Daily Practice Problems-03

Q1. If $\vec{A} = \hat{\imath} + \hat{\jmath} + \hat{k}$ and $\vec{B} = 2\hat{\imath} + \hat{\jmath}$ find $\vec{A}.\vec{B}$

Q2. If $3\hat{\imath} + 2\hat{\jmath} + 8\hat{k}$ and $2\hat{\imath} + x\hat{\jmath} + \hat{k}$ are at right angles that x=

a. 7

b. -7

c. 5

d. -4

Q3. If for two vector $\vec{A}$ and $\vec{B}$, sum $(\vec{A} + \vec{B})$ is perpendicular to the difference $(\vec{A} - \vec{B})$. The ratio of their magnitude is

a. 1

b. 2

c. 3

d. None of these

Q4. $a_1\hat{\imath} + a_2\hat{\jmath}$ is a unit vector perpendicular to $4\hat{\imath} - 3\hat{\jmath}$ if-

a. $a_1 = 0.6, a_2 = 0.8$

b. $a_1 = 3, a_2 = 4$

c. $a_1 = 0.8, a_2 = 0.6$

d. $a_1 = 4, a_2 = 3$

Q5. Vectors perpendicular to $i + j + k$ is

a. $i - j + k$

b. $i - j - k$

c. $-i - j - k$

d. $3i + 2j - 5k$

Q6. A particle moves from position $3\hat{\imath} + 2\hat{\jmath} - 6\hat{k}$ to $14\hat{\imath} + 13\hat{\jmath} + 9\hat{k}$ due to a uniform force of $(4\hat{\imath} + \hat{\jmath} + 3\hat{k})$N. If the displacement in meters then work done will be

a. 100 J

b. 200 J

c. 300 J

d. 250 J

Q7. If $\vec{P}.\vec{Q} = PQ$, then angle between $\vec{P}$ *and* $\vec{Q}$ is

a. 0°

b. 30°

c. 45°

d. 60°

Q8. The angle between two vectors $-2\hat{\imath}+3\hat{\jmath}+\hat{k}$ and $\hat{\imath}+2\hat{\jmath}-4\hat{k}$ is

a. 0°

b. 90°

c. 180°

d. None of the above

Q9. The angle between the vectors $(\vec{\imath}+\vec{\jmath})$ and $(\vec{\jmath}+\vec{k})$ is

a. 30°

b. 45°

c. 60°

d. 90°

Q10. A particle moves with a velocity $6\vec{\imath}-4\vec{\jmath}+3\vec{k}$ m/s under the influence of a constant force $\vec{F}=20\hat{\imath}+15\hat{\jmath}-5\hat{k}$ N. The instantaneous power applied to the particle is

a. 35 J/s

b. 45 J/s

c. 25 J/s

d. 195 J/s

Q11. The vector $\vec{P}=a\hat{\imath}+a\hat{\jmath}+3\hat{k}$ and $\vec{Q}=a\hat{\imath}-2\hat{\jmath}-\hat{k}$ are perpendicular to each other. The positive value of a is

a. 3

b. 4

c. 9

d. 13

Q12. A particle moves in the x-y plane under the action of a force $\vec{F}$ such that the value of its linear momentum $(\vec{P})$ at any-time t is $P_x=2cost$, $P_y=2sint$. The angle θ between $\vec{F}$ and $\vec{P}$

at a given time t. will be

a. $\theta=0°$

b. $\theta=30°$

c. $\theta=90°$

d. $\theta=180°$

Q13. What are the components of the vector $\vec{A}=2\hat{\imath}+3\hat{\jmath}$ along the direction $\hat{\imath}+\hat{\jmath}\ and\ \hat{\imath}-\hat{\jmath}$?

Q14. Find the vector projection of $5\hat{\imath}-4\hat{\jmath}+\hat{k}$ along the vector $3\hat{\imath}-2\hat{\jmath}+4\hat{k}$?

ANSWERS

1. 3

2. b

3. a

4. d

5. d

6. a

7. a

8. b

9. c

10. b

11. a

12. c

13. $\frac{5}{\sqrt{2}} units,\ -\frac{1}{\sqrt{2}}\ units$

14. $\left(\frac{27}{29}, -\frac{18}{29}, \frac{36}{29}\right)$