



# PHYSICS

## BOOKS - NTA MOCK TESTS

### NEET MOCK TEST 15

#### Physics

1. A current  $I = 20 \sin(100\pi t) A$  is passed in the first coil, which induces a maximum emf of

$10\pi V$  in the second coil. The mutual inductance for the pair of coils is

A. 10 mH

B. 15 mH

C. 25 mH

D. 5 mH

**Answer: D**



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2. A uniform magnetic field exists in region given by  $\vec{B} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ . A rod of length  $5m$  is placed along  $y$ -axis is moved along  $x$ -axis with constant speed  $1m/sec$ . Then the magnitude of induced *e. m. f* in the rod is :

A. zero

B. 25 V

C. 20 V

D. 15 V

**Answer: B**



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3. A transformer is used to light a 140 W, 24 V lamp from 240 V AC mains. The current in mains cable is 0.7 A, find the efficiency of transformer.

A. 63.8 %

B. 84 %

C. 83.3 %

D. 48 %

**Answer: C**



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4. The current in an LCR circuit is given by

$$I = 20 \sin\left(100\pi t + \frac{\pi}{6}\right) A.$$
 The voltage across

the the inductance  $L$  of  $0.1H$  at  $t = 0$  will be

A. 31.4 V

B. 3.14 V

C. 157 V

D. 314 V

**Answer: D**



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5. The time required for a 50Hz alternating current to increase from zero to 70.7 % of its peak value is-

A. 2.5 ms

B. 10 ms

C. 20 ms

D. 14.14 ms

**Answer: A**



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6. The focal length of a simple convex lens used as a magnifier is 10 cm. For the image to be formed at a distance of distinct vision  $D = 25$  cm, the object must be placed away from the lens nearly at a distance of

A. 5 cm

B. 7 cm

C. 8 cm

D. 16 cm

**Answer: D**



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7. In Young's double slit experiment, the ratio of maximum and minimum intensities in the fringe system is 9:1 the ratio of amplitudes of coherent sources is



A. 9:1

B. 3:1

C. 2:1

D. 1:1

**Answer: C**



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**8.** The plane surface of a plano-convex lens of focal length  $f$  is silvered. It will behave as

A. plane mirror

B. convex mirror of focal length  $2F$

C. concave mirror of focal length  $\frac{F}{2}$

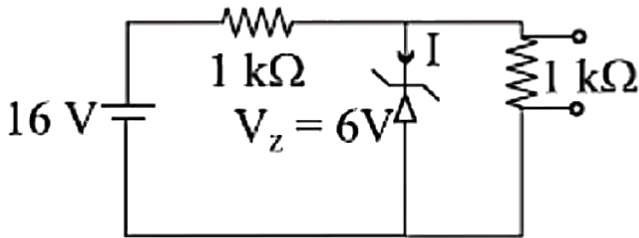
D. none of these

**Answer: C**



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9. What is value of current  $I$  in given circuit



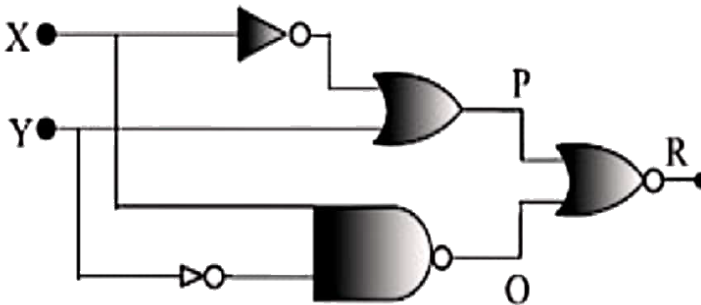
- A. 6 mA
- B. 10 mA
- C. 4 mA
- D. zero

**Answer: C**





10. The figure gives a system of logic gates. From the study of the truth table, it can be found that to produce a high output (1) at R, we must have



A.  $X = 0, Y = 1$

B.  $X = 1, Y = 1$

C.  $X = 1, Y = 0$

D.  $X = 0, Y = 0$

**Answer: C**



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**11.** In an excited state of hydrogen like atom an electron has total energy of  $-3.4eV$ . If the kinetic energy of the electron is  $E$  and its de-Broglie wavelength is  $\lambda$ , then

A.  $E = 6. \text{ eV}$ ,  $\lambda \sim 6.6 \times 10^{-10} \text{ m}$

B.  $E = 3.4 \text{ eV}$ ,  $\lambda \sim 6.6 \times 10^{-10} \text{ m}$

C.  $E = 3.4 \text{ eV}$ ,  $\lambda \sim 6.6 \times 10^{-11} \text{ m}$

D.  $E = 6.8 \text{ eV}$ ,  $\lambda \sim 6.6 \times 10^{-11} \text{ m}$

**Answer: B**



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**12.** The energies of energy levels A, B and C for a given atom are in the sequence

$E_A < E_B < E_C$ . If the radiations of

wavelength  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$  are emitted due to the atomic transitions C to B, B to A and C to A respectively then which of the following relations is correct :-

A.  $\lambda_3 = \lambda_1 + \lambda_2$

B.  $\lambda_3 = \frac{\lambda_1 + \lambda_2}{\lambda_1 + \lambda_2}$

C.  $\lambda_1 + \lambda_2 + \lambda_3 = 0$

D. none

**Answer: B**



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13. If the overbridge is concave instead of being convex, the thrust on the road at the lowest position will be

A.  $mg + \frac{mv^2}{r}$

B.  $mg - \frac{mv^2}{r}$

C.  $\frac{m^2v^2g}{r}$

D.  $\frac{v^2g}{r}$

**Answer: A**



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14. A particle is moving with a constant speed along a straight line path. A force is not required to

- A. increase its speed
- B. decrease the momentum
- C. change the direction
- D. keep it moving with uniform velocity

**Answer: D**



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15. Which of the following statements is not true

A. the coefficient of friction between two surface increases as the surface in contact are made rough

B. the force of friction acts in a direction opposite to the applied force

C. rolling friction is greater than sliding friction

D. the coefficient of friction between wood  
and wood is less than 1

**Answer: C**



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16. If  $\vec{A} = 4\hat{i} - 3\hat{j}$  and  $\vec{B} = 6\hat{i} + 8\hat{j}$  then  
magnitude and direction of  $\vec{A} + \vec{B}$  will be

A.  $5, \tan^{-1}\left(\frac{3}{4}\right)$

B.  $5\sqrt{5}, \tan^{-1}\left(\frac{1}{2}\right)$

C. 10,  $\tan^{-1}(5)$

D. 25,  $\tan^{-1}\left(\frac{3}{4}\right)$

**Answer: B**



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**17.** The random error in the arithmetic mean of 100 observations is  $x$ , then random error in the arithmetic mean of 400 observations would be

A.  $4x$

B.  $\frac{x}{4}$

C.  $2x$

D.  $\frac{x}{2}$

**Answer: B**



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**18.** 50 g ice at  $0^{\circ}C$  is kept in an insulating vessel and 50 g water at  $100^{\circ}C$  is mixed in it.

Then the final temperature of the mixture is  
(neglect the heat loss)

A.  $10^{\circ} C$

B.  $0^{\circ} C < T_m < 20^{\circ} C$

C.  $20^{\circ} C$

D. above  $20^{\circ} C$

**Answer: A**



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19. Distribution of energy in the spectrum of a black body can be correctly represented by .

A. wien's law

B. stefan's law

C. planck's law

D. kirchhoff's law

**Answer: C**



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20. Air is bad conductor of heat or partly conducts heat, still vacuum is to be placed between the walls of the thermos flask because

A. it is difficult to fill the air between the walls of thermos flask

B. due to more pressure of air, the thermos can get crack

C. by convection, heat can flow through air

D. on filling the air, there is no advantage



**Answer: C**



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**21.** Water enters through end A with a speed  $v_1$  and leaves through end B with a speed  $v_2$  of cylindrical tube AB. The tube is always completely filled with water. In case I the tube is horizontal, in case II it vertical with the end A upward and in case III it is vertical with the end B upward. We have  $v_1 = v_2$  for

A. Case I

B. Case II

C. Case III

D. each case

**Answer: D**



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**22.** If a bullet of mass 5gm moving with velocity  $100\text{m/sec}$ , penetrates the wooden

block upto 6cm. Then the average force imposed by the bullet on the block is

A. 8300 N

B. 417 N

C. 830 N

D. zero

**Answer: B**



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23. A constant pressure air thermometer gave a reading of 47.5 units of volume when immersed in ice cold water, and 67 units in a boiling liquid. The boiling point of the liquid will be

A.  $135^{\circ} C$

B.  $125^{\circ} C$

C.  $112^{\circ} C$

D.  $100^{\circ} C$

**Answer: C**



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**24.** When vapour condenses into liquid

- A. it absorbs heat
- B. it liberates heat
- C. its temperature increases
- D. its temperature decreases

**Answer: B**



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25. A travelling wave passes a point of observation. At this point, the time interval between successive crests is 0.2 seconds and

A. the wavelength is 5 m

B. the frequency is 5 Hz

C. the velocity of propagation is 5 m/s

D. the wavelength is 0.2 m

**Answer: B**



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26. A tuning fork makes 256 vibrations per second in air. When the speed of sound is  $330\text{m} / \text{s}$ , the wavelength of the note emitted is :

A. 0.56 m

B. 0.89 m

C. 1.11 m

D. 1.29 m

**Answer: D**



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27. A particle executes a simple harmonic motion of time period  $T$ . Find the time taken by the particle to go directly from its mean position to half the amplitude.

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

B.  $\frac{T}{4}$

C.  $\frac{T}{8}$

D.  $\frac{T}{12}$



**Answer: D**



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**28.** The length of the two rods made up of the same metal and having the same area of cross-section are 0.6 m and 0.8 m respectively. The temperature between the ends of first rod is  $90^{\circ}$  C and  $60^{\circ}$  C and that for the other rod is 150 and  $110^{\circ}$  C. For which rod the rate of conduction will be greater

A. first

B. second

C. same for both

D. none of the above

**Answer: C**



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**29.** In thermodynamic process, 200 Joules of heat is given to a gas and 100 Joules of work is

also done on it. The change in internal energy of the gas is

A. 100 J

B. 300 J

C. 419 J

D. 24 J

**Answer: B**



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30. A perfect gas at  $27^{\circ}C$  is heated at constant pressure so as to triple its volume.

The temperature of the gas will be

A.  $1^{\circ}C$

B.  $900^{\circ}C$

C.  $627^{\circ}C$

D.  $450^{\circ}C$

**Answer: C**



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31. When a copper ball is heated, the largest percentage increase will occur in its

A. diameter

B. area

C. volume

D. density

**Answer: C**



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32. For a particle of a rotating rigid body,

$v = r\omega$ , which of the following are correct ?

A.  $\omega \propto \frac{1}{r}$

B.  $\omega \propto v$

C.  $v \propto \frac{1}{r}$

D.  $\omega$  is independent of  $r$

**Answer: D**



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**33.** Two rings of same radius and mass are placed such that their centres are at a common point and their planes are perpendicular to each other. The moment of inertia of the system about an axis passing through the centre and perpendicular to the plane of one of the rings is (mass the ring =  $m$ , radius =  $r$ )

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

B.  $mr^2$

C.  $\frac{3}{2}mr^2$

D.  $2mr^2$

**Answer: C**



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**34.** In one dimensional elastic collision of equal masses, the velocities are interchanged.

Can velocities in a one dimensional collision be interchanged if the masses are not equal?

A. only (i) is correct



B. only (ii) is correct

C. both (i) and (ii) are correct

D. both (i) and (ii) are wrong

**Answer: A**



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**35.** A projectile is fired with velocity  $v_0$  at angle  $60^\circ$  with horizontal. At top of its trajectory it explodes into three fragments of equal masses. First fragment retraces the path,

second moves vertically upwards with speed

$\frac{3v_0}{2}$ . Speed of the third fragment is

A.  $\frac{3v_0}{2}$

B.  $\frac{5v_0}{2}$

C.  $v_0$

D.  $2v_0$

**Answer: B**



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**36.** Two men  $A$  and  $B$  are carrying a uniform bar of length  $L$  on their shoulders. The bar is held horizontally such that  $A$  gets one-fourth load. If  $A$  is at one end of the bar, the distance of  $B$  from that end is

A.  $\frac{L}{3}$

B.  $\frac{L}{4}$

C.  $\frac{2L}{3}$

D.  $\frac{3L}{4}$

**Answer: A**



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37. A body, constrained to move in the Y-direction is subjected to a force given by  $\vec{F} = (-2\hat{i} + 15\hat{j} + 6\hat{k})N$ . What is the work done by this force in moving the body a distance 10 m along the Y-axis

A. 20 J

B. 150 J

C. 160 J

D. 190 J

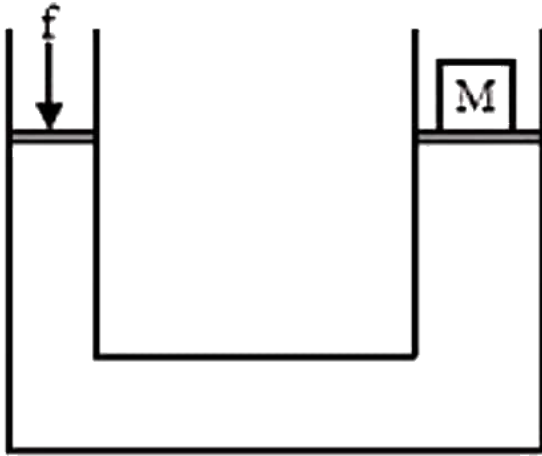
**Answer: B**



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**38.** In a hydraulic press, radii of connecting pipes,  $r_1$  and  $r_2$  are in the ratio 1:2 . In order to lift a heavy mass  $M$  on the larger piston, the small piston must be pressed through a

minimum force  $f$  equal to



A.  $Mg$

B.  $\frac{Mg}{2}$

C.  $\frac{Mg}{4}$

D.  $\frac{Mg}{8}$

**Answer: C**



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**39.** Two liquids A and B are at  $30^{\circ}C$  and  $20^{\circ}C$ , respectively. When they are mixed in equal masses, the temperature of the mixture is found to be  $26^{\circ}C$ . The ratio of their specific heat is

A. 3 : 2

B. 1 : 1

C. 2 : 3

D. 4: 3

**Answer: A**



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**40.** If a stone is to hit at a point which is at a horizontal distance 100 m away and at a height 50 m above the point from where the stone starts, then what is the value of initial speed  $u$  if the stone is launched at an angle  $45^\circ$  ?

A.  $10\sqrt{2}m / s$



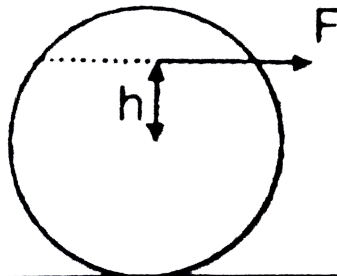
B.  $10\sqrt{5}m / s$

C.  $20\sqrt{5}m / s$

D.  $20\sqrt{10}m / s$

**Answer: C**

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41.

A solid sphere of mass  $m$  and radius  $R$  is

placed on a rough horizontal surface. A horizontal force  $F$  is applied to sphere at a height  $h$ , ( $0 \leq h \leq R$ ) from centre. If sphere rolls slipping then,

A.  $h = \frac{2}{5}R$  and  $v = \frac{J}{M}$

B.  $h = \frac{2}{5}R$  and  $v = \frac{2}{5} \frac{J}{M}$

C.  $h = \frac{7}{5}R$  and  $v = \frac{7}{5} \frac{J}{M}$

D.  $h = \frac{7}{5}R$  and  $v = \frac{J}{M}$

**Answer: A**



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42. A body is displaced from  $(0, 0)$  to  $(1\text{m}, 1\text{m})$  along the path  $x = y$  by a force  $F = (x^2\hat{j} + y\hat{i})\text{N}$ . The work done by this force will be

A.  $\frac{4}{3}J$

B.  $\frac{5}{6}J$

C.  $\frac{3}{2}J$

D.  $\frac{7}{5}J$

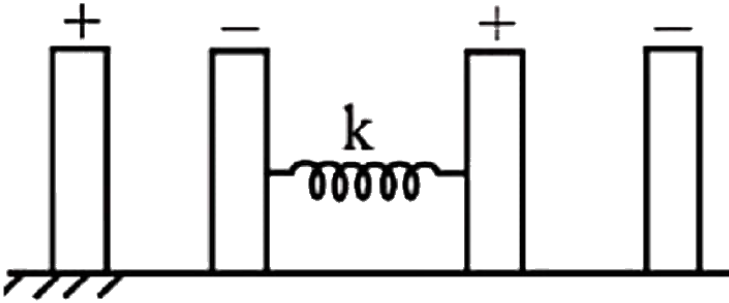
**Answer: B**



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**43.** Two charged capacitors have their outer plates fixed and inner plates connected by a spring of force constant  $k$ . The magnitude of charge on each capacitor is  $q$  and sign of charge on each capacitor is  $q$  and sign of charge is shown in figure. Find the extension

in the spring at equilibrium.



A.  $\frac{q^2}{2A\epsilon_0 k}$

B.  $\frac{q^2}{2A\epsilon_0 k}$

C.  $\frac{q^2}{4A\epsilon_0 k}$

D. Zero

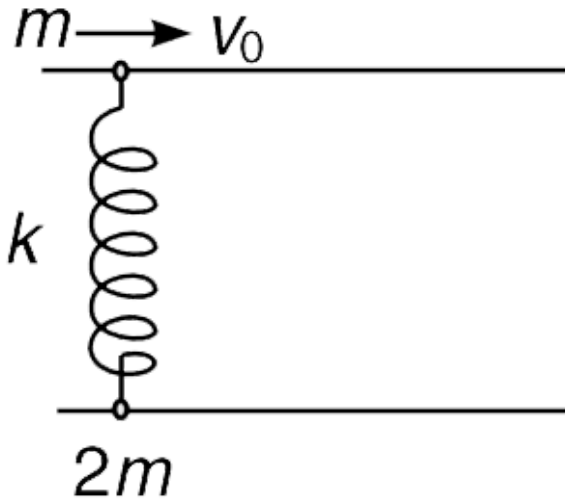
**Answer: A**



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**44.** Two rings of mass  $m$  and  $2m$  are connected with a light spring and can slide over two frictionless parallel horizontal rails as shown in figure. Ring of mass  $m$  is given velocity ' $v_0$ ' in horizontal direction as shown. Calculate the maximum stretch in spring during subsequent

motion.



- A.  $\sqrt{\frac{m}{k}} v_0$
- B.  $\sqrt{\frac{3m}{k}} v_0$
- C.  $\sqrt{\frac{2m}{3k}} v_0$
- D.  $\sqrt{\frac{2m}{k}} v_0$

**Answer: C**

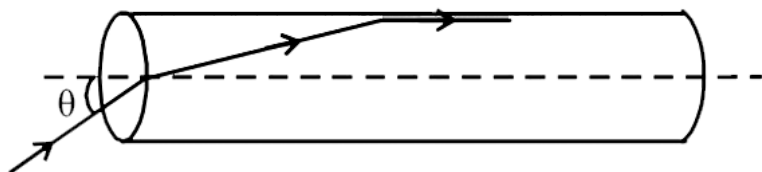


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**45.** A transparent solid cylindrical rod has a refractive index of  $\frac{2}{\sqrt{3}}$ . It is surrounded by air.

A light ray is incident at the mid-point of one end of the rod as shown in the figure. The incident angle  $\theta$  for which the light ray grazes along the wall of the rod is:





A.  $\sin^{-1}\left(\frac{1}{2}\right)$

B.  $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

C.  $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$

D.  $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

**Answer: D**



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