

**JEE Main January 2026**  
**Question Paper With Text Solution**  
**22 January | Shift-2**

**PHYSICS**



**JEE Main & Advanced | XI-XII Foundation | VI-X Pre-Foundation**

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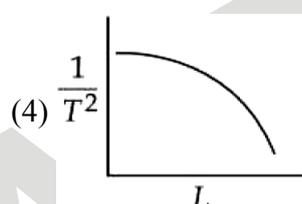
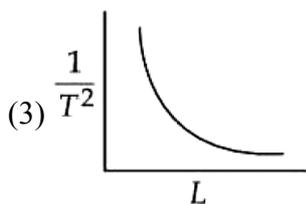
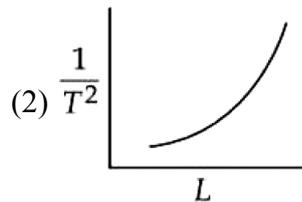
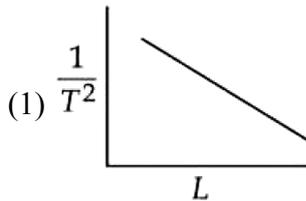
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**JEE MAIN JANUARY 2026 | 22 JANUARY SHIFT-2****SECTION - A**

Question ID : 8606541001

26. Using a simple pendulum experiment  $g$  is determined by measuring its time period  $T$ . Which of the following plots represent the correct relation between the pendulum length  $L$  and time period  $T$  ?

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**Ans.** Official answer NTA (3)**Sol.**

Question ID : 8606541016

27. In parallax method for the determination of focal length of a concave mirror, the object should always be placed :

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- (1) between the focus (F) and the centre of curvature (C) of the mirror ONLY  
(2) beyond the centre of the curvature (C) of the mirror ONLY  
(3) at any point beyond the focus (F) of the mirror  
(4) between the pole (P) and the focus (F) of the concave mirror ONLY

**Ans.** Official answer NTA (3)**Sol.**

Question ID : 8606541002

28. If  $\epsilon$ ,  $E$  and  $t$  represent the free space permittivity, electric field and time respectively, then the unit of

 $\frac{\epsilon E}{t}$  will be :

क

- (1)  $A/m^2$                       (2)  $Am$                       (3)  $A/m$                       (4)  $Am^2$

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**Ans.** Official answer NTA (1)

**Sol.**

Question ID : 8606541010

29. Consider two boxes containing ideal gases A and B such that their temperatures, pressures and number densities are same. The molecular size of A is half of that of B and mass of molecule A is four times that of B. If the collision frequency in gas B is  $32 \times 10^{18}/s$  then collision frequency in gas A is \_\_\_\_\_ /s.

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- (1)  $2 \times 10^8$                       (2)  $4 \times 10^8$                       (3)  $32 \times 10^8$                       (4)  $8 \times 10^8$

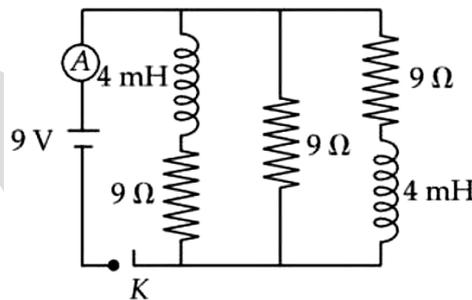
**Ans.** Official answer NTA (2)

**Sol.**

Question ID : 8606541009

30. Figure shows the circuit that contains three resistances ( $9\Omega$  each) and two inductors ( $4\text{ mH}$  each). The reading of ammeter at the moment switch K is turned ON, is \_\_\_\_\_ A.

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- (1) 1                                      (2) 3                                      (3) 2                                      (4) zero

**Ans.** Official answer NTA (1)

**Sol.**

Question ID : 8606541019

31. The smallest wavelength of Lyman series is 91 nm. The difference between the largest wavelengths of Paschen and Balmer series is nearly \_\_\_\_\_ nm .

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- (1) 1550                                      (2) 1784                                      (3) 1875                                      (4) 1217

**Ans.** Official answer NTA (4)

**Sol.**



Question ID : 8606541017

32. Which of the following are true for a single slit diffraction ?
- A. Width of central maxima increases with increase in wavelength keeping slit width constant.
- B. Width of central maxima increases with decrease in wavelength keeping slit width constant.
- C. Width of central maxima increases with decrease in slit width at constant wavelength.
- D. Width of central maxima increases with increase in slit width at constant wavelength.
- E. Brightness of central maxima increases for decrease in wavelength at constant slit width.

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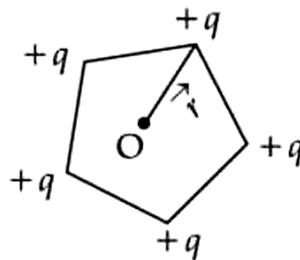
- (1) B, C only                      (2) B, D only                      (3) A, D only                      (4) A, D, E only

**Ans.** Official answer NTA (4)**Sol.**

Question ID : 8606541012

33. Five positive charges each having charge  $q$  are placed at the vertices of a pentagon as shown in the figure. The electric potential ( $V$ ) and the electric field ( $\vec{E}$ ) at the center  $O$  of the pentagon due to these five positive charges are :

क



(1)  $V = \frac{5q}{4\pi\epsilon_0 r}$  and  $\vec{E} = 0$

(2)  $V = \frac{5q}{4\pi\epsilon_0 r}$  and  $\vec{E} = \frac{5\sqrt{3}q}{8\pi\epsilon_0 r^2} \hat{r}$

(3)  $V = \frac{5q}{4\pi\epsilon_0 r}$  and  $\vec{E} = \frac{5q}{4\pi\epsilon_0 r^2} \hat{r}$

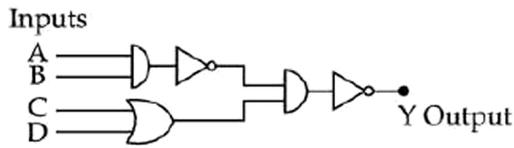
(4)  $V = 0$  and  $\vec{E} = 0$

**Ans.** Official answer NTA (1)**Sol.**



Question ID : 8606541020

34. The correct truth table for the given input data of the following logic gate is :



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(1)

(2)

(3)

(4)

**Ans.** Official answer NTA (4)**Sol.**

Question ID : 8606541004

35. Given below are two statements :

**Statement I :** An object moves from position  $r_1$  to position  $r_2$  under a conservative force field  $\vec{F}$ .The work done by the force is  $W = -\int_{r_1}^{r_2} \vec{F} \cdot d\vec{r}$ .**Statement II :** Any object moving from one location to another location can follow infinite number of paths. Therefore, the amount of work done by the object changes with the path it follows for a conservative force.

In the light of the above statements, choose the correct answer from the options given below :

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(1) Statement I is false but Statement II is true

(2) Both Statement I and Statement II are true



- (3) Both Statement I and Statement II are false  
(4) Statement I is true but Statement II is false

**Ans.** Official answer NTA (4)

**Sol.**

Question ID : 8606541014

36. A laser beam has intensity of  $4.0 \times 10^{14} \text{ W / m}^2$ . The amplitude of magnetic field associated with beam is \_\_\_\_\_ T. (Take  $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / \text{Nm}^2$  and  $c = 3 \times 10^8 \text{ m / s}$ )

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- (1) 2.0                      (2) 5.5                      (3) 1.83                      (4) 18.3

**Ans.** Official answer NTA (3)

**Sol.**

Question ID : 8606541006

37. Given below are two statements :

**Statement I :** A satellite is moving around earth in the orbit very close to the earth surface. The time period of revolution of satellite depends upon the density of earth.

**Statement II :** The time period of revolution of the satellite is  $T = 2\pi \sqrt{\frac{R_e}{g}}$  (for satellite very close to the earth surface), where  $R_e$  radius of earth and  $g$  acceleration due to gravity. In the light of the above statements, choose the correct answer from the options given below :

क

- (1) Statement I is true but Statement II is false  
(2) Statement I is false but Statement II is true  
(3) Both Statement I and Statement II are true  
(4) Both Statement I and Statement II are false

**Ans.** Official answer NTA (3)

**Sol.**

Question ID : 8606541015

38. The wavelength of light, while it is passing through water is 540 nm. The refractive index of water is  $4/3$ . The wavelength of the same light when it is passing through a transparent medium having refractive index of  $3/2$  is \_\_\_\_\_ nm.

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- (1) 380                      (2) 480                      (3) 540                      (4) 840



**Ans.** Official answer NTA (2)

**Sol.**

Question ID : 8606541008

39. Three small identical bubbles of water having same charge on each coalesce to form a bigger bubble. Then the ratio of the potentials on one initial bubble and that on the resultant bigger bubble is :

क

- (1)  $3^{2/3} : 1$                       (2)  $1 : 3^{1/3}$                       (3)  $1 : 3^{2/3}$                       (4)  $1 : 2^{2/3}$

**Ans.** Official answer NTA (3)

**Sol.**

Question ID : 8606541011

40. In an open organ pipe  $v_3$  and  $v_6$  are 3<sup>rd</sup> and 6<sup>th</sup> harmonic frequencies, respectively. If  $v_6 - v_3 = 2200$  Hz then length of the pipe is \_\_\_\_\_ mm.

(Take velocity of sound in air is 330 m/s)

क

- (1) 275                      (2) 250                      (3) 225                      (4) 200

**Ans.** Official answer NTA (3)

**Sol.**

Question ID : 8606541018

41. Light is incident on a metallic plate having work function  $110 \times 10^{-20}$  J. If the produced photoelectrons have zero kinetic energy then the angular frequency of the incident light is \_\_\_\_\_ rad/s.

( $h = 6.63 \times 10^{-34}$  J.s).

क

- (1)  $1.66 \times 10^{15}$                       (2)  $1.04 \times 10^{16}$                       (3)  $1.04 \times 10^{13}$                       (4)  $1.66 \times 10^{16}$

**Ans.** Official answer NTA (2)

**Sol.**

Question ID : 8606541013

42. An electric power line having total resistance of  $2\Omega$ , delivers 1 kW of power at 250 V. The percentage efficiency of transmission line is \_\_\_\_\_ .

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- (1) 92.5                      (2) 100                      (3) 96.9                      (4) 86.5

**Ans.** Official answer NTA (3)

**Sol.**

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Question ID : 8606541005

43. Given below are two statements :

**Statement I:** For a mechanical system of many particles total kinetic energy is the sum of kinetic energies of all the particles.

**Statement II:** The total kinetic energy can be the sum of kinetic energy of the center of mass w.r.t to the origin and the kinetic energy of all the particles w.r.t. the center of mass as the reference.

In the light of the above statements, choose the correct answer from the options given below :

क

- (1) Statement I is true but Statement II is false
- (2) Statement I is false but Statement II is true
- (3) Both Statement I and Statement II are true
- (4) Both Statement I and Statement II are false

**Ans.** Official answer NTA (3)**Sol.**

Question ID : 8606541007

44. When a part of a straight capillary tube is placed vertically in a liquid, the liquid raises upto certain height  $h$ . If the inner radius of the capillary tube, density of the liquid and surface tension of the liquid decrease by 1% each, then the height of the liquid in the tube will change by \_\_\_\_\_%.

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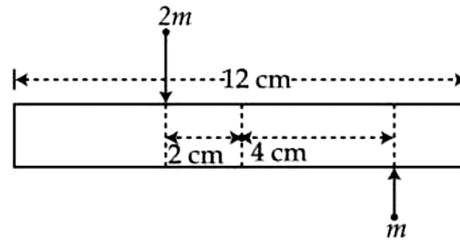
- (1) +3
- (2) -3
- (3) +1
- (4) -1

**Ans.** Official answer NTA (3)**Sol.**

Question ID : 8606541003

45. A uniform bar of length 12 cm and mass 20 m lies on a smooth horizontal table. Two point masses  $m$  and  $2m$  are moving in opposite directions with same speed of  $v$  and in the same plane as the bar, as shown in figure. These masses strike the bar simultaneously and get stuck to it. After collision the entire system is rotating with angular frequency  $\omega$ . The ratio of  $v$  and  $\omega$  is :

क



(1) 33

(2)  $2\sqrt{88}$ 

(3) 32

(4) 66

**Ans.** Official answer NTA (1)**Sol.**

Question ID : 8606541024

46. An insulated cylinder of volume  $60\text{ cm}^3$  is filled with a gas at  $27^\circ\text{C}$  and 2 atmospheric pressure. Then the gas is compressed making the final volume as  $20\text{ cm}^3$  while allowing the temperature to rise to  $77^\circ\text{C}$ . The final pressure is \_\_\_\_\_ atmospheric pressure.

क

**Ans.** Official answer NTA (7)**Sol.**

Question ID : 8606541021

47. Two masses  $m$  and  $2m$  are connected by a light string going over a pulley (disc) of mass  $30m$  with radius  $r = 0.1\text{ m}$ . The pulley is mounted in a vertical plane and it is free to rotate about its axis. The  $2m$  mass is released from rest and its speed when it has descended through a height of  $3.6\text{ m}$  is.

(Assume string does not slip and  $g = 10\text{ m/s}^2$ )

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**Ans.** Official answer NTA (2)**Sol.**

Question ID : 8606541022

48. A capacitor P with capacitance  $10 \times 10^{-6}\text{ F}$  is fully charged with a potential difference of  $6.0\text{ V}$  and disconnected from the battery. The charged capacitor P is connected across another capacitor Q with capacitance  $20 \times 10^{-6}\text{ F}$ . The charge on capacitor Q when equilibrium is established will be  $\alpha \times 10^{-5}\text{ C}$  (assume capacitor Q does not have any charge initially), the value of  $\alpha$  is \_\_\_\_\_.

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**Ans.** Official answer NTA (4)**MATRIX JEE ACADEMY**

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**Sol.**

Question ID : 8606541025

49. A conducting circular loop is rotated about its diameter at a constant angular speed of 100 rad/s in a magnetic field of 0.5 T perpendicular to the axis of rotation. When the loop is rotated by  $30^\circ$  from the horizontal position, the induced EMF is 15.4 mV . The radius of the loop is \_\_\_\_\_ mm.

$$\left( \text{Take } \pi = \frac{22}{7} \right)$$

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**Ans.** Official answer NTA (14)**Sol.**

Question ID : 8606541023

50. A cylindrical conductor of length 2 m and area of cross-section  $0.2 \text{ mm}^2$  carries an electric current of 1.6 A when its ends are connected to a 2 V battery. Mobility of electrons in the conductor is  $\alpha \times 10^{-3} \text{ m}^2 / \text{V.s}$ . The value of  $\alpha$  is : (electron concentration =  $5 \times 10^{28} / \text{m}^3$  and electron charge =  $1.6 \times 10^{-19} \text{ C}$ )

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**Ans.** Official answer NTA (1)**Sol.**