



This Test Booklet contains 20 pages.

Do not open this Test Booklet until you are asked to do so.

Important Instructions :

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on **Side-1** and **Side-2** carefully with **blue/black** ballpoint pen only.
2. The test is of **3 hours** duration and Test Booklet contains **180** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total score. The maximum marks are **720**.
3. Use **Blue/Black Ballpoint Pen only** for writing particulars on this page/marking responses.
4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. *The candidates are allowed to take away Test Booklet only with them.*
6. The CODE for this Test Booklet is **AA**. Make sure that the CODE printed on **Side-2** of the Answer Sheet is the same as that on this Test 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.
7. The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
8. Use of white fluid for correction is **not** permissible on the Answer Sheet.
9. Each candidate must show on demand his/her Admit Card to the Invigilator.
10. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign the Attendance Sheet twice. **Cases where a candidate has not signed the Attendance Sheet second time will be deemed not to have handed over the Answer Sheet and dealt with as an unfair means case.**
12. Use of Electronic/Manual Calculator is prohibited.
13. The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
14. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
15. The candidates will write the correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

SEAL

Name of the Candidate (in Capitals) : RAAFIAH IZHAR

Roll Number (in Figures) : 81418841

(in Words) : EIGHT ONE FOUR ONE EIGHT EIGHT FOUR ONE

Centre of Examination (in Capitals) : DEHI POLICE PUBLIC SCHOOL B-4 Enclave Delhi

Candidate's Signature : Raafiah Izhare Invigilator's Signature : [Signature]

Facsimile Signature Stamp of Centre Superintendent : _____

E1

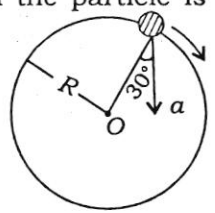
1. Planck's constant (h), speed of light in vacuum (c) and Newton's gravitational constant (G) are three fundamental constants. Which of the following combinations of these has the dimension of length?

- (1) $\frac{\sqrt{hG}}{c^{3/2}}$ (2) $\frac{\sqrt{hG}}{c^{5/2}}$
 (3) $\sqrt{\frac{hc}{G}}$ (4) $\sqrt{\frac{Gc}{h^{3/2}}}$

2. Two cars P and Q start from a point at the same time in a straight line and their positions are represented by $x_P(t) = at + bt^2$ and $x_Q(t) = ft - t^2$. At what time do the cars have the same velocity?

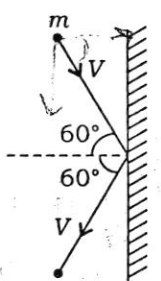
- (1) $\frac{a-f}{1+b}$ (2) $\frac{a+f}{2(b-1)}$
 (3) $\frac{a+f}{2(1+b)}$ (4) $\frac{f-a}{2(1+b)}$

3. In the given figure, $a = 15 \text{ m/s}^2$ represents the total acceleration of a particle moving in the clockwise direction in a circle of radius $R = 2.5 \text{ m}$ at a given instant of time. The speed of the particle is



- (1) 4.5 m/s (2) 5.0 m/s
 (3) 5.7 m/s (4) 6.2 m/s

4. A rigid ball of mass m strikes a rigid wall at 60° and gets reflected without loss of speed as shown in the figure below. The value of impulse imparted by the wall on the ball will be



- (1) $2mV$
 (2) $2mV$
 (3) $\frac{mV}{2}$
 (4) $\frac{mV}{3}$

$v_k = \frac{2\sqrt{3}m}{3}$
 $\frac{\sqrt{3}+1}{2\sqrt{3}} \times 3 = \frac{5}{2\sqrt{3}}$
 $n = \frac{25-1}{9} = \frac{24}{9} = \frac{8}{3}$

$\frac{JMD}{E1g} = \frac{16}{a}$
 $\frac{25}{9}$

5. A bullet of mass 10 g moving horizontally with a velocity of 400 m s^{-1} strikes a wood block of mass 2 kg which is suspended by light inextensible string of length 5 m. As result, the centre of gravity of the block found to rise a vertical distance of 10 cm. The speed of the bullet after it emerges horizontally from the block will be

- (1) 100 m s^{-1}
 (2) 80 m s^{-1}
 (3) 120 m s^{-1}
 (4) 160 m s^{-1}

6. Two identical balls A and B having velocities of 0.5 m/s and -0.3 m/s respectively collide elastically in one dimension. The velocities of B and A after the collision respectively will be

- (1) -0.5 m/s and 0.3 m/s
 (2) 0.5 m/s and -0.3 m/s
 (3) -0.3 m/s and 0.5 m/s
 (4) 0.3 m/s and 0.5 m/s

7. A particle moves from a point $(-2\hat{i} + 5\hat{j})$ to $(4\hat{j} + 3\hat{k})$ when a force of $(4\hat{i} + 3\hat{j}) \text{ N}$ is applied. How much work has been done by the force?

- (1) 8 J
 (2) 11 J
 (3) 5 J
 (4) 2 J

$(2\hat{i} - 1\hat{j} + 3\hat{k}) \cdot (4\hat{i} + 3\hat{j})$
 $8\hat{i} - 3\hat{j} = 5$

8. Two rotating bodies A and B of masses m and $2m$ with moments of inertia I_A and I_B ($I_B > I_A$) have equal kinetic energy of rotation. If L_A and L_B be their angular momenta respectively, then

- (1) $L_A = \frac{L_B}{2}$
 (2) $L_A = 2L_B$
 (3) $L_B > L_A$
 (4) $L_A > L_B$

$L_1 \omega_1 = L_2 \omega_2$
 $\frac{L_1 \omega_1^2}{\omega_1^2} = \frac{L_2 \omega_2^2}{\omega_2^2}$
 $\frac{L_1 \omega_1^2}{\omega_1^2} = \frac{L_2 \omega_2^2}{\omega_1^2}$
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