SAMPLE QUESTION PAPER

INSTITUTE NAME & LOGO

JEE-MAIN EXAM YEAR

Phy : Full Portion Paper

Test Number	Test Booklet No.
Write/Check this Code on your Answer Sheet	Write this number on your Answer Sheet

: IMPORTANT INSTRUCTIONS :

02. Immediately fill in the particulars on this page of the Test Booklet with **Blue/Black Ball point Pen. Use of pencil is strictly prohibited**
03. The Answer Sheet is kept inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully.
04. The test is of **60 Min.** duration
05. The Test Booklet consists of **25** questions. The maximum marks are **100**. All the Ques. consists of **FOUR (4**) marks each.
06. P**hysics 25 Ques. (100 Marks)**
07. Candidates will be awarded marks as stated above in Instruction No.5 for correct response of each question. ONE (1) marks 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.
08. Use **Blue/Black Ball Point Pen only** for writing particulars/marking responses on **Side-1** and **Side-2** of the Answer Sheet. **Use of pencil is strictly prohibited.**
09. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc., except the Admit Card inside the examination hall/room.
10. Rough work is to be done on the space provided for this purpose in the Test Booklet only. This space is given at the bottom of each page of the booklet.
11. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. **However, the candidates are allowed to take away this Test Booklet with them.**
12. The CODE for this Booklet is A. Make Sure that the CODE printed on **Side-2** of the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
13. Do not fold or make any stray marks on the Answer Sheet.
14. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.

Name of the Candidate : _____

Roll Number : In figures : | | | | | | | |

In words : _____

Examination Centre Number : | | | | | | |

Name of Examination Centre (in Capital letters) : _____

Candidate's Signature : _____ Invigilator's Signature : _____

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JEE-MAIN EXAM YEAR

Time : 60 Min	**Phy : Full Portion Paper**	**Marks : 100**

01) The ratio of the lengths of two wires A and B of same material is 1:2 and the ratio of their diameter is 2 : 1. They are stretched by the same force, then the ratio of increase in length will be
1) 8 : 1 2) 2 : 1
3) 1 : 8 4) 1 : 2

02) A square frame of side L is dipped in a liquid. On taking out, a membrane is formed. If the surface tension of the liquid is T, the force acting on the frame will be
1) 10 TL 2) 8 TL
3) 2 TL 4) 4 TL

03) At which temperature the speed of sound in hydrogen will be same as that of speed of sound in oxygen at 100°C
1) - 317.5°C 2) - 249.7°C
3) - 212.5°C 4) - 148°C

04) If an electron revolves in the path of a circle of radius of 0.5×10^{-10} m at frequency of 5×10^{15} cycles/s, then the electric current in the circle is (Charge of an electron = 1.6×10^{-19} C)
1) 1.6 mA 2) 1.2 mA
3) 0.8 mA 4) 0.4 mA

05) Equal masses of water and a liquid of density 2 are mixed together, then the mixture has a density of
1) 4/3 2) 3/2
3) 2/3 4) 3

06) A force of 5 N acts on a 15 kg body initially at rest. The work done by the force during the first second of motion of the body is
1) 75 J 2) 6 J
3) 5 J 4) $\frac{5}{6}$ J

07) An infinite number of charges, each of charge 1 μC, are placed on the x-axis with co-ordinates x = 1, 2, 4, 8, ...∞. If a charge of 1 C is kept at the origin, then what is the net force acting on 1 C charge?
1) 36000 N 2) 24000 N
3) 12000 N 4) 9000 N

08) A ray of light is incident at 50° on the middle of one of the two mirrors arranged at an angle of 60° between them. The ray then touches the second mirror, get reflected back to the first mirror, making an angle of incidence of
1) 80° 2) 70°
3) 60° 4) 50°

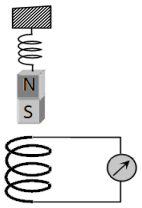
09) A block weighs W is held against a vertical wall by applying a horizontal force F. The minimum value of F needed to hold the block is
1) less than W. 2) greater than W.
3) equal to W. 4) data is insufficient.

10) A system is given 300 calories of heat and it does 600 joules of work. How much does the internal energy of the system change in this process? (J = 4.18 joules/cal)
1) - 528.2 Joule 2) - 300 Joule
3) 156.5 Joule 4) 654 Joule

11) The earth's magnetic field at a given point is 0.5×10^{-5} Wb-m^{-2}. This field is to be annulled by magnetic induction at the center of a circular conducting loop of radius 5.0 cm. The current required to be flown in the loop is nearly
1) 40 A 2) 4 A
3) 0.4 A 4) 0.2 A

12) Voltage and current in an ac circuit are given by $V = 5\sin\left(100\pi t - \frac{\pi}{6}\right)$ and $I = 4\sin\left(100\pi t + \frac{\pi}{6}\right)$, then
1) voltage leads the current by 60^o.
2) current leads the voltage by 60^o.
3) current leads the voltage by 30^o.
4) voltage leads the current by 30^o.

13) A magnet NS is suspended from a spring and while it oscillates, the magnet moves in and out of the coil C. The coil is connected to a galvanometer G. Then as the magnet oscillates,



1) G shows deflection to the left and right but the amplitude steadily decreases.
2) G shows no deflection.
3) G shows deflection on one side.
4) G shows deflection to the left and right with constant amplitude.

14) 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 liquids. The boiling point of the liquid will be
1) 100° C 2) 112° C
3) 125° C 4) 135° C

15) A particle executing simple harmonic motion has an amplitude of 6 cm. Its acceleration at a distance of 2 cm from the mean position is 8 cm/s^2. The maximum speed of the particle is

1) 24 cm/s 2) 16 cm/s
3) 12 cm/s 4) 8 cm/s

16) Two identical solid copper spheres of radius R placed in contact with each other. The gravitational attraction between them is proportional to

1) R^{-4} 2) R^4
3) R^{-2} 4) R^2

17) In an apparatus, the electric field was found to oscillate with an amplitude of 18 V/m. The magnitude of the oscillating magnetic field will be

1) 11×10^{-11} T 2) 9×10^{-9} T
3) 6×10^{-8} T 4) 4×10^{-6} T

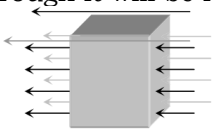
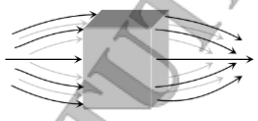
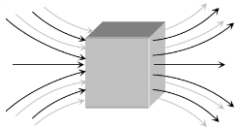
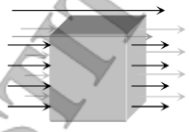
18) Two objects of masses 200 g and 500 g possess velocities $10\hat{i}$ m/s and $3\hat{i}+5\hat{j}$ m/s respectively. The velocity of their centre of mass in m/s is

1) $25\hat{i}-\frac{5}{7}\hat{j}$ 2) $5\hat{i}+\frac{25}{7}\hat{j}$
3) $\frac{5}{7}\hat{i}-25\hat{j}$ 4) $5\hat{i}-25\hat{j}$

19) A flask is filled with 13 gm of an ideal gas at 27°C and its temperature is raised to 52°C. The mass of the gas that has to be released to maintain the temperature of the gas in the flask at 52°C and the pressure remaining the same is

1) 1.0 g 2) 1.5 g
3) 2.0 g 4) 2.5 g

20) An uniform magnetic field, parallel to the plane of the paper existed in space initially directed from left to right. When a bar of soft iron is placed in the field parallel to it, the lines of force passing through it will be represented by

1) 
2) 
3) 
4) 

21) A body of mass 10kg is being acted upon by a force $3t^2$ and an opposing constant force of 32N. The initial speed is $10\,ms^{-1}$. Then what is the velocity (in m/s) of the body after 5 seconds?

22) If the speed of light in vacuum is taken as unity and light takes 8 minutes and 20 seconds to cover the distance between the sun and the earth, then what will be this distance in terms of the new unit?

23) The magnitude of the X and Y components of $\vec{A}$ are 7 and 6. Also the magnitudes of X and Y components of $\vec{A}+\vec{B}$ are 11 and 9 respectively. Find the magnitude of $\vec{B}$.

24) A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm. How much further (in cm) it will penetrate before coming to rest assuming that it faces constant resistance to motion?

25) A body falling freely from a given height H hits an inclined plane in its path at a height h. As a result of this impact the direction of the velocity of the body becomes horizontal. Estimate the value of (h/H), at which the body will take maximum time to reach the ground.