GGSRDN
Educational Services Private Limited
9th, 10th, NEET, JEE(Main/Advanced)
अभ्यास ही सबसे बड़ा गुरू है।

CLASS : XI (PHYSICS)

DPP

DAILY PRACTICE PROBLEM

DPP-1 TO 10

DPP 1 : **Mathematical Tools**
DPP 2 : **Mathematical Tools**
DPP 3 : **Mathematical Tools**
DPP 4 : **Mathematical Tools**
DPP 5 : **Mathematical Tools**
DPP 6 : **Mathematical Tools**
DPP 7 : **Mathematical Tools**
DPP 8 : **Mathematical Tools**
DPP 9 : **Mathematical Tools**
DPP 10 : **Rectilinear Motion, Vector, Mathematical Tools**

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 1

Total Marks : 30

Max. Time : 30 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.6	(3 marks, 3 min.)	[18, 18]
Comprehension ('–1' negative marking) Q.7 to Q.10	(3 marks, 3 min.)	[12, 12]

1. sin 300° is equal to

(A) 1/2 (B) –1/2 (C) $-\frac{\sqrt{3}}{2}$ (D) $\frac{\sqrt{3}}{2}$

2. Value of tan225° is :

(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) 1 (D) –1

3. Value of sin15°. cos15° is :

(A) 1 (B) 1/2 (C) 1/4 (D) $\frac{\sqrt{3}}{2}$

4. Value of sin (37°) cos (53°) 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° (B) sin 90° (C) cos 90° (D) cos 0°

COMPREHENSION

Following are three equations of motion

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

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

PHYSICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 2

Total Marks : 35

Max. Time : 40 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.3	(3 marks, 3 min.)	[9, 9]
Subjective Questions ('–1' negative marking) Q.4 to Q.8	(4 marks, 5 min.)	[20, 25]
Comprehension ('–1' negative marking) Q.9 to Q.10	(3 marks, 3 min.)	[6, 6]

1. $y = x^3 + 2x^2 + 7x + 8$ then $\frac{dy}{dx}$ will be -

(A) $3x^2 + 2x + 15$ (B) $3x^2 + 4x + 7$ (C) $x^3 + 2x^2 + 15$ (D) $x^3 + 4x + 7$

2. Differentiation of $2x^2 + 3x$ w.r.t. x is :

(A) $4x + 3$ (B) $4x$ (C) 3 (D) $4x + 1$

3. Equation of straight line is $2x + 3y = 5$. Slope of the straight line is :

(A) 3/2 (B) 2/3 (C) –2/3 (D) –3/2

4. $y = x^4 + 3x^2 + \pi + 2$. Find $\frac{dy}{dx}$:

5. $y = 4 + 5x + 7x^3$. Find $\frac{dy}{dx}$:

6. Find slope of a straight line $2x - 5y + 7 = 0$

7. $y = x + x^2 + \frac{1}{x} + \frac{1}{x^3}$. Find $\frac{dy}{dx}$

8. $y = x^2 + \frac{1}{x^2}$. Find $\frac{dy}{dx}$

COMPREHENSION

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

Where ; S is displacement, u - initial velocity (constant) , v - final velocity , a - acceleration(constant) & t - time taken then -

9. Differentiation of 'S' w.r.t. 't' will be -

(A) $u + \frac{at}{2}$ (B) $u + at$ (C) $u + 2at$ (D) $\frac{ut^2}{2} + \frac{at^3}{6}$

10. Differentiation of above result w.r.t. 't' will be -

(A) a (B) u + a (C) u (D) none

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 3

Total Marks : 31

Max. Time : 32 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.7	(3 marks, 3 min.)	[21, 21]
Subjective Questions ('–1' negative marking) Q.8	(4 marks, 5 min.)	[4, 5]
Comprehension Questions ('–1' negative marking) Q.9 to Q.10	(3 marks, 3 min.)	[6, 6]

1. If $y = \sin(x) + \ln(x^2) + e^{2x}$ then $\frac{dy}{dx}$ will be :

(A) $\cos x + \frac{2}{x} + e^{2x}$ (B) $\cos x + \frac{2}{x} + 2e^{2x}$ (C) $-\cos x + \frac{2}{x^2} + e^{2x}$ (D) $-\cos x - \frac{2}{x^2} + 2e^{2x}$

2. If $y = e^x \cdot \cot x$ then $\frac{dy}{dx}$ will be

(A) $e^x \cot x - \text{cosec}^2 x$ (B) $e^x \text{cosec}^2 x$ (C) $e^x[\cot x - \text{cosec}^2 x]$ (D) $e^x \cot x$

3. If $y = x \ln x$ then $\frac{dy}{dx}$ will be

(A) $\ln x + x$ (B) $1 + \ln x$ (C) $\ln x$ (D) 1

4. If $y = \frac{\ell nx}{x}$ then $\frac{dy}{dx}$ will be :

(A) $\frac{1-\ell nx}{x}$ (B) $\frac{1+\ell nx}{x^2}$ (C) $\frac{1-\ell nx}{x^2}$ (D) $\frac{\ell nx-1}{x^2}$

5. Differentiation of $\sin(x^2 + 3)$ w.r.t. x is -

(A) $\cos(x^2 + 3)$ (B) $2x \cos(x^2 + 3)$ (C) $(x^2 + 3)\cos(x^2 + 3)$ (D) $2x \cos(2x + 3)$

6. If $y = x^2 \sin x$, then $\frac{dy}{dx}$ will be -

(A) $x^2 \cos x + 2x \sin x$ (B) $2x \sin x$ (C) $x^2 \cos x$ (D) $2x \cos x$

7. If $y = \tan x \cdot \cos^2 x$ then $\frac{dy}{dx}$ will be -

(A) $1 + 2\sin^2 x$ (B) $1 - 2\sin^2 x$ (C) 1 (D) $2\sin^2 x$

8. $y = (2x + 3)^4 - (7x - 1)^2 + \frac{2}{(3x+1)^3} + \frac{4}{(4x-3)^2}$. Find $\frac{dy}{dx}$

COMPREHENSION

If a function is written as :
$y_1 = \sin(4x^2)$ & another function is $y_2 = \ln(x^3)$ then :

9. $\frac{dy_1}{dx}$, will be :

(A) $8x \cos(4x^2)$ (B) $\cos(4x^2)$ (C) $-\cos(4x^2)$ (D) $-8x \cos(4x^2)$

10. $\frac{dy_2}{dx}$ will be

(A) $\frac{1}{x^3}$ (B) $\frac{3}{x}$ (C) $-\frac{1}{x^3}$ (D) $\frac{3}{x^2}$

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 4

Total Marks : 33

Max. Time : 35 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.7	(3 marks, 3 min.)	[21, 21]
Multiple choice Objective ('–1' negative marking) Q.8	(4 marks, 4 min.)	[4, 4]
Subjective Questions ('–1' negative marking) Q.9 to Q.10	(4 marks, 5 min.)	[8, 10]

1. Double differentiation of displacement w.r.t. time is :
(A) acceleration (B) velocity (C) force (D) none

2. If $y = x^3$ then $\frac{d^2y}{dx^2}$ is -
(A) $6x^2$ (B) $6x$ (C) $3x^2$ (D) $3x$

3. If $Q = 4v^3 + 3v^2$, then the value of 'v' such that, there exist maxima of 'Q' -
(A) 0 (B) $-\frac{1}{2}$ (C) $\frac{1}{2}$ (D) none

4. If $y = 2\sin^2\theta + \tan\theta$ then $\frac{dy}{d\theta}$ will be -
(A) $4\sin\theta\cos\theta + \sec\theta\tan\theta$ (B) $2\sin 2\theta + \sec^2\theta$
(C) $4\sin\theta + \sec^2\theta$ (D) $2\cos^2\theta + \sec^2\theta$

5. $\int x^3 dx$ is equal to :
(A) $3x^2$ (B) $\frac{x^4}{4} + C$ (C) $\frac{x^4}{4}$ (D) $4x^3$

6. $\int 2\sin(x)dx$ is equal to :
(A) $-2\cos x + C$ (B) $2\cos x + C$ (C) $-2\cos x$ (D) $2\cos x$

7. If $y = \sin x$, then $\frac{d^2y}{dx^2}$ will be :
(A) $\cos x$ (B) $\sin x$ (C) $-\sin x$ (D) $\sin x + C$

8. Which of the following has value zero ?
(A) Sin 0° (B) tan 0° (C) cos 0° (D) cot 0°

9. $y = x(c - x)$ where c is a constant. Find maximum value of y.

10. If $y = 4\cos 4x$ find $\int y\,dx$

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 5

Total Marks : 29

Max. Time : 31 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Subjective Questions ('–1' negative marking) Q.5 to Q. 6	(4 marks, 5 min.)	[8, 10]
Comprehension ('–1' negative marking) Q.7 to Q.9	(3 marks, 3 min.)	[9, 9]

1. Maximum value of $f(x) = \sin x + \cos x$ is :

(A) 1 (B) 2 (C) $\frac{1}{\sqrt{2}}$ (D) $\sqrt{2}$

2. The displacement of a body at any time t after starting is given by $s = 15t - 0.4t^2$. The velocity of the body will be 7 ms^{-1} after time :

(A) 20 s (B) 15 s (C) 10 s (D) 5 s

3. For the previous question, the acceleration of the particle at any time t is :

(A) -0.8 m/s^2 (B) 0.8 m/s^2 (C) -0.6 m/s^2 (D) 0.5 m/s^2

4. A particle is moving in a straight line. Its displacement at time t is given by s (in m) = $-4t^2 + 2t$, then its velocity and acceleration at time $t = \frac{1}{2}$ second are

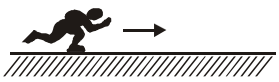
(A) -2 m/s, -8 m/s^2 (B) 2 m/s, 6 m/s^2 (C) -2 m/s , 8 m/s^2 (D) 2 m/s, 8 m/s^2

5. A stone thrown upwards from ground level, has its equation of height $h = 490t - 4.9t^2$ where 'h' is in metres and t is in seconds respectively. What is the maximum height reached by it ?

6. If $\int (x+1)dy$

COMPREHENSION

If a man has a velocity varying with time given as $v = 3t^2$, v is in m/s and t in sec then :



7. Find out the velocity of the man after 3 sec.

(A) 18 m/s (B) 9 m/s (C) 27 m/s (D) 36 m/s

8. Find out his displacement after 2 seconds of his start :

(A) 10 m (B) 6 m (C) 12 m (D) 8 m

9. Find out his acceleration after 3 seconds :

(A) 9 m/s^2 (B) 18 m/s^2 (C) 12 m/s^2 (D) 6 m/s^2

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 6

Total Marks : 33

Max. Time : 36 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Subjective Questions ('–1' negative marking) Q.5 to Q.7	(4 marks, 5 min.)	[12, 15]
Comprehension ('–1' negative marking) Q.8 to Q.10	(3 marks, 3 min.)	[9, 9]

1. If $y = 2x^3 + 3x^2 + 6x + 1$, then $\frac{dy}{dx}$ will be -

(A) $6(x^2 + x + 1)$ (B) $6(x^2 + x + 2)$ (C) $6x^2 + 3x$ (D) $(x^2 + 6x + 1)$

2. If $x = (6y + 4)(3y^2 + 4y + 3)$ then $\int x\,dy$ will be :

(A) $\frac{1}{3y^2+4y+3}$ (B) $\frac{(3y^2+4y+3)^2}{2} + C$ (C) $(3y^2 + 4y + 3)$ (D) $\frac{(6y+4)}{(3y^2+4y+3)}$

3. If $f(x) = \frac{x+1}{x-1}$, then the value of $f(f(f(x)))$ is :

(A) $\frac{x-1}{x+1}$ (B) 1 (C) $\frac{x+1}{x-1}$ (D) x

4. $\int\left[(x)^{1/3} - \frac{1}{(x)^{1/3}}\right] dx$ is equal to :

(A) $x^{4/3} - x^{2/3} + c$ (B) $\frac{4}{3}x^{2/3} - \frac{2}{3}x^{2/3} + c$ (C) $\frac{3}{4}x^{4/3} - \frac{2}{3}x^{1/3} + c$ (D) $\frac{3}{4}(x)^{4/3} - \frac{3}{2}(x)^{2/3} + c$

5. Integrate the following : $\int (\sin 4t + 2t)\,dt$

6. Integrate the following : $\int (2t - 4)^{-4}\,dt$

7. Integrate the following : $\int \frac{dt}{(6t-1)}$

COMPREHENSION

If charge flown through a cross section of wire in one direction during 0 to t is given by $q = 3 \sin (3t)$ then

8. Find out the amount of charge flowing through the wire till $t = \left(\frac{\pi}{6}\right)$ seconds.

(A) 3 coulombs (B) 6 coulombs (C) 1 coulomb (D) Zero coulomb

9. Find out the current flowing through the wire at $t = \frac{\pi}{9}$ second.

(A) 4.5 Amp (B) $4.5\sqrt{3}$ Amp (C) $\sqrt{3}/2$ Amp (D) 9 Amp.

10. Find out the area under i – t curve from $t = \frac{\pi}{9}$ to $t = \frac{\pi}{6}$ seconds :

(A) $3\left[\frac{2-\sqrt{3}}{2}\right]$ (B) $3\left[\frac{2+\sqrt{3}}{2}\right]$ (C) $\left[\frac{2-\sqrt{3}}{2}\right]$ (D) $\left[\frac{2+\sqrt{3}}{2}\right]$

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 7

Total Marks : 29

Max. Time : 31 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Subjective Questions ('–1' negative marking) Q.5 to Q. 6	(4 marks, 5 min.)	[8, 10]
Comprehension ('–1' negative marking) Q.7 to Q.9	(3 marks, 3 min.)	[9, 9]

1. If $y = \sqrt{\sin\sqrt{x}}$, then $\frac{dy}{dx}$ is :

(A) $\frac{1}{4\sqrt{x}} \cdot \frac{\cos\sqrt{x}}{\sin\sqrt{x}}$ (B) $\frac{1}{4\sqrt{x}} \cdot \sqrt{\tan\sqrt{x}}\sqrt{\cos\sqrt{x}}$ (C) $\frac{1}{4\sqrt{x}}\sqrt{\frac{\cos\sqrt{x}}{\sin\sqrt{x}}}$ (D) $\frac{1}{4\sqrt{x}}\sqrt{\cot\sqrt{x}} \cdot \sqrt{\cos\sqrt{x}}$

2. A particle moves along a straight line such that its displacement at any time t is given by :
$s = t^3 - 6t^2 + 3t + 4$ metresThe velocity when the acceleration is zero is :
(A) 3 ms^{-1} (B) – 12 ms^{-1} (C) 42 ms^{-1} (D) – 9 ms^{-1}

3. The area of region between y = sinx and x–axis in the interval $\left[0, \frac{\pi}{2}\right]$ will be :

(A) 1 (B) 0 (C) 2 (D) $\frac{1}{2}$

4. The value of $\int_0^{\pi/2} \sin^2 x\, dx$ will be :

(A) 1 (B) 0 (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

Evaluate : -

5. $\int_0^1 (3x^2 + 4)dx$

6. $\int_0^{\pi/2} (\sin x + \cos x)\, dx$

COMPREHENSION

If $a = (3t^2 + 2t + 1) m/s^2$ is the expression according to which the acceleration of a particle varies moving along a straight line . Then -

7. The expression for instantaneous velocity at any time 't' will be (if the particle was initially at rest) -
(A) $t^3 + 2t + 1$ (B) $t^3 + t + 1$ (C) $t^3 + t^2 + t$ (D) $t^3 + t^2 + t + C$

8. The change in velocity after 3 seconds of its start is :
(A) 30 m/s (B) 39 m/s (C) 3 m/s (D) 20 m/s

9. Find displacement of the particle after 2 seconds of start -
(A) 26 m (B) 26/3 m (C) 30/7 m (D) 26/7 m

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 8

Total Marks : 32

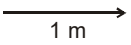
Max. Time : 33 min.

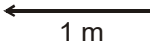
Topic : Mathematical Tools

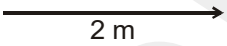
Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.5	(3 marks, 3 min.)	[15, 15]
Multiple choice objective ('–1' negative marking) Q.6	(4 marks, 4 min.)	[4, 4]
Subjective Questions ('–1' negative marking) Q.7	(4 marks, 5 min.)	[4, 5]
Comprehension ('–1' negative marking) Q.8 to Q.10	(3 marks, 3 min.)	[9, 9]

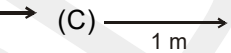
1. If $\vec{A}$ is $2\hat{i}+9\hat{j}+4\hat{k}$, then $4\vec{A}$ will be :

(A) $8\hat{i}+16\hat{j}+36\hat{k}$ (B) $8\hat{i}+36\hat{k}+16\hat{j}$ (C) $8\hat{i}+9\hat{j}+16\hat{k}$ (D) $8\hat{i}+36\hat{j}+16\hat{k}$

2. Which of the following vector is equal as that of 

(A) 

(B) 

(C) 

(D) 

3. The point for the curve, $y = xe^x$,
(A) x = - 1 is minima (B) x = 0 is minima (C) x = - 1 is maxima (D) x = 0 is maxima

4. The function $x^5 - 5x^4 + 5x^3 - 10$ has a maxima, when x =
(A) 3 (B) 2 (C) 1 (D) 0

5. The unit vector along $\vec{A} = 2\hat{i}+3\hat{j}$ is :

(A) $2\hat{i}+3\hat{j}$ (B) $\frac{2\hat{i}+3\hat{j}}{2}$ (C) $\frac{2\hat{i}+3\hat{j}}{3}$ (D) $\frac{2\hat{i}+3\hat{j}}{\sqrt{13}}$

6. Which of the following represents a vector ?

(A) (B) (C) $\overleftarrow{A}$ (D) $\vec{A}$ (E) $\hat{A}$

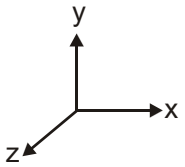
7. The x-component of a certain vector in x-y-plane is 2 units and y-component is + $2\sqrt{3}$ units. What is the magnitude of the vector.

COMPREHENSION

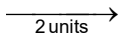
Position vector $\vec{A}$ is $2\hat{i}$

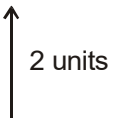
Position vector $\vec{B}$ is $3\hat{j}$

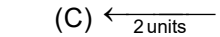
$\hat{i},\hat{j},\hat{k}$ are along the shown x,y and z axes :

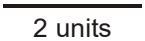


8. Geometrical representation of $\vec{A}$ is

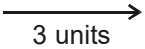
(A) 

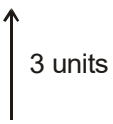
(B) 

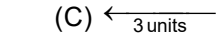
(C) 

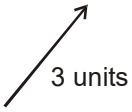
(D) 

9. Geometrical representation of $\vec{B}$ is :

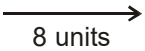
(A) 

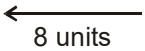
(B) 

(C) 

(D) 

10. $-4\vec{A}$ can be represented as

(A) 

(B) 

(C) $\vec{A}$ (D) $\vec{A}$

PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 9

Total Marks : 32

Max. Time : 33 min.

Topic : Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.8	(3 marks, 3 min.)	[24, 24]
Multiple choice objective ('–1' negative marking) Q.9	(4 marks, 4 min.)	[4, 4]
Subjective Questions ('–1' negative marking) Q.10	(4 marks, 5 min.)	[4, 5]

1. Given : $\vec{A} = 2\hat{i} - 3\hat{j}$ and $\vec{B} = 5\hat{i} - 6\hat{j}$

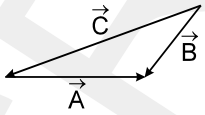
The magnitude of $(\vec{A} + \vec{B})$ is :

(A) $\sqrt{120}$ units (B) $\sqrt{130}$ units (C) $\sqrt{58}$ units (D) $\sqrt{65}$ units

2. Unit vector along $3\hat{i} + 3\hat{j}$ is

(A) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$ (B) $\frac{3\hat{i}+3\hat{j}}{2}$ (C) $\hat{i}+\hat{j}$ (D) $\frac{\hat{i}+\hat{j}}{\sqrt{3}}$

3. For the figure shown.



(A) $\vec{A}+\vec{B}=\vec{C}$ (B) $\vec{B}+\vec{C}=\vec{A}$ (C) $\vec{C}+\vec{A}=\vec{B}$ (D) $\vec{A}+\vec{B}+\vec{C}=0$

4. Parallelogram law of vectors is applicable to the addition of :

(A) Any two vectors (B) Two scalars

(C) A vector and a scalar (D) Two vectors representing same physical quantity.

5. *If* $\vec{A}$ *and* $\vec{B}$ *are two non–zero vectors such that* $|\vec{A}+\vec{B}| = \frac{|\vec{A}-\vec{B}|}{2}$ *and* $|\vec{A}| = 2|\vec{B}|$ then the angle between $\vec{A}$ and $\vec{B}$ is :

(A) 37° (B) 53° (C) $\cos^{-1}(-3/4)$ (D) $\cos^{-1}(-4/3)$

6. Vectors $\vec{A} = \hat{i} + \hat{j} - 2\hat{k}$ and $\vec{B} = 3\hat{i} + 3\hat{j} - 6\hat{k}$ are :

(A) Parallel (B) Antiparallel (C) Perpendicular (D) at acute angle with each other

7. A particle is moving with speed 6 m/s along the direction of $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$, then its velocity is :

(A) $(4\hat{i} + 2\hat{j} - 4\hat{k})$ units (B) $(4\hat{i} + 4\hat{j} - 2\hat{k})$ units

(C) $(4\hat{i} + 4\hat{j} - 4\hat{k})$ units (D) $(2\hat{i} + 4\hat{j} - 2\hat{k})$ units

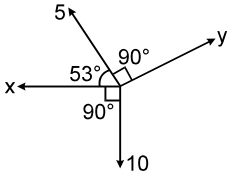
8. If $\vec{P} = \hat{i} + \hat{j} - \hat{k}$ and $\vec{Q} = \hat{i} - \hat{j} + \hat{k}$, then unit vector along $(\vec{P} - \vec{Q})$ is :

(A) $\frac{1}{\sqrt{2}}\hat{i} - \frac{1}{2}\hat{k}$ (B) $\frac{\sqrt{2}\hat{j} - \sqrt{2}\hat{k}}{2}$ (C) $\frac{\hat{j}-\hat{k}}{2\sqrt{2}}$ (D) $\frac{2\hat{j} - 2\hat{k}}{4}$

9. If $|\vec{a}+\vec{b}| \geq |\vec{a}-\vec{b}|$ then angle between $\vec{a}$ and $\vec{b}$ may be

(A) 50° (B) 90° (C) 60° (D) 120°

10. Find the magnitude of the unknown forces X and Y if sum of all forces is zero.



PHYSICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 10

Total Marks : 27

Max. Time : 28 min.

Topics : Rectilinear Motion, Vector, Mathematical Tools

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.5	(3 marks, 3 min.)	[15, 15]
Multiple choice objective ('–1' negative marking) Q.6 to Q.7	(4 marks, 4 min.)	[8, 8]
Subjective Questions ('–1' negative marking) Q.8	(4 marks, 5 min.)	[4, 5]

1. A particle is moving in a straight line with initial velocity u and uniform acceleration f. If the sum of the distances travelled in t^{th} and $(t + 1)^{th}$ seconds is 100cm, then its velocity after t seconds, in cm/s, is
(A) 20 (B) 30 (C) 50 (D) 80

2. If $\vec{A},\vec{B}$ & $\vec{A}+\vec{B}$ are three non–zero vector. Such that $\vec{A}+\vec{B}$ is perpendicular to $\vec{B}$ then which of one is correct :

(A) $A \geq B$ (B) $A \geq \frac{B}{\sqrt{2}}$ (C) $A > B$ (D) $A > \frac{B}{\sqrt{2}}$

3. A car covers a distance of 2 km in 2.5 minutes. If it covers half of the distance with speed 40 km/hr, the rest distance it shall cover with a speed of:
(A) 56 km/hr (B) 60 km/hr (C) 48 km/hr (D) 50 km/hr

4. The displacement of a body is given by $r = \sqrt{a^2 - t^2}$ + t cos t^2, where t is the time and a is constant. Its velocity is:

(A) $\frac{-t}{\sqrt{a^2-t^2}}$ + cos t^2 – t sin 2t (B) $\frac{-t}{\sqrt{a^2-t^2}}$ + cos t^2 – 2 t^2 sin t^2

(C) $\frac{-a}{(a^2 - t^2)}$ + 2 t cos t^2 sin t + sin t (D) a – t^2 – t sin t^2

5. A body goes 30 km south and then 40 km east. What will be the displacement from initial point ?
(A) 50 km, 37° South of East (B) 30 km, 37° South of East
(C) 40 km, 53° South of East (D) 70 km, 53° South of East

6. The displacement of a body from a reference point is given by, $\sqrt{x}$ = 2 t – 3, where 'x' is in metres and it is non negative number, t in seconds. This shows that the body :
(A) is at rest at t = 3/2 (B) is speeding up for t > 3/2
(C) is retarded for t < 3/2 (D) is in uniform motion

7. Pick the correct statements:
(A) Average speed of a particle in a given time interval is never less than the magnitude of the average velocity.

(B) It is possible to have a situation in which $\left|\frac{d\vec{v}}{dt}\right| \neq 0$ but $\frac{d}{dt}|\vec{v}| = 0$.

(C) The average velocity of a particle is zero in a time interval. It is possible that the instantaneous velocity is never zero in the interval.
(D) The average velocity of a particle moving on a straight line is zero in a time interval. It is possible that the instantaneous velocity is never zero in the interval. (Infinite acceleration are not allowed)

8. A body moves with uniformly accelerated motion and travels 200 cm in the first two seconds and 220 cm in the next four seconds. What will be the velocity at the end of 7 seconds from start?

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9th, 10th, NEET, JEE(Main/Advanced)

अभ्यास ही सबसे बड़ा गुरू है।

CLASS : IX (PHYSICS)

D P P

DAILY PRACTICE PROBLEM

Solutions

DPP-1 TO 10

DPP 1 : **Mathematical Tools**
DPP 2 : **Mathematical Tools**
DPP 3 : **Mathematical Tools**
DPP 4 : **Mathematical Tools**
DPP 5 : **Mathematical Tools**
DPP 6 : **Mathematical Tools**
DPP 7 : **Mathematical Tools**
DPP 8 : **Mathematical Tools**
DPP 9 : **Mathematical Tools**
DPP 10 : **Rectilinear Motion, Vector, Mathematical Tools**

Answer Key

DPP NO. - 1

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

DPP NO. - 2

1. (B) **2.** (A) **3.** (C) **4.** $4x^3 + 6x$

5. $5 + 21x^2$ **6.** $\frac{2}{5}$ **7.** $\frac{dy}{dx} = 1 + 2x - \frac{1}{x^2} - \frac{3}{x^4}$.

8. $\frac{dy}{dx} = 2x - \frac{2}{x^3}$. **9.** (B) **10.** (A)

DPP NO. - 3

1. (B) **2.** (C) **3.** (B) **4.** (C) **5.** (B)
6. (A) **7.** (B)

8. $\frac{dy}{dx} = 8(2x+3)^3 - 14(7x-1) - \frac{18}{(3x+1)^4} - \frac{32}{(4x-3)^3}$.

9. (A) **10.** (B)

DPP NO. - 4

1. (A) **2.** (B) **3.** (B) **4.** (B)
5. (B) **6.** (A) **7.** (C) **8.** (A), (B)

9. $\frac{c^2}{4}$ **10.** sin 4x + C

DPP NO. - 5

1. (D) **2.** (C) **3.** (A) **4.** (A)
5. 12250 m **6.** $4x^3 + 6x^2 + C$
7. (C) **8.** (D) **9.** (B)

DPP NO. - 6

1. (A) **2.** (B) **3.** (C) **4.** (D)

5. $-\frac{1}{4}\cos 4t + t^2 + C$. **6.** $= -\frac{(2t-4)^{-3}}{6} + C$

7. $\frac{1}{6}\log(6t-1) + C$ **8.** (A) **9.** (A)

10. (A) **11.** (C)

DPP NO. - 7

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

DPP NO. - 8

1. (D) **2.** (C) **3.** (A) **4.** (C) **5.** (D)
6. (B,D,E) **7.** 4 units **8.** (A) **9.** (B)
10. (B)

DPP NO. - 9

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

DPP NO. - 10

1. (C) **2.** (C) **3.** (B) **4.** (B) **5.** (A)
6. (A,B,C) **7.** (A,B,C) **8.** 10 cm s^{-1}

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

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

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

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

9. $v = u$
$v = o$ m/s

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

DPP NO. - 2

1. $y = x^3 + 2x^2 + 7x + 8$

$\frac{dy}{dx} = 3x^2 + 4x + 7$

2. $y = 2x^2 + 3x$

$\frac{dy}{dx} = 4x + 3$

3. $y = -2/3\ x + 5/3 \Rightarrow \frac{dy}{dx} = -2/3$

Alter : $y = mx + c$
(slope) $m = -2/3$

4. $y = x^4 + 3x^2 + \pi + 2; \ \frac{dy}{dx} = 4x^3 + 6x$

5. $y = 4 + 5x + 7x^3 \ ; \frac{dy}{dx} = 5 + 21x^2$

6. $y = \frac{2}{5}x + \frac{7}{5} \Rightarrow \frac{dy}{dx} = \frac{2}{5}$

7. $y = x + x^2 + \frac{1}{x} + \frac{1}{x^3} \ ; \ \frac{dy}{dx} = 1 + 2x - \frac{1}{x^2} - \frac{3}{x^4}$.

8. $y = x^2 + \frac{1}{x^2}. \quad \frac{dy}{dx} = 2x - \frac{2}{x^3}$

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

$v = \frac{dS}{dt} = u + \frac{1}{2}a \times 2t \quad = u + at$

10. $\frac{dv}{dt} = a$

DPP NO. - 3

1. $y = \sin x + \ell n x^2 + e^{2x}$

$\frac{dy}{dx} = \cos x + \frac{2x}{x^2} + 2e^{2x}$

$= \cos x + \frac{2}{x} + 2e^{2x}$

2. $y = e^x \cdot \cot x$

$\frac{dy}{dx} = e^x \frac{d}{dx}(\cot x) + \cot x \frac{d}{dx}(e^x)$

$= e^x(-\text{cosec}^2 x) + \text{cot}x\ e^x$
$= e^x[\text{cot}x - \text{cosec}^2 x]$

3. $y = x\ell nx$

$$\frac{dy}{dx} = x\frac{d}{dx}\ell nx + \ell nx\ \frac{d}{dx}(x)$$

$$= x\left(\frac{1}{x}\right) + \ell nx$$

$$= 1 + \ell nx$$

4. $y = \frac{\ell nx}{x}$

$$\frac{dy}{dx} = \frac{x\frac{d}{dx}(\ell nx) - \ell nx\frac{d}{dx}(x)}{x^2}$$

$$= \frac{x(1/x) - \ell nx}{x^2}$$

$$\frac{dy}{dx} = \frac{1-\ell nx}{x^2}$$

5. $y = \sin(x^2 + 3)$

$$\frac{dy}{dx} = \cos(x^2 + 3)(2x + 0)$$

$$= 2x\cos(x^2 + 3)$$

6. $y = x^2 \sin x$

$$\frac{dy}{dx} = x^2\frac{d}{dx}\sin x + \sin x\ \frac{d}{dx}(x^2)$$

$$= x^2\cos x + 2x\sin x$$

7. $y = \tan x \cos^2 x$

$$\frac{dy}{dx} = \tan x\ \frac{d}{dx}(\cos^2 x) + \cos^2 x\ \frac{d}{dx}(\tan x)$$

$$= \tan x\,(-2)\cos x \sin x + \cos^2 x \sec^2 x$$

$$= 1 - 2\sin^2 x$$

Alter : $y = \frac{\sin x}{\cos x} \times \cos^2 x = \sin x \cos x$

$$y = \frac{1}{2}\sin 2x$$

$$\frac{dy}{dx} = \frac{1}{2} \times 2\cos 2x$$

$$= \cos 2x$$

$$= 1 - 2\sin^2 x$$

8. $y = (2x+3)^4 - (7x-1)^2 + \frac{2}{(3x+1)^3} + \frac{4}{(4x-3)^2}$

$$\frac{dy}{dx} = = 4(2x+3)^3 \times 2 - 2(7x-1) \times 7 + 2(-3)$$

$$\times (3x+1)^{-4} \times 3 + 4 \times (-2) \times (4x-3)^{-3} \times 4$$

9. $y_1 = \sin 4x^2$,

$$\frac{dy_1}{dx} = \cos 4x^2\,(8x) = 8x\cos 4x^2$$

10. $y_2 = \ell nx^3 \Rightarrow \frac{dy_2}{dx} = \frac{3x^2}{x^3} = \frac{3}{x}$

DPP NO. - 4

1. $\frac{dx}{dt} = v \Rightarrow \frac{d^2x}{dt^2}$ = acceleration

2. $y = x^3$

$$\frac{dy}{dx} = 3x^2 \quad \frac{d^2y}{dx^2} = 6x$$

3. $Q = 4V^3 + 3V^2$

$$\frac{dQ}{dv} = 12V^2 + 6V$$

$$\frac{dQ}{dv} = 0 \Rightarrow V = 0, -\frac{1}{2}$$

$$\frac{d^2Q}{dV^2} = 24\,v + 6 \Rightarrow \left(\frac{d^2Q}{dv^2}\right)_{v=0} = 6\ (+ve)$$

$$\left(\frac{d^2Q}{dv^2}\right)_{v=-1/2} = -12 + 6 = -6\ (-ve)$$

$V = -1/2$ for maximum Q

4. $y = 2\sin^2\theta + \tan\theta$

$$\frac{dy}{d\theta} = 2 \times 2\sin\theta\cos\theta + \sec^2\theta$$

$$= 2\sin 2\theta + \sec^2\theta$$

5. $\int x^3 dx = \frac{x^4}{4} + C$

6. $\int 2\sin(x)dx = -2\cos x + C$

7. $y = \sin x$

$$\frac{dy}{dx} = \cos x$$

$$\frac{d^2y}{dx^2} = -\sin x$$

8. $\sin° = 0$

$\tan 0° = 0$

9. $\frac{dy}{dx} = C - 2x = 0 \quad \Rightarrow \quad x = \frac{c}{2}$

$$\frac{d^2y}{dx^2} = -2$$

$$Y_{max} = \frac{c}{2}\left(c - \frac{c}{2}\right) = \frac{c^2}{4}$$

10. y = 4 cos 4x

$$\int y dx = \int 4\cos t \frac{dt}{4}$$

4x = t

4dx = dt

dx = $\frac{dt}{4}$

$$\int 4\cos t \frac{dt}{4} = \textbf{sin t = sin 4x}$$

DPP NO. - 5

1. $y = f(x) = \sin x + \cos x$

$$\frac{dy}{dx} = \cos x - \sin x$$

$\frac{dy}{dx} = 0$, $\sin x = \cos x$, $\tan x = 1$

$x = 45°$

$y = \sin 45° + \cos 45°$

$$= \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}$$

$$= \frac{2}{\sqrt{2}} = \sqrt{2}$$

Alter : $fx = \sqrt{2} \sin\left(x + \frac{\pi}{4}\right)$

$f(x)_{max} = \sqrt{2}$

2. (C*) 10 s

3. $\frac{ds}{dt} = 15 - 0.8\,t = 7 = v$

; $8 = 0.8\,t$; $t = 10$ second.

$a = \frac{d^2s}{dt^2} = -0.8$ m/s²

4. (A*) -2 m/s, -8 m/s²

5. $\frac{ds}{dt} = 490 - 9.8\,t = 0 \quad t = \frac{490}{9.8} = 50$ second.

$S_{max} = 490 \times 50 - 4.9 \times 2500 = 12250$ m

6. $dy = 12x dx \quad \int (x+1)(12x)dx = 4x^3 + 6x^2 + C$

7. $v = 3t^2$

$v = 3(3)^2 = 27$ m/s

8. $\int_0^s dS = \int_0^2 3t^2 dt$

$S = \left[t^3\right]_0^2 = 8$

9. $f = \frac{dv}{dt} = 6t$

$f = 6 \times 3 = 18$ m/s²

DPP NO. - 6

1. $y = 2x^3 + 3x^2 + 6x + 1$

$$\frac{dy}{dx} = 6x^2 + 6x + 6$$

$$= 6(x^2 + x + 1)$$

2. Let $3y^2 + 4y + 3 = t \quad \Rightarrow (6y + 4)\,dy = dt$

Then $\int x dy = \int t\,dt = \frac{t^2}{2} + C$

$$= \frac{(3y^2 + 4y + 3)^2}{2} + C$$

3. $f(f(x)) = \dfrac{\left(\frac{x+1}{x-1}\right)+1}{\left(\frac{x+1}{x-1}\right)-1} = x$

$f(f(f(x))) = \dfrac{x+1}{x-1}$.

4. $\int x^{1/3}dx - \int x^{-1/3}dx = \dfrac{(x)^{1/3+1}}{\left(\frac{1}{3}+1\right)} - \dfrac{(x)^{-1/3+1}}{\left(-\frac{1}{3}+1\right)} + c$

$= \dfrac{3}{4}(x)^{4/3} - \dfrac{3}{2}(x)^{2/3} + c.$

5. $\int(\sin 4t + 2t)dt = -\dfrac{1}{4}\cos 4t + t^2 + C.$

6. $u = 2t - 4$

$\dfrac{du}{dt} = 2$

$\int \dfrac{u^{-4}du}{2} = \dfrac{1}{2}\left(\dfrac{u^{-3}}{-3}\right) + C$

Ans. $= -\dfrac{(2t-4)^{-3}}{6} + C$

7. $u = 6t - 1$

$\dfrac{dx}{dt} = 6$

$\dfrac{1}{6}\int\dfrac{du}{u}$

$= \dfrac{1}{6}\log u + C$

$= \dfrac{1}{6}\log(6t-1) + C$

Ans. $\dfrac{1}{6}\log(6t-1) + C$

8. $q = 3\sin 3t$

$q\left(\dfrac{\pi}{6}\right) - q(0) = q$

$q = 3\sin 3 \times \dfrac{\pi}{6} = 3$ coulombs

9. $i = \dfrac{dq}{dt} = 3 \times 3\cos(3t) \Rightarrow i\big|_{t=\frac{\pi}{9}} = 9\cos\left(3.\dfrac{\pi}{9}\right)$

$= 9\cos\left(\dfrac{\pi}{3}\right) = \dfrac{9}{2}A$

10. $\Delta q = 3|\sin 3t|_{\pi/9}^{\pi/6} = 3\left[1 - \dfrac{\sqrt{3}}{2}\right] = 3\left[\dfrac{2-\sqrt{3}}{2}\right]$

Δq = total charge flown between $t = \dfrac{\pi}{9}$ to $\dfrac{\pi}{6}$

DPP NO. - 7

1. $\dfrac{d}{dx}\left[\left(\sin\sqrt{x}\right)^{1/2}\right] = \dfrac{1}{2}(\sin\sqrt{x})^{-1/2} \cdot [\cos\sqrt{x}] \cdot \dfrac{1}{2}$

$(x)^{-1/2}$ (By power chain rule)

$= \dfrac{1}{4\sqrt{x}} \cdot \dfrac{\cos\sqrt{x}}{\sqrt{\sin\sqrt{x}}} = \dfrac{1}{4\sqrt{x}} \cdot \sqrt{\cot\sqrt{x}} \cdot \sqrt{\cos\sqrt{x}}$

2. $v = \dfrac{ds}{dt} = 3t^2 - 12t + 3,\ a = \dfrac{dv}{dt} = 6t - 12 = 0$

$\Rightarrow t = 2s$

$v_{t=2} = 3 \times 4 - 12 \times 2 + 3 = -9$ m/s

3. $\int_0^{\pi/2}\sin x dx = [-\cos x]_0^{\pi/2} = 1.$

4. $\int_0^{\pi/2}\sin^2 x dx = \left[\dfrac{x}{2} - \dfrac{\sin 2x}{4} + c\right]_0^{\pi/2} = \dfrac{\pi}{4}.$

Evaluate :

5. $\int_0^1(3x^2+4)dx = [x^3]_0^1 + 4[x]_0^1 = 1 + 4 = 5$

6. $\int_0^{\pi/2}(\sin x + \cos x)\,dx = [-\cos x]_0^{\pi/2} + [\sin x]_0^{\pi/2}$

$= 1 - 0 + 1 - 0 = 2$

7. $a = 3t^2 + 2t + 1$

$$\int_0^v dv = \int_0^t (3t^2 + 2t + 1)dt \qquad v = t^3 + t^2 + t$$

8. $V(t = 0) = 0$

$V_{t=3} = (3)^3 + (3)^2 + 3$

$= 27 + 9 + 3$

$= 39$

$\Delta V = 39 - 0 = 39$ m/s.

9. $\int_0^s dS = \int_0^2 (t^3 + t^2 + t)dt \qquad S = \left[\frac{t^4}{4} + \frac{t^3}{3} + \frac{t^2}{2}\right]_0^2 \qquad S$

$= 4 + \frac{8}{3} + 2S = \frac{12 + 8 + 6}{3} = \frac{26}{3}$

DPP NO. - 8

1. $\vec{A} = 2\hat{i} + 9\hat{j} + 4\hat{k}$

$4\vec{A} = 8\hat{i} + 36\hat{j} + 16\hat{k}$

2. $\xrightarrow[1\text{ m}]{}$ magnitude & direction must be same.

3. $\frac{dy}{dx} = x.e^x + e^x = (x + 1)e^x = 0 ; \qquad x = -1 ;$

$\frac{d^2y}{dx^2} > 0$ for $x = -1$

4. $\frac{dy}{dx} = \frac{d}{dx}(x^5 - 5x^4 + 5x^3 - 10) = 5x^4 - 20x^3 + 15x^2$

$= 0 \quad ; \quad x = 3, 0, 1$

$\frac{d^2y}{dx^2} < 0 \quad$ at $x = 1$

5. $\vec{A} = 2\hat{i} + 3\hat{j}$

$\hat{A} = \frac{2\hat{i} + 3\hat{j}}{\sqrt{4 + 9}} = \frac{2\hat{i} + 3\hat{j}}{\sqrt{13}}$

6*. (B) $\longrightarrow$ (D) $\vec{A}$

7. $A_x = 2$

$A_y = 2\sqrt{3}$

$A = \sqrt{A_x^2 + A_y^2}$

$= \sqrt{4 + 12} \quad = 4$

8. $\vec{A} = 2\hat{i}$

$\xrightarrow[2\text{ units}]{}$

9. $\vec{B} = 3\hat{j}$ $\uparrow$ 3 units

10. $-4\vec{A} = -8i \xleftarrow[8\text{ units}]{}$

DPP NO. - 9

1. $(\vec{A} + \vec{B}) = 7\hat{i} - 9\hat{j}$

$\therefore \quad |\vec{A} + \vec{B}| = \sqrt{49 + 81} = \sqrt{130}$

2. unit vector $= \frac{3\hat{i} + 3\hat{j}}{\sqrt{3^2 + 3^2}} = \frac{\hat{i} + \hat{j}}{\sqrt{2}}$

3. Apply triangle law of vector addition.

5. $(A^2 + B^2 + 2AB\cos\theta) = \frac{1}{4}(A^2 + B^2 - 2AB\cos\theta)$

$\Rightarrow 3A^2 + 3B^2 + 10\,AB\cos\theta = 0$

or $12B^2 + 3B^2 + 10(2B)(B)\cos\theta = 0$

$15B^2 + 20B^2\cos\theta = 0$

$\cos\theta = -\frac{3}{4}$

6. Since $\vec{B} = 3\vec{A}$, so both are parallel.

7. Velocity = (speed) $\hat{A}$

$= 6\frac{(2\hat{i} + 2\hat{j} - \hat{k})}{\sqrt{4 + 4 + 1}} = (4\hat{i} + 4\hat{j} - 2\hat{k})$ units.

8. $\vec{P} - \vec{Q} = (\hat{i} + \hat{j} - \hat{k}) - (\hat{i} - \hat{j} + \hat{k}) = 2\hat{j} - 2\hat{k}$

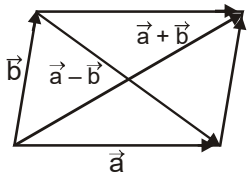
$\therefore$ unit vector along

$$\vec{P}-\vec{Q} = \frac{(\vec{P}-\vec{Q})}{|\vec{P}-\vec{Q}|} = \frac{2\hat{j}-2\hat{k}}{\sqrt{(2)^2+(-2)^2}}$$

$$\therefore \quad \vec{P}-\vec{Q} = \frac{(\vec{P}-\vec{Q})}{|\vec{P}-\vec{Q}|} = \frac{2\hat{j}-2\hat{k}}{\sqrt{(2)^2+(-2)^2}}$$

$$= \frac{2\hat{j}-2\hat{k}}{\sqrt{4+4}} = \frac{2\hat{j}-2\hat{k}}{2\sqrt{2}} = \frac{\hat{j}-\hat{k}}{\sqrt{2}}$$

9.

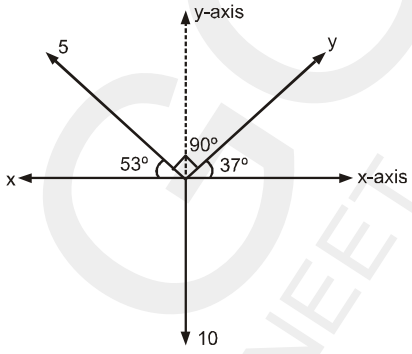


$$|\vec{a}+\vec{b}| \geq |\vec{a}-\vec{b}|$$

$\Rightarrow$ angle between $\vec{a}$ & $\vec{b} \leq 90°$

$\Rightarrow$ $\vec{a}\ \vec{b} \leq 90°$

10.



$\Sigma\vec{F} = 0$

$\Rightarrow$ $(y\cos37°\,\hat{i} + y\sin37°\,\hat{j}) + (5\cos53°(-\hat{i}) + 5\sin53°\,\hat{j}) + (x(-\hat{i}) + 10(-\hat{j})) = 0$

$\Rightarrow$ $\left(\frac{4y}{5}-3-x\right)\hat{i}+\left(\frac{3y}{5}+4-10\right)\hat{j} = 0\hat{i}+0\hat{j}$

Comparing coefficients of $\hat{i}$ & $\hat{j}$ both sides–

$\frac{4y}{5} - x = 3$ .....(i)

$\frac{3y}{5} = 6 \quad \Rightarrow \quad y = 10$

Putting $8 - x = 3 \quad \Rightarrow \quad x = 5$

DPP NO. - 10

1. $S_t + S_{t+1} = 100$

$u + \frac{1}{2}f(2t-1) + u + \frac{1}{2}f[2(t+1)-1] = 100$

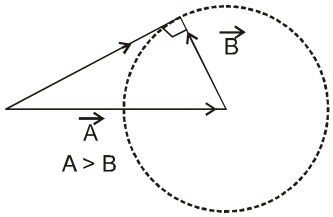
$2u + \frac{1}{2}f(2t-1+2t+1) = 100$

$2u + 2ft = 100$

$u + ft = 50$

$v = 50$ cm/s.

2.



So, A > B

3. time taken by car to cover first half distance.

$= \frac{1}{40}$ hr $= \frac{1}{40} \times 60$ min $= 1.5$ min.

Remaining time $= 2.5 - 1.5 = 1$ min.

required speed $= \frac{1\text{km}}{1\text{min}} = 60$ km/hr

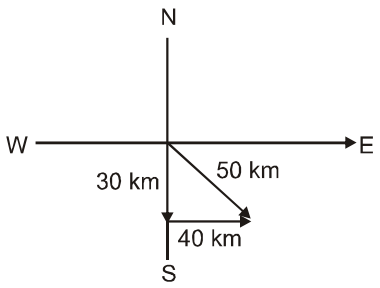
4. $r = \sqrt{a^2-t^2} + t\cos t^2$

$V = \frac{dr}{dt} = \frac{1}{2}(a^2-t^2)^{-1/2}(-2t) + t(-\sin t^2)\,2t.$

$+ \cos t^2.$

$V = -\frac{t}{\sqrt{a^2-t^2}} - 2t^2\sin t^2 + \cos t^2.$

5.



Net displacement = 50 km

6. $\sqrt{x} = (2t - 3)$ for B option

$x = (2t - 3)^2$ accelerated

for $t > 3/2$

$\frac{dx}{dt} = 2(2t - 3)(2) = 4(2t - 3)$

$V = 4(2t - 3) = 0$

rest at $t = 3/2$

$a = 8$ m/s.

7. since $\frac{\text{Distance}}{\Delta t} \geq \frac{|\text{Displacement}|}{\Delta t}$

aV speed $\geq$ | aV. velocity |

in uniform circular motion speed is constant but acc. $\neq 0$

in uniform circle motion after one round average velocity becomes zero.

8. Let u be initial velocity & a be its acceleration

Distance in first 2 sec = $S_1 = 200$ cm

$\Rightarrow u(2) + \frac{1}{2}a(2)^2 = 200$ cm

$\Rightarrow u + a = 100$ .....(i)

Distance in next 4 sec. = $S_2 = 220$ cm

Distance in first 6 sec. = $S_1 + S_2 = 200 + 220$ cm

$\Rightarrow u(6) + \frac{1}{2}a(6)^2 = 420$

$\Rightarrow u + 3a = 70$ .....(ii)

From equations (i) & (ii), we get

$a = -15$ cm/s^2, $u = 115$ cm/s

Hence, velocity at the end of 7 sec. from start

$= u + 7a$

$= 115 + 7(-15) = 10$ cm/s.