

Topic : Mathematical Tools

Type of Questions

Single choice Objective ('-1' negative marking) Q.1 to Q.6
Comprehension ('-1' negative marking) Q.7 to Q.10

(3 marks, 3 min.)
(3 marks, 3 min.)

M.M., Min.
[18, 18]
[12, 12]

1. $\sin 300^\circ$ is equal to
(A) $1/2$ (B) $-1/2$ (C) $-\frac{\sqrt{3}}{2}$ (D) $\frac{\sqrt{3}}{2}$
2. Value of $\tan 225^\circ$ is :
(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) 1 (D) -1
3. Value of $\sin 15^\circ \cdot \cos 15^\circ$ is :
(A) 1 (B) $1/2$ (C) $1/4$ (D) $\frac{\sqrt{3}}{2}$
4. Value of $\sin (37^\circ) \cos (53^\circ)$ is -
(A) $\frac{9}{25}$ (B) $\frac{12}{25}$ (C) $\frac{16}{25}$ (D) $\frac{3}{5}$
5. If $\sin \theta = \frac{1}{3}$, then $\cos \theta$ will be -
(A) $\pm \frac{8}{9}$ (B) $\pm \frac{4}{3}$ (C) $\pm \frac{2\sqrt{2}}{3}$ (D) $\pm \frac{3}{4}$
6. Which of the following has value 1 :
(A) $\tan 45^\circ$ (B) $\sin 90^\circ$ (C) $\cos 90^\circ$ (D) $\cos 0^\circ$

COMPREHENSION

Following are three equations of motion

$$S(t) = ut + \frac{1}{2}at^2 \quad v(s) = \sqrt{u^2 + 2as} \quad v(t) = u + at$$

Where ; S, u, t, a, v are respectively the displacement (dependent variable), initial velocity (constant), time taken (independent variable), acceleration (constant) and final velocity (dependent variable) of the particle after time t.

7. Find displacement of a particle after 10 seconds starting from rest with a uniform acceleration of 2m/s^2 .
(A) 10 m (B) 100 m (C) 50 m (D) 200 m
8. Find the velocity of the particle after 100 m –
(A) 10 m/s (B) 20 m/s (C) 30 m/s (D) 0 m/s
9. Find the velocity of the particle after 10 seconds if its acceleration is zero in interval (0 to 10 s) –
(A) 10 m/s (B) 20 m/s (C) 30 m/s (D) 0 m/s
10. Find the displacement of the particle when its velocity becomes 10 m/s if acceleration is 5 m/s^2 all through –
(A) 50 m (B) 200 m (C) 10 m (D) 100 m



Answers Key

DPP NO. - 1

1. (C) 2. (C) 3. (C) 4. (A)
5. (C) 6. (ABD) 7. (B) 8. (B)
9. (D) 10. (C)

Hint & Solutions

DPP NO. - 1

1. $\sin 300^\circ = \sin (360 - 60) = -\sin 60^\circ = -\frac{\sqrt{3}}{2}$

2. $\tan 225^\circ = \tan (180 + 45) = \tan 45^\circ = 1$

3. $\sin 15^\circ \cos 15^\circ = \frac{\sin 30^\circ}{2} = \frac{1}{4}$

4. $\sin 37^\circ \times \cos 53^\circ = \frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$

5. $\cos \theta = \sqrt{1 - \sin^2 \theta} = \sqrt{1 - \frac{1}{9}} = \pm \frac{2\sqrt{2}}{3}$

6. $\tan 45^\circ = 1 \quad \sin 90^\circ = 1 \quad \cos 0^\circ = 1$

7. $S = ut + \frac{1}{2}at^2$

$$S = 0 + \frac{1}{2} \times 2(10)^2 = 100 \text{ m}$$

8. $v = u + at$
 $v = 0 + 2 \times 10$
 $= 20 \text{ m/s.}$

9. $v = u$
 $v = 0 \text{ m/s}$

10. $v^2 = u^2 + 2as$
 $(10)^2 = 0 + 2 \times 5 \times s$

