

# SAMPLE PAPER

## 2019 NEET

### PHYSICS

SET-2

Roll No.

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#### General Instructions

- (i) This test consists of 45 question.
- (ii) Each question is allotted 4 marks for correct response.
- (iii) Candidates will be awarded marks as stated above in instruction no. 2 for correct response of each question. 1 mark will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
- (iv) There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted according as per instructions.

1. If  $M$  is mass and  $L$  is the latent heat of fusion, then the dimensional formula for  $ML$  is same as that of
  - (a) charge  $\times$  potential
  - (b) potential/capacitance
  - (c) inductance  $\times$  current
  - (d) pressure/volume



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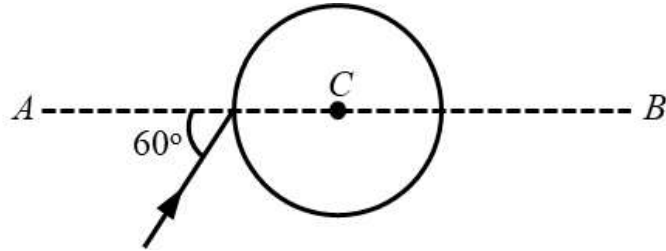
2. A body falling from a height  $h$  travels 40 m in the last two seconds of its fall to ground. The height  $h$  in metres is (use  $g = 10 \text{ ms}^{-2}$ )
- (a) 80
  - (b) 60
  - (c) 45
  - (d) 40
3. If the number of steady revolutions per minute of a conical pendulum is increased from 75 to 80, the difference in the level of bob would be
- (a) 1.0 cm
  - (b) 1.5 cm
  - (c) 2.0 cm
  - (d) 2.5 cm
4. The moment of inertia of a uniform horizontal cylinder of mass  $M$  about an axis passing through its edge and perpendicular to the axis of the cylinder when its length is 6 times its radius  $R$  is
- (a)  $\frac{39}{4}MR^2$
  - (b)  $\frac{39}{4}MR$
  - (c)  $\frac{49}{4}MR$
  - (d)  $\frac{49}{4}MR^2$
5. If both the mass and radius of the earth decreases by 1%, then
- (a) the escape velocity would increase
  - (b) the escape velocity would decrease
  - (c) the acceleration due to gravity would increase
  - (d) the acceleration due to gravity would decrease
6. A closed cubical box is completely filled with water and is accelerated horizontally towards right with constant acceleration  $a$ . The resultant normal force by the water on the top of the box
- (a) passes through the centre of the top
  - (b) passes through a point to the left of the centre
  - (c) passes through a point to the right of the centre
  - (d) is zero
7. A thin copper wire of length  $l$  increases in length by 1%, when heated from  $0^\circ\text{C}$  to  $100^\circ\text{C}$ . If a thin copper plate of area  $(2l \times l)$  is heated from  $0^\circ\text{C}$  to  $100^\circ\text{C}$ , the percentage increase in its area would be
- (a) 1%
  - (b) 2%
  - (c) 3%
  - (d) 4%



8. How many of the following three equations represent simple harmonic motion?
- (i)  $x = A \sin [(\omega + \delta) t]$   
(ii)  $x = A \cos^3 \omega t$   
(iii)  $x = \frac{A}{\tan^2 (wt + \delta) + 1}$
- (a) zero  
(b) 1  
(c) 2  
(d) 3
9. Five balls numbered 1, 2, 3, 4, 5 are suspended using separate threads. The balls (1, 2), (2, 4) and (4, 1) show electrostatic attraction, while balls (2, 3) and (4, 5) show repulsion. Therefore, ball 1 must be
- (a) negatively charged  
(b) positively charged  
(c) neutral  
(d) made of metal
10. Two concentric coplanar circular loops of radii  $r_1$  and  $r_2$  carry currents of respectively  $I_1$  in opposite directions (one clockwise and other anticlockwise). The magnetic field induction at the centre of the loops is half as due to loop carrying current  $I_1$  alone at the centre. If  $r_2 = 2 r_1$ , the value of  $I_2/I_1$  is
- (a) 2  
(b) 1/2  
(c) 1/4  
(d) 1
11. A direct current of 5 A is superimposed on an alternating current  $I = 10 \sin \omega t$  flowing through a wire. The effective value of the resulting current will be
- (a)  $(15/2)$  A  
(b)  $(5\sqrt{3})$  A  
(c)  $(5\sqrt{5})$  A  
(d) 15 A
12. If the ratio of amplitudes of two interfering waves is 4 : 3, then the ratio of maximum and minimum intensity is
- (a) 16 : 18  
(b) 18 : 16  
(c) 49 : 1  
(d) 94 : 1



13. A ray of light falls on a transparent sphere with centre at  $C$  as shown in figure given here. The ray emerges from the sphere parallel to line  $AB$ . The refractive index of the sphere is



- (a)  $3/2$   
 (b)  $\sqrt{2}$   
 (c)  $1/2$   
 (d)  $\sqrt{3}$
14. A lens is placed between a source of light and a wall. It forms images of area  $A_1$  and  $A_2$  on the wall, for its two different positions. The area of the source obtained is  
 (a)  $(A_1 + A_2)/2$   
 (b)  $\sqrt{A_1 A_2}$   
 (c)  $[A_1^{-1} + A_2^{-1}]^{-1}$   
 (d)  $[(\sqrt{A_1} + \sqrt{A_2})/2]^2$
15. Light of wavelength  $\lambda$  and photon energy  $2 \text{ eV}$  falling on a metal surface produces photoelectrons of maximum velocity  $v$ . If  $\lambda$  is decreased by  $25\%$  and the maximum velocity is doubled, the work function of metal (in eV) is  
 (a) 1.2  
 (b) 1.5  
 (c) 1.6  
 (d) 1.8
16. The de-Broglie wavelength associated with proton changes by  $0.25\%$  if its momentum is changed by  $p_0$ . The initial momentum was  
 (a)  $100 p_0$   
 (b)  $p_0/400$   
 (c)  $401 p_0$   
 (d)  $p_0/100$
17. A radioactive substance has a half-life of 60 minutes. During 3 hour, the fraction of atoms that have decayed would be  
 (a) 12.5%  
 (b) 25.1%  
 (c) 8.5%  
 (d) 87.5%



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18. When an electron jumps from a level  $n = 4$  to  $n = 1$ , momentum of the recoiled hydrogen atom will be
- zero
  - $6.8 \times 10^{-27} \text{ kg ms}^{-1}$
  - $12.75 \times 10^{-19} \text{ kg ms}^{-1}$
  - $13.6 \times 10^{-19} \text{ kg ms}^{-1}$
19. A TV Tower has a height of 150 m. The area of the region covered by the TV broadcast is (radius of earth =  $6.4 \times 10^6 \text{ m}$ )
- $9.6 \pi \times 10^8 \text{ m}^2$
  - $19.2 \pi \times 10^9 \text{ m}^2$
  - $19.2 \pi \times 10^7 \text{ m}^2$
  - $1.92 \pi \times 10^3 \text{ km}^2$

**Direction.** Read the following questions and choose if

- both, Assertion and Reason are true and the Reason is correct explanation of the Assertion.
- both, Assertion and Reason are true but the Reason is not correct explanation of the Assertion.
- Assertion is true but the Reason is false.
- both, Assertion and Reason are false.

20. **Assertion :** If  $\theta$  is the angle between  $\vec{A}$  and  $\vec{B}$ , then

$$\tan\theta = \frac{\vec{A} \times \vec{B}}{\vec{A} \cdot \vec{B}}$$

**Reason :**  $\vec{A} \times \vec{B}$  perpendicular to  $\vec{A} \cdot \vec{B}$

- A
- B
- C
- D

21. **Assertion :** If we take air friction into account, then for a projectile, the time of ascent is less than the time of descent.

**Reason :** The magnitude of retardation in upward motion is less than the acceleration in the downward motion.

- A
- B
- C
- D

22. **Assertion :** The direction of magnetic field at a point produced by a linear conductor carrying current can be given by Ampere's law.

**Reason :** The Ampere's law correlates the direction of magnetic field with the current through linear conductor.

- A
- B
- C
- D



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23. **Assertion** : Microwave have more energy than the radiowaves.

**Reason** : Energy  $E = hc/\lambda$ .

- (a) A
- (b) B
- (c) C
- (d) D

24. **Assertion** : The nature of X-ray spectrum is continuous.

**Reason** : X-rays arise due to jumps of electrons from higher orbit to one of the inner orbit in an atom.

- (a) A
- (b) B
- (c) C
- (d) D

25. A particle performs a uniform circular motion with an angular momentum  $L$ . If the frequency of the particle's motion is doubled and its  $KE$  is halved, the angular momentum becomes

- (a)  $4 L$
- (b)  $0.5 L$
- (c)  $2 L$
- (d)  $0.25 L$

26. Two rods of same length and area of cross-section and Young's moduli  $Y_1$  and  $Y_2$  are joined end to end. The equivalent Young's modulus for the composite rod is

- (a)  $\frac{Y_1 + Y_2}{2}$
- (b)  $\frac{2 Y_1 Y_2}{Y_1 + Y_2}$
- (c)  $\sqrt{Y_1 Y_2}$
- (d)  $Y_1 + Y_2$

27. 3 mole of hydrogen is mixed with 1 mole of neon. The molar specific heat at constant pressure is

- (a)  $\frac{9R}{4}$
- (b)  $\frac{9R}{2}$
- (c)  $\frac{13R}{4}$
- (d)  $\frac{13R}{2}$



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28. A bottle is inverted and dipped into a tank of water. At the bottom of a tank,  $(3/5)$ th of the bottle is filled with water. The depth of the tank is :  
[1 atm =  $10^5 \text{ Nm}^{-2}$  ;  $g = 10 \text{ ms}^{-2}$ ]
- (a) 5 m
  - (b) 10 m
  - (c) 15 m
  - (d) 20 m
29. While a guitar string is vibrating you gently touch the mid point of the string to ensure that the string does not vibrate at that point. In which harmonic the string may be vibrating?
- (a) Second
  - (b) Fourth
  - (c) Sixth
  - (d) All of these
30. A conducting sphere of radius  $R$  is charged to a potential of  $V$  volt. Then the electric field at a distance  $r$  ( $>R$ ) from the centre of the sphere would be
- (a)  $\frac{V}{r}$
  - (b)  $\frac{RV}{r^2}$
  - (c)  $\frac{rV}{R^2}$
  - (d)  $\frac{R^2V}{r^3}$
31. To reduce the range of voltmeter its resistance need to be reduced. A voltmeter has resistance  $G$  and range  $V$ . Which of the following resistances when connected in parallel will convert it into a voltmeter of range  $V/n$ ?
- (a)  $n G$
  - (b)  $G/(n - 1)$
  - (c)  $G/(n + 1)$
  - (d)  $G (n + 1)$
32. Two different loops are concentric and lie in the same plane. The current in the outer loop is clockwise and increases with time. The induced current in the inner loop then is
- (a) clockwise
  - (b) counter clockwise
  - (c) zero
  - (d) in a direction that depends on the ratio of the loop radii



33. In an  $LCR$  circuit, the potential difference between the terminals of the inductor is 60 V, between the terminals of capacitor is 30 V and that between the terminals of resistor is 40 V. The supply voltage is
- 25 V
  - 50 V
  - 100 V
  - 130 V
34. In an interference pattern by two identical slits, the intensity of central maxima is  $I$ . What will be the intensity of the same spot, if one of the slits is closed?
- $I/4$
  - $I/2$
  - $I$
  - $2 I$
35. A convex lens ( ${}^a\mu_g = 1.5$ ) has a focal length of 8 cm when placed in air. The change in focal length of the lens when placed in water ( ${}^a\mu_w = 4/3$ ) is
- 8 cm
  - 16 cm
  - 24 cm
  - 32 cm
36. Two identical metal plates show photoelectric effect when a light of wavelength  $\lambda_A$  falls on plate  $A$  and  $\lambda_B$  on plate  $B$  ( $\lambda_A = \lambda_B$ ). The maximum kinetic energy is
- $2 K_A = K_B$
  - $K_A < K_B/2$
  - $K_A = 2 K_B$
  - $K_A = K_B/2$
37. A radioactive series is  ${}_{92}\text{U}^{238} - {}_{82}\text{Pb}^{206}$ . How many  $\alpha$  and  $\beta$  particles are emitted?
- 10  $\alpha$ , 6  $\beta$
  - 4  $\alpha$ , 8  $\beta$
  - 6  $\alpha$ , 8  $\beta$
  - 8  $\alpha$ , 6  $\beta$
38. A carrier wave is simultaneously modulated by two sine waves having modulation indices of 0.3 and 0.4. The total modulation index will be
- 0.1
  - 0.5
  - 0.7
  - 0.35





39. If a vector  $\vec{A}$  makes an angle  $\alpha$ ,  $\beta$  and  $\gamma$  respectively with the  $X$ ,  $Y$  and  $Z$  axes respectively, then  $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma$  is equal to
- 0
  - 1
  - 2
  - 3
40. Two particles having position vectors  $\vec{r}_1 = (3\hat{i} + 5\hat{j})$  metres and  $\vec{r}_2 = (-5\hat{i} - 3\hat{j})$  metres are moving with velocities  $\vec{v}_1 = (4\hat{i} + 3\hat{j}) \text{ ms}^{-1}$  and  $\vec{v}_2 = (a\hat{i} + 7\hat{j}) \text{ ms}^{-1}$ . If they collide after 2 seconds, the value of  $a$  is
- 2
  - 4
  - 6
  - 8
41. A projective is thrown with an initial velocity of  $(x\hat{i} + y\hat{j}) \text{ ms}^{-1}$ . If the range of projectile is doubled, the maximum height reached by it, then
- $x = 2y$
  - $y = 2x$
  - $x = y$
  - $y = 4x$
42. If a particle of mass  $m$  is moving in a horizontal circle of radius  $r$  with a centripetal force  $(-K/r^2)$ , to total energy is
- $-\frac{K}{2r}$
  - $-\frac{K}{r}$
  - $\frac{-2K}{r}$
  - $-\frac{4K}{r}$
43. A rod of length  $l$  is hinged at one end and kept horizontal. It is allowed to fall. The velocity of the other end of the rod at lowest position is
- $\sqrt{gl}$
  - $\sqrt{2gl}$
  - $\sqrt{3gl}$
  - $2\sqrt{gl}$
44. The reading of a manometer fitted to a closed tap is  $2.5 \times 10^5 \text{ N/m}^2$ . If the valve is opened, the reading of the manometer falls to  $3 \times 10^5 \text{ N/m}^2$ . The velocity of water is :
- 1 m/s
  - 10 m/s
  - 100 m/s
  - 0.1 m/s



45. A vessel contains 1 mole of  $O_2$  and 1 mole of He. The value of  $C_p/C_v$  for the mixture is :

- (a) 1.33
- (b) 1.50
- (c) 1.67
- (d) 1.28