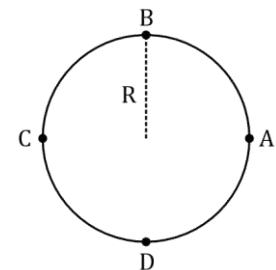


## DPP - 1

## Kinematics

- Q.1** A particle moving on circular path covers circle in a given time, find distance covered & displacement. In the following path.

	Displacement	Distance
A to C		
A to B		
A to D		
A to A		



- Q.2** A cyclist moving on a circular track of radius 1 m, completes one revolution in 10 s. Then find out its displacement after 1 minute and 5 s.

- (A)  $13\pi$  m
- (B)  $\pi$  m
- (C)  $2\pi$  m
- (D) 2m

- Q.3** A particle moves 30 m due north, then 20 m due east, then  $20\sqrt{2}$  m due south west. Find displacement.

- (A) 10m North
- (B) 10m South
- (C) 10m N – S
- (D) 2m E – W

- Q.4** A wheel of radius R is placed on a horizontal surface and its contact point on ground is P. If the wheel starts rolling without slipping and completes half revolution. Then find out magnitude of displacement of point P.

- (A)  $2\pi R$
- (B)  $2R$
- (C)  $R\sqrt{2 + \pi^2}$
- (D)  $R\sqrt{4 + \pi^2}$

- Q.5** A drunkard walking in a narrow lane takes 5 steps forward and 3 steps backward, followed again by 5 steps forward and 3 steps backward, and so on. Each step is 1 m long and required 1 second to cover. How long the drunkard takes to fall in a pit 13 m away from the start?

- (A) 9 s
- (B) 21 s
- (C) 32 s
- (D) 37 s



**Q.6** A particle moves for 30 sec such that for first 10 seconds it moves with 200 m/s and for next 20 seconds it moves with 100 m/s. Find average speed.

- (A) 133.3 m/s
- (B) 13.3 m/s
- (C) 108 m/s
- (D) N.O.T.

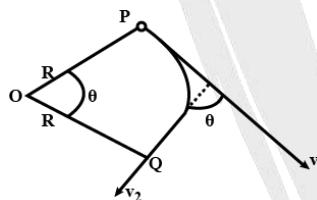
**Q.7** A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km/hr. Finding the market closed he immediately turns and walks home with speed of 7.5 km/hr. The average speed of the man over the interval of time 0 to 40 min is equal to :-

- (A) 5 m/s
- (B) 7.6 m/s
- (C) 5.625 m/s
- (D) N.O.T.

**Q.8** The distance of a particle moving along a straight line is given by  $S = 4t^2 + 5t - 6$  here s is in cm and t is in seconds calculate initial speed of particle and speed at  $t=4$  second respectively.

- (A) 37 cm/s and 5 cm/s
- (B) 5 cm/s and 37 cm/s
- (C) 0 cm/s and 37 cm/s
- (D) 5 cm/s and 5 cm/s

**Q.9** A particle describes an angle  $\theta$  in circular path with a constant speed v. Find the



- (a) change in the velocity of the particle and
- (b) average acceleration of the particle during the motion in the curve (circle).

- (A)  $v \sin \frac{\theta}{4}, \frac{v^2}{R\theta} \sin \frac{\theta}{2}$
- (B)  $2v \sin \frac{\theta}{2}, \frac{2v^2}{R\theta} \sin \frac{\theta}{2}$
- (C)  $3v \sin \frac{\theta}{2}, \frac{2v^2}{R\theta} \sin \frac{\theta}{4}$
- (D) None of the above

**Q.10** A truck travelling due to North at 20 m/s turns East and travels at the same speed. The change in its velocity is –

- (A)  $20\sqrt{2}$  m/s North East
- (B)  $20\sqrt{2}$  m/s South East
- (C)  $40\sqrt{2}$  m/s North East
- (D)  $20\sqrt{2}$  m/s North West



**Q.11** A body moves in a straight line along, x-axis. Its distances x (in metre) from the origin is given by  $x = 8t - 3t^2$ . The average speed in the interval  $t = 0$  to  $t = 1$  second is .

- (A)  $5 \text{ ms}^{-1}$       (B)  $-4 \text{ ms}^{-1}$       (C)  $6 \text{ ms}^{-1}$       (D) zero

**Q.12** The displacement s of a particle depends on time t according to the following relation

$s = \frac{1}{3}t^3 - t^2 + t$ . The velocity and displacement of the particle at the instant when its acceleration is zero, are respectively-

- (A)  $0, \frac{1}{3}$       (B)  $\frac{1}{3}, 0$       (C)  $\frac{1}{3}, \frac{1}{3}$       (D) None of the above

**Q.13** Position of particle varies with time as  $x \propto t^{1/2}$ . Find relation between velocity and acceleration

- (A)  $a \propto v$   
 (B)  $a \propto v^3$   
 (C)  $a \propto v^2$   
 (D)  $a \propto v^{-3/2}$

**Q.14** Mark the wrong statement -

- (A) Nothing is in the state of absolute rest or state of absolute motion  
 (B) Magnitude of displacement is always equal to the distance travelled  
 (C) Magnitude of displacement can never be greater than the distance travelled  
 (D) Magnitude of displacement may be equal to the distance travelled

**Q.15** If velocity of particle is given by  $v = (2t + 3)\text{m/s}$ . Find average velocity for interval 0 to 3 – 5.

- (A) 3 m/s  
 (B) 6 m/s  
 (C) 8 m/s  
 (D) 12 m/s

**Q.16** At an instant t, the coordinates of a particle are  $x = at^2$ ,  $y = bt^2$  and  $z = 0$ , then its velocity at the instant t will be –

- (A)  $t\sqrt{a^2 + b^2}$       (B)  $2t\sqrt{a^2 + b^2}$       (C)  $\sqrt{a^2 + b^2}$       (D)  $2t^2\sqrt{a^2 + b^2}$



## ANSWER KEY

1.

	Displacement	Distance
A to C	$2R$	$\pi R$
A to B	$\sqrt{2}R$	$\pi R/2$
A to D	$\sqrt{2}R$	$3\pi R/2$
A to A	0	$2\pi R$

2. (D)    3. (A)    4. (D)    5. (D)    6. (A)    7. (C)    8. (B)  
9. (B)    10. (B)    11. (A)    12. (A)    13. (B)    14. (B)    15. (B)  
16. (B)

