



## PHYSICS

# BOOKS - CHHAYA PHYSICS (BENGALI ENGLISH)

## QUESTION PAPERS OF JEE MAIN -2017

### Question

1. A man grows into a giant such that his linear dimensions increase by a factor of 9. Assuming

that his density remains same , the stress in the lag will change by a factor of

A. 9

B.  $\frac{1}{9}$

C. 81

D.  $\frac{1}{81}$

**Answer:**



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2. A body is thrown vertically upwards . Which one the following graphs corrently represent the velocity vs time ?

A. 

B. 

C. 

D. 

**Answer:**



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3. A body of mass  $m = 10^{-2}$  Kg is moving in a medium and experiences a frictional force  $F = -Kv^2$ . Its initial speed is  $V_0 = 10m \cdot s^{-1}$  if after 10 s, its energy is  $\frac{1}{8}mv_0^2$ , the value of K will be

A.  $10^{-3} Kg \cdot M^{-1}$

B.  $10^{-3} Kg \cdot S^{-1}$

C.  $10^{-4} Kg \cdot m^{-1}$

D.  $10^{-1} Kg \cdot M^{-1} \cdot s^{-1}$

**Answer:**



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4. A time dependent force  $F = 6t$  acts on a particle of mass 1 Kg . IF the particle starts from rest ,. The work done by the force during the first 1s will be

A.  $4.5J$

B.  $22J$

C.  $9J$

D.  $18J$

**Answer:**



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5. The moment of inertia of a uniform cylinder of length  $l$  and radius  $R$  about its perpendicular bisector is  $I$ . What is the ratio  $\frac{l}{R}$  such that the moment of inertia is minimum?

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

B.  $\frac{\sqrt{3}}{2}$

C. 1

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

**Answer:**



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6. The variation of acceleration due to gravity  $g$  with distance  $d$  from centre of the earth is best represented by ( $R = \text{earth's radius}$  )

A. 

B. 

C. 

D. 

**Answer:**

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7. A copper ball of mass 100 g is at a temperature  $T$  . It is dropped in a copper calorimeter of mass 100 g , filled with 170 g of water at room temperature . Subsequently , the



temperature of the system is found to be  $75^{\circ}C$ ,  $T$  is given by ( given : room temperature =  $30^{\circ}C$ , specific heat of copper =  $0.1\text{cal}/g^{\circ}C$ )

A.  $800^{\circ}C$

B.  $885^{\circ}C$

C.  $1250^{\circ}C$

D.  $825^{\circ}C$

**Answer:**



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8. An external pressure  $P$  is applied on a cube at  $0^\circ C$  so that it is equally compressed from all sides.  $K$  is the bulk modulus of the material of the cube and  $\alpha$  is its coefficient of linear expansion. Suppose we want to bring the cube to its original size by heating the temperature should be raised by

A.  $\frac{P}{3\alpha K}$

B.  $\frac{P}{\alpha K}$

C.  $\frac{3\alpha}{PK}$

D.  $3PK\alpha$

**Answer:**



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9.  $C_p$  and  $C_V$  are specific heats at constant pressure and constant volume respectively . It is observed that

$$C_p - C_v = a \text{ for hydrogen gas}$$

$$C_p - C_v = b \text{ for nitrogen gas}$$

The correct relation between a and b is

A.  $a = \frac{1}{14}b$

B.  $a = b$

C.  $a = 14b$

D.  $a = 28b$

**Answer:**



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**10.** The temperature of an open room of volume  $30m^3$  increases from  $17^\circ C$  to  $27^\circ C$  due to the sunshine . The atmospheric pressure

in the room remains  $1 \times 10^5$  Pa . If  $n_i$  and  $n_f$  are the number of molecules in the room before and after heating then  $n_f - n_i$  will be

A.  $-1.61 \times 10^{23}$

B.  $1.38 \times 10^{23}$

C.  $2.5 \times 10^{25}$

D.  $-2.5 \times 10^{25}$

**Answer:**



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11. A particle is executing simple harmonic motion with a time period  $T$ . At time  $t=0$ , it is at its position of equilibrium. The kinetic energy - time graph of the particle will look like

A. 

B. 

C. 

D. 

**Answer:**





12. An observer is moving with half the speed of light towards a stationary microwave source emitting waves at frequency 10GHz. What is the frequency of the microwave measured by the observer ? ( speed of light  $= 3 \times 10^8 m. s^{-1}$ )

A. 10.1GHz

B. 12.1GHz

C. 17.3GHz

D.  $15.3\text{GHz}$

**Answer:**



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**13.** An electric dipole has a fixed dipole moment  $\vec{p}$ , which makes angle  $\theta$  respect to x - axis when subjected to an electric field  $\vec{E}_1 = W\hat{i}$ , it experiences a torque  $\vec{T}_1 = \tau\hat{k}$ .  
When subjected to another electric field



$\vec{E}_2 = \sqrt{3}E_1\hat{j}$  it experience a torque

$\vec{T}_2 = -\vec{T}_1$ . The angle  $\theta$  is

A.  $30^\circ$

B.  $45^\circ$

C.  $60^\circ$

D.  $90^\circ$

**Answer:**



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14. A capacitance of  $2.0 \mu F$  is required in an electrical circuit across a potential difference of  $1.0 \text{ kV}$ . A large number of  $1 \mu F$  capacitors are available which can withstand a potential difference of not more than  $300 \text{ V}$ . the minimum number of capacitors required to achieve this is

A. 2

B. 16

C. 24

D. 32

**Answer:**



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**15.** In the given circuit diagram when the current reaches steady state in the circuit , the charge on the capacitor of capacitance  $C$  will be

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A.  $CE$

B.  $\frac{CEr_1}{r_2 + r}$

C.  $\frac{CEr_2}{r + r_2}$

D.  $\frac{CEr_1}{r_1 + r}$

**Answer:**



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**16.** A magnetic needle of magnetic moment  $6.7 \times 10^{-2} \text{ A} \cdot \text{m}^2$  and moment of inertia  $7.5 \times 10^{-6} \text{ Kg} \cdot \text{M}^2$  is performing simple harmonic oscillations in a magnetic field of  $0.01 \text{ T}$  . Time taken for 10 complete oscillations is

A.  $6.65s$

B.  $8.89s$

C.  $6.98S$

D.  $8.76S$

**Answer:**



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17. when a current of 5 mA is passed through a galvanometer having a coil of resistance  $15\Omega$ , it shows full scale deflection. The value of the resistance to be put in series with the galvanometer to convert it into a voltmeter of range  $0 - 10V$  is

A.  $1.985 \times 10^3 \Omega$

B.  $2.045 \times 10^3 \Omega$

C.  $2.535 \times 10^3 \Omega$

D.  $4.005 \times 10^3 \Omega$

**Answer:**



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**18.** An electron beam is acceleration by a potential difference  $V$  to hit a metallic target to produce X- rays . It produces continuous as well as characteristic X - rays . If  $\lambda_{\min}$  is the

smallest possible wavelength of X -ray in the spectrum , the variation of  $\log \lambda_{\min}$  with  $\log V$  is correctly represented in

A. 

B. 

C. 

D. 

**Answer:**



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19. In a young's double slit experiment slits are separated by 0.5 mm, and the screen is placed 150 cm away .A beam of light consisting of two wavelength ,650 nm and 520 nm consisting of two interference fringers on the screen . The least distance from the common central maximum to the point where the bright fringes due to both the wavelength coincide is

A.  $1.56\text{mm}$

B.  $7.8\text{mm}$

C.  $9.75\text{mm}$

D.  $15.6\text{mm}$

**Answer:**



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**20.** A radioactive nucleus A with a half-life  $T$ , decays into a nucleus B. At  $t=0$ , there is no nucleus B. At some time  $t$ , the number of B to that of A is 0.3. Then,  $t$  is given by

$$\text{A. } t = \frac{T}{2} \frac{\log 2}{\log 1.3}$$

$$\text{B. } t = T \frac{\log 1.3}{\log 2}$$

$$\text{C. } t = T \log(1.3)$$

$$\text{D. } t = \frac{T}{\log(1.3)}$$

**Answer:**



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**21.** Which of the following statements is false ?

A. Wheatstone bridge is the most sensitive when all the four resistances are

of of the same order of magnitude .

B. In a balanced wheatstone bridge if the cell and the galvanometer are exchanged , the null point is distured .

C. A rhostat can be used as a potential divider .

D. Kirchoff's second law represents energy conservation .

**Answer:**



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22. The following observations were taken for determining surface tension  $T$  of water by capillary method : diameter of capillary ,  
 $D = 1.25 \times 10^{-2}m$ .

using  $g = 9.80m/s^2$  and the simplified relation  $T = \frac{r h g}{2} \times 10^3 N/m$ , the possible error in surface tension is closest to

A. 0.15 %

B. 1.5 %

C. 2.4 %

D. 10 %

**Answer:**



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