  
B.  $\frac{eEt^2}{2m_e}$   
C.  $\frac{m_e \text{gt}^2}{eE}$   
D.  $\frac{2Et^2}{em_e}$ 

#### Answer: B



**28.** A constant potential difference is applied between the ends of the wire. If the length of the wire is elongated 4 times, then the drift velocity of electrons will be

A. increases 4 times

B. decreases 4 times

C. increases 2 times

D. decreases 2 times

#### Answer: A



**29.** In a metre bridge , the gaps are enclosed by resistances of  $2\omega$  and  $3\Omega$  . The value of shunt to be added to  $3\Omega$  resister to shift the balancing point by 22.5cm is

A. 1  $\Omega$ 

B. 2  $\Omega$ 

C. 2.5  $\Omega$ 

D. 5  $\Omega$ 

Answer: B



**30.** Two long straight parallel conductors 10 cm apart, carry equal currents of magnitude 3A in the same direction. Then the magnetic induction at a point midway between then is

A.  $2 imes 10^{-5}T$ 

 ${\sf B}.\,3 imes10^{-5}T$ 

C. zero

D.  $4 imes 10^{-5}T$ 

#### Answer: C



**31.** In a crossed field, the magnetic field induction is 2.OT and electric field intensity is  $20 \times 10^3 \frac{v}{m}$ . At which velocity the electron will travel In a straight line without the effect of electric and magnetic fields ?

A. 
$$rac{20}{1.6} imes 10^3 ms^{-1}$$

B. 
$$10 imes 10^3 ms^{-1}$$

C. 
$$20 imes 10^3 ms^{-1}$$

D. 
$$40 imes 10^3 ms^{-1}$$

#### **Answer: B**



**32.** A material of  $0.25cm^2$  cross sectional area is placed in a magnetic field of strength (H)  $1000Am^{-1}$ . Then the magnetic flux produced is (Susceptibility of material is 313)(Permeability of free space,  $\mu = 4\pi \times 10^{-7} Hm^{-1}$ 

A.  $8.33 imes 10^{-8} Wb$ 

B.  $1.84 imes 10^{-6} Wb$ 

C.  $9.87 imes10^{-6}Wb$ 

D.  $3.16 imes 10^{-6}Wb$ 

Answer: C

**33.** The magnitude of the induced emf in a coil of inductance 30 mH in which the current changes from 6A to 2A in 2s is

A. 0.06 V

B. 0.6 V

C. 1.06 V

D. 6 V

Answer: A



34. In a Ac circuit aV and I are given below , then find

the power dissiapted in the circuit

V= 50 sin (50t) V

$$I=50\sin\Bigl(50+\Bigl(rac{\pi}{3}\Bigr)\Bigr)mA$$

B. 1.25 W

C. 2.50 W

D. 5.0 W

#### Answer: A



**35.** Light with an energy flux of  $9Wcm^{-2}$ ? falls on a nonreflecting surface at normal incidence. If the surface has an area of  $20cm^2$ . The total momentum delivered for complete absorption in one hour is

A.  $2.16 imes 10^{-4} kgms^{-1}$ 

B. 1.16 imes 10  $^{-3}kgms$   $^{-1}$ 

C.  $2.16 imes10^{-3}kgms^{-1}$ 

D.  $3.16 imes 10^{-4} kgms^{-1}$ 

#### Answer: C



36. The ratio of the De-Broglie wavelength for the electron and proton moving the same velocity is  $m_p-Mass$  of proton, $m_e-Mass$  of electron)

A.  $m_p$  :  $m_e$ 

 $\mathsf{B}.\,m_p^2\!:\!m_e^2$ 

 $\mathsf{C}.\,m_e\!:\!m_p$ 

D.  $m_e^2$  :  $m_p^2$ 

#### **Answer: A**



**37.** The ratio of longest wavelength line in the Balmer andaschen series of hydrogen spectrum is

A. 
$$\frac{5}{36}$$
  
B.  $\frac{7}{20}$   
C.  $\frac{7}{144}$   
D.  $\frac{5}{27}$ 

#### **Answer: B**



38. In the following nuclear reaction 'x' stands for

 $n 
ightarrow p + e^- + x.$ 

A.  $\alpha$ -particle

B. positron

C. nutrino

D. antinutrino

Answer: D



39. In the following circuit, the output Y becomes zero

for the input combinations.



- A. A=1, B=0, C=0
- B. A=0, B=1, C=1
- C. A=0, B=0, C=0
- D. A=1, B=1, C=0

#### Answer: D



**40.** The maximum amplitude of an amplitude modulated wave is 16 V, while the minimum amplitude is 4 V. The modulation index is

A. 0.4

B. 0.5

C. 0.6

D. 4

Answer: C

