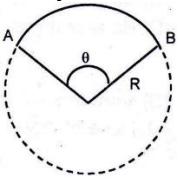


<p><b>DPP</b> <b>Daily Practice Problem</b> <b>Physics</b></p>	<p><b>Topic : Mathematical Tools</b> <b>DPP No. 1</b></p>	<p><b>Time : 25 min.</b> <b>Total Marks : 48 Max.</b></p>
<b>Type of Questions</b> Single choice Objective ('-1' negative marking) Q. 1 to Q. 8 Multiple choice Objective ('-1' negative marking) Q. 9 to Q. 12		

- Q 1)** Value of  $\tan 225^\circ$  is :
- A)  $\sqrt{3}$       B)  $\frac{1}{\sqrt{3}}$   
C) 1      D) -1
- Q 2)**  $\sin 300^\circ$  is equal to
- A)  $\frac{1}{2}$       B)  $-\frac{1}{2}$   
C)  $-\frac{\sqrt{3}}{2}$       D)  $\frac{\sqrt{3}}{2}$
- Q 3)** 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)  $\pm \frac{3}{4}$
- Q 4)** Values of  $\sin 15^\circ \cdot \cos 15^\circ$  is :
- A) 1      B)  $\frac{1}{2}$   
C)  $\frac{1}{4}$       D)  $\frac{\sqrt{3}}{2}$
- Q 5)** Value of  $\sin(37^\circ) \cos(53^\circ)$  is -
- A)  $\frac{12}{25}$       B)  $\frac{9}{25}$   
C)  $\frac{16}{25}$       D)  $\frac{4}{5}$
- Q 6)** If  $\sin \theta = \frac{3}{5}$  and  $\cos \theta < 0$ , then find  $\tan \theta$  -
- A)  $\frac{3}{5}$       B)  $-\frac{3}{4}$   
C)  $-\frac{4}{3}$       D)  $-\frac{4}{3}$
- Q 7)**  $\sin 2\theta =$
- A)  $2\sin \theta \cos \theta$       B)  $\frac{2\sin \theta}{\cos \theta}$   
C)  $2\cos \theta$       D)  $\frac{\sin \theta \cos \theta}{2}$
- Q 8)** The length of the arc AB, shown in the figure ( $R=7$  cm,  $\theta=90^\circ$ ,  $\pi=22/7$ )
- 
- A) 11 cm      B) 22 cm  
C) 650 cm      D) None of these
- Q 9)** Which of the following is/are correct trigonometric identity:
- A)  $1 + \tan^2 \theta = \sec^2 \theta$       B)  $1 - \cot^2 \theta = \operatorname{cosec}^2 \theta$   
C)  $\sin^2 \theta + \cos^2 \theta = 1$       D)  $\sin \theta \sec \theta = \tan \theta$
- Q 10)** Which of the following has value 1?
- A)  $\tan 45^\circ$       B)  $\sin 90^\circ$   
C)  $\cos 90^\circ$       D)  $\cos 0^\circ$
- Q 11)** Which of the following has value zero?
- A)  $\sin 0^\circ$       B)  $\tan 0^\circ$   
C)  $\cos 0^\circ$       D)  $\sec 0^\circ$
- Q 12)** Convert the following angles into radian :-
- (i)  $30^\circ$  (ii)  $45^\circ$  (iii)  $60^\circ$  (iv)  $90^\circ$  (v)  $120^\circ$  (vi)  $135^\circ$  (vii)  $150^\circ$  (viii)  $180^\circ$  (ix)  $270^\circ$

<b>DPP</b> <b>Daily Practice Problem</b> <b>Physics</b>	<b>Topic : Mathematical Tools</b> <b>DPP No. 2</b>	<b>Time : 30 min.</b> <b>Total Marks : 52 Max.</b>
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**Type of Questions**
**Single choice Objective ('-1' negative marking) Q. 1 to Q. 10**
**Multiple choice Objective ('-1' negative marking) Q. 11 to Q. 13**

- Q 1)**  $\cos(A+B) =$   
A)  $\cos A \cos B - \sin A \sin B$       B)  $\cos A \cos B + \sin A \sin B$   
C)  $\sin A \sin B + \cos A \cos B$       D) None of these
- Q 2)**  $\cos(A-B) =$   
A)  $\cos A \cos B - \sin A \sin B$       B)  $\cos A \cos B + \sin A \sin B$   
C)  $\sin A \sin B + \cos A \cos B$       D) None of these
- Q 3)**  $\sin(A+B) =$   
A)  $\sin A \cos B + \cos A \sin B$       B)  $\sin A \cos B - \cos A \sin B$   
C)  $\cos A \sin B - \sin A \cos B$       D) None of these
- Q 4)**  $\sin(A-B) =$   
A)  $\sin A \cos B + \cos A \sin B$       B)  $\sin A \cos B - \cos A \sin B$   
C)  $\cos A \sin B - \sin A \cos B$       D) None of these
- Q 5)**  $\sin A + \sin B =$   
A)  $2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$       B)  $2 \sin\left(\frac{A-B}{2}\right) \cos\left(\frac{A+B}{2}\right)$   
C)  $-2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$       D)  $2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A+B}{2}\right)$
- Q 6)**  $\sin A - \sin B =$   
A)  $2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$       B)  $2 \sin\left(\frac{A-B}{2}\right) \cos\left(\frac{A+B}{2}\right)$   
C)  $-2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$       D)  $2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A+B}{2}\right)$
- Q 7)**  $\cos A + \cos B =$   
A)  $2 \sin\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$       B)  $2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$   
C)  $-2 \sin\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$       D)  $-2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$
- Q 8)**  $\cos A - \cos B =$   
A)  $2 \sin\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$       B)  $2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$   
C)  $-2 \sin\left(\frac{A+B}{2}\right) \sin\left(\frac{A-B}{2}\right)$       D)  $-2 \cos\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right)$
- Q 9)** The value of  $\sin(15^\circ)$  is  
A)  $\frac{\sqrt{3}+1}{2\sqrt{2}}$       B)  $\frac{\sqrt{3}-1}{2\sqrt{2}}$   
C)  $\frac{\sqrt{3}}{2\sqrt{2}}$       D)  $\frac{1}{2\sqrt{2}}$
- Q 10)** The value of  $\sin(75^\circ)$  is  
A)  $\frac{\sqrt{3}+1}{2\sqrt{2}}$       B)  $\frac{\sqrt{3}-1}{2\sqrt{2}}$   
C)  $\frac{\sqrt{3}}{2\sqrt{2}}$       D)  $\frac{1}{2\sqrt{2}}$
- Q 11)**  $\sin^2 \theta =$   
A)  $\frac{1+\cos 2\theta}{2}$       B)  $\frac{1-\cos 2\theta}{2}$   
C)  $1 - \cos^2 \theta$       D)  $\sin(2\theta)$
- Q 12)**  $\cos 2\theta =$   
A)  $2 \cos^2 \theta - 1$       B)  $1 - 2 \sin^2 \theta$   
C)  $\cos^2 \theta - \sin^2 \theta$       D)  $\cos^2 \theta + \sin^2 \theta$
- Q 13)**  $\cos^2 \theta =$   
A)  $\frac{1+\cos 2\theta}{2}$       B)  $\frac{1-\cos 2\theta}{2}$   
C)  $1 - \sin^2 \theta$       D)  $\cos(2\theta)$

<p><b>DPP</b> <b>Daily Practice Problem</b> <b>Physics</b></p>	<p><b>Topic : Mathematical Tools</b> <b>DPP No. 3</b></p>	<p><b>Time : 30 min.</b> <b>Total Marks : 50 Max.</b></p>										
<p><b>Type of Questions</b></p> <p>Single choice Objective ('-1' negative marking) Q. 1 to Q. 7</p> <p>Multiple choice Objective ('-1' negative marking) Q. 8 &amp; 9</p> <p>Subjective Questions ('-1' negative marking) Q. 10 &amp; 11</p> <p>Match the following (no negative marking) Q. 12</p>												
<p><b>Q 1)</b> <math>\sin 210^\circ</math> is equal to</p> <p>A) <math>\frac{1}{2}</math> B) <math>-\frac{1}{2}</math> C) <math>-\frac{\sqrt{3}}{2}</math> D) <math>\frac{\sqrt{3}}{2}</math></p>	<p><b>Q 2)</b> <math>\sin(90^\circ + \theta)</math> is -</p> <p>A) <math>\sin\theta</math> B) <math>\cos\theta</math> C) <math>-\cos\theta</math> D) <math>-\sin\theta</math></p>	<p><b>Q 3)</b> <math>\sec(\pi + \theta)</math></p> <p>A) <math>\cos\theta</math> B) <math>\tan\theta</math> C) <math>\sec\theta</math> D) <math>-\sec\theta</math></p>										
<p><b>Q 4)</b> If <math>A = 60^\circ</math> then value of <math>\sin 2A</math> will be</p> <p>A) <math>\frac{\sqrt{3}}{2}</math> B) <math>\frac{1}{2}</math> C) <math>\frac{1}{\sqrt{3}}</math> D) <math>\frac{1}{\sqrt{2}}</math></p>	<p><b>Q 5)</b> <math>\sin(750^\circ) =</math></p> <p>A) <math>\frac{1}{2}</math> B) <math>-\frac{1}{4}</math> C) 0 D) <math>\frac{\sqrt{3}}{2}</math></p>	<p><b>Q 6)</b> Value of <math>\sin 225^\circ</math> is :</p> <p>A) <math>\frac{1}{\sqrt{2}}</math> B) <math>-\frac{1}{\sqrt{2}}</math> C) 1 D) -1</p>										
<p><b>Q 7)</b> <math>\cos\left(\frac{11\pi}{6}\right) =</math></p> <p>A) <math>\frac{1}{2}</math> B) <math>-\frac{\sqrt{3}}{2}</math> C) 0 D) <math>\frac{\sqrt{3}}{2}</math></p>	<p><b>Q 8)</b> If <math>\theta=120^\circ</math>, then:</p> <p>A) <math>\sin\theta = \frac{\sqrt{3}}{2}</math> B) <math>\cos\theta = \frac{1}{2}</math> C) <math>\cot\theta = \frac{1}{2}</math> D) <math>\tan\theta = \sqrt{3}</math></p>	<p><b>Q 9)</b> Which of the following have value equal to 1 ?</p> <p>A) <math>\tan 225^\circ</math> B) <math>-\cos \pi</math> C) <math>\sin\left(\frac{5\pi}{4}\right)</math> D) <math>\tan(405^\circ)</math></p>										
<p><b>Q 10)</b> Find the values of</p> <p>A) <math>\cos(-60^\circ)</math> B) <math>\tan(210^\circ)</math> C) <math>\cos(120^\circ)</math> D) <math>\sin(-1485^\circ)</math></p>	<p><b>Q 11)</b> The following angle lie in which quadrant -</p> <p>(i) <math>\frac{\pi}{3}</math>      (ii) <math>\frac{5\pi}{3}</math>      (iii) <math>\frac{2\pi}{7}</math>      (iv) <math>\frac{5\pi}{6}</math>      (v) <math>\frac{7\pi}{5}</math></p>	<p><b>Q 12)</b> Match the following columns :</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>a) <math>\cos 307^\circ</math></td> <td>i) <math>\frac{3}{5}</math></td> </tr> <tr> <td>b) <math>\cot 37^\circ</math></td> <td>ii) <math>-\frac{3}{5}</math></td> </tr> <tr> <td>c) <math>\cos 127^\circ</math></td> <td>iii) <math>\frac{4}{3}</math></td> </tr> <tr> <td>d) <math>\cos(-37^\circ)</math></td> <td>iv) <math>-\frac{4}{3}</math></td> </tr> <tr> <td>e) <math>\tan 307^\circ</math></td> <td>v) <math>\frac{4}{5}</math></td> </tr> </tbody> </table>	a) $\cos 307^\circ$	i) $\frac{3}{5}$	b) $\cot 37^\circ$	ii) $-\frac{3}{5}$	c) $\cos 127^\circ$	iii) $\frac{4}{3}$	d) $\cos(-37^\circ)$	iv) $-\frac{4}{3}$	e) $\tan 307^\circ$	v) $\frac{4}{5}$
a) $\cos 307^\circ$	i) $\frac{3}{5}$											
b) $\cot 37^\circ$	ii) $-\frac{3}{5}$											
c) $\cos 127^\circ$	iii) $\frac{4}{3}$											
d) $\cos(-37^\circ)$	iv) $-\frac{4}{3}$											
e) $\tan 307^\circ$	v) $\frac{4}{5}$											

DPP Daily Practice Problem <b>Physics</b>	<b>Topic : Mathematical Tools</b> DPP No. 4	Time : 30 min. Total Marks : 48 Max.	
<b>Type of Questions</b>			
Single choice Objective ('-1' negative marking) Q. 1 to Q. 11			
Subjective Questions ('-1' negative marking) Q. 12			
<b>Q 1)</b> If $f(x) = 3x + 4x^2 - 2$ , then value of $f(-1)$ is			
A) 1	B) -1		
C) 2	D) 5		
<b>Q 2)</b> If $f(x) = \sin^2 x - \cos^2 x$ , Then find $f(\pi/12)$			
A) $\frac{\sqrt{3}}{2}$	B) $-\frac{\sqrt{3}}{2}$		
C) $\frac{1}{2}$	D) $-\frac{1}{2}$		
<b>Q 3)</b> If $f(x) = \frac{x+1}{\frac{x}{1}-1}$ , Find the value of $f(x) + f(-x)$ is			
A) $2(1+x^2)$	B) $2 \frac{(1-x^2)}{(1+x^2)}$		
C) $2 \frac{(1+x^2)}{(1-x^2)}$	D) $\frac{(1+x^2)}{(1-x^2)}$		
<b>Q 4)</b> $f(x) = \tan x$ then the value of $f\left(\frac{\pi}{4}\right)$			
A) 2	B) 3		
C) 1	D) None of these		
<b>Q 5)</b> If $g(x) = e^{2x} + e^x - 1$ and $h(x) = 3x^2 - 1$ , the value of $g(h(0))$ is :			
A) $\frac{1}{e^2} + e - 1$	B) $\frac{1}{e^2} + \frac{1}{e} - 1$		
C) $e^2 + e - 1$	D) $\frac{1}{e^2} + \frac{1}{e}$		
<b>Q 6)</b> If $f(x) = \sin^3 x - \cos(2x)$ , then the value of $f\left(\frac{\pi}{2}\right)$ is -			
A) 2	B) 0		
C) -2	D) 1		
<b>Q 7)</b> If $f(x) = x^2$ and $g(x) = \sin(2x)$ ; the value of $g(f(\sqrt{y}))$ =			
A) $\sin y$	B) $\sin 2y$		
C) $\sin 2\sqrt{y}$	D) $\sin^2(2y)$		
<b>Q 8)</b> If $f(x) = \sin x + \cos x$ , then $\frac{f(x)+f(-x)}{f(x)-f(-x)}$			
A) $\frac{\sin x + \cos x}{\sin x - \cos x}$	B) $\cot x$	C) $\tan x$	D) $\frac{\sin x - \cos x}{\sin x + \cos x}$
<b>Q 9)</b> If $f(x) = x + 1$ ; $g(z) = z^2$ ; $h(y) = 3y$ , The value of $f(h(g(a)))$ is :			
A) $(3a+1)^2$	B) $3a^2 + 1$	C) $3(a^2 + 1)$	D) $3a^2$
<b>Q 10)</b> If $f(x) = \frac{x^3-1}{x^2+1}$ , then the value of $f((1))$ is			
(i) 2	(ii) -2	(iii) 1	(iv) -1
<b>Q 11)</b> If $f(x) = 5x - 5$ , $g(x) = \sin^3 x + 2\cos^3 x$ The value of $f(g(f(1)))$ is			
A) 5	B) 0	C) 10	D) -5
<b>Q 12)</b> If $f(x) = \frac{x-1}{x+1}$ , Find the value of			
A) $f(1)$	B) $f(0)$		
C) $f(f(1))$	D) $f(2)$		

**Type of Questions**

**Single choice Objective ('-1' negative marking) Q. 1 to Q. 11**

**Subjective Questions ('-1' negative marking) Q. 12 to Q. 14**

- Q 1)** If  $f(x) = \frac{x}{(x^2+a^2)^{3/2}}$ , where a is a constant. The value of  $f(\frac{a}{\sqrt{2}})$  is  
 A)  $\frac{2^{3/2}}{3a^2}$       B)  $\frac{2a^2}{3\sqrt{3}}$   
 C)  $\frac{2}{3\sqrt{3}a^2}$       D)  $\frac{3\sqrt{3}}{2}a^2$
- Q 2)** If  $f(x) = \left(\frac{\sin x}{1-\cos^2 x}\right)(\operatorname{cosec} x + \cot x)(\operatorname{cosec} x - \cot x)$ , Then find  $f(\pi/2)$   
 A) 1      B) -1  
 C) -2      D) *None of these*
- Q 3)** If  $f(x) = x^3$ ;  $g(y) = y - 1$ ;  $h(z) = z + 1$   
 The value of  $f(g(h(x)))$  is :  
 A)  $x^3 + 1$       B)  $x^3 - 1$   
 C)  $x + 1$       D)  $x^3$
- Q 4)** If  $f(x) = x^2 - 1$  and  $g(x) = \frac{1}{x} + 1$ ; the value of  $f\left(\frac{1}{g(x)}\right)$  is  
 A)  $\frac{(x+1)^2}{2x+1}$       B)  $\frac{-2x-1}{(x+1)^2}$   
 C)  $\frac{1+2x}{(x+1)^2}$       D)  $\frac{(x+1)^2}{1-2x}$
- Q 5)** If  $y = x^3 + 2x^2 + 7x + 8$  then  $\frac{dy}{dx}$  will be –  
 A)  $3x^2 + 2x + 15$       B)  $3x^2 + 4x + 7$   
 C)  $x^3 + 2x^2 + 15$       D)  $x^3 + 4x + 7$
- Q 6)** If  $y = \frac{1}{x^4}$  then,  $\frac{dy}{dx}$  will be  
 A)  $\frac{4}{x^3}$       B)  $4x$   
 C)  $-\frac{4}{x^5}$       D)  $\frac{4}{x^5}$
- Q 7)** 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)  $2x \cos x$
- Q 8)** If  $y = e^x \cdot \cot x$  then  $\frac{dy}{dx}$  will be  
 A)  $e^x \cdot \cot x - \operatorname{cosec}^2 x$       B)  $e^x \cdot \operatorname{cosec}^2 x$   
 C)  $e^x [\cot x - \operatorname{cosec}^2 x]$       D)  $e^x \cot x$
- Q 9)** If  $y = x \ln x$  then  $\frac{dy}{dx}$  will be  
 A)  $\ln x + x$       B)  $1 + \ln x$       C)  $\ln x$       D) 1
- Q 10)**  $f(x) = \sin^2 x - \cos^2 x$ , then the value of  $f'\left(\frac{\pi}{4}\right)$  is  
 (i) 2      (ii) 0      (iii) 1      (iv) *none of these*
- Q 11)** If  $y = \tan x \cos^2 x$ , then  $\frac{dy}{dx}$  will be –  
 A)  $1 + 2\sin^2 x$       B)  $1 - 2\sin^2 x$       C) 1      D)  $2\sin^2 x$
- Q 12)**  $y = 4 + 5x + 7x^3$ . Find  $\frac{dy}{dx}$
- Q 13)**  $y = x + x^2 + \frac{1}{x} + \frac{1}{x^3}$ . Find  $\frac{dy}{dx}$
- Q 14)**  $y = x^2 + \frac{1}{x^2}$ . Find  $\frac{dy}{dx}$

<b>DPP</b> <b>Daily Practice Problem</b> <b>Physics</b>	<b>Topic : Mathematical Tools</b> <b>DPP No. 6</b>	<b>Time : 30 min.</b> <b>Total Marks : 56 Max.</b>
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**Type of Questions**
**Single choice Objective ('-1' negative marking) Q. 1 to Q. 11**
**Subjective Questions ('-1' negative marking) Q. 12 to Q. 14**

- Q 1)** Double differentiation of displacement w. r. t. time is  
 A) *acceleration*      B) *velocity*  
 C) *force*      D) *none*
- Q 2)** Find value of  $\sin^2 15^\circ + \sin^2 645^\circ$ :  
 A)  $\frac{1}{2}$       B) 1  
 C)  $\frac{1}{\sqrt{3}}$       D) *None of these*
- Q 3)** Slope of graph  $y = \tan x$  drawn between  $y$  and  $x$ , at  $x = \frac{\pi}{4}$  is :  
 A) 0      B) 1  
 C) 2      D)  $\frac{1}{\sqrt{2}}$
- Q 4)** The value of  $f'(x)$  at  $x = 1$  for the function  $f(x) = x \log_e x$  is  
 A)  $\log_e 2$       B) 2  
 C) 1      D) 0
- Q 5)** If  $y = \sin x$ , then  $\frac{d^2y}{dx^2}$  will be :  
 A)  $\cos x$       B)  $\sin x$   
 C)  $-\sin x$       D)  $\sin x + C$
- Q 6)** If  $y = x^3$  then  $\frac{d^2y}{dx^2}$  is -  
 A)  $6x^2$       B)  $6x$   
 C)  $3x^2$       D)  $3x$
- Q 7)** 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)  $2\cos^2 \theta + \sec^2 \theta$
- Q 8)** Differentiation of  $\sin(x^2 + 3)$  w.r.t.  $x$   
 A)  $\cos(x^2 + 3)$       B)  $2x \cos(x^2 + 3)$   
 C)  $(x^2 + 3)\cos(x^2 + 3)$       D)  $2x \cos(2x + 3)$
- Q 9)** 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)  $-\cos x - \frac{2}{x} + 2e^{2x}$
- Q 10)** If  $f(x) = x^3 \ln(x)$  Then  $f'(x)$  is :  
 (i)  $x^2$       (ii)  $x^2(1 + 3x^2 \ln(x))$       (iii)  $4x^2$       (iv) *None of these*
- Q 11)** If  $y = e^{kt}$  then  $\frac{dy}{dx}$  will be  
 A)  $e^{kt}$       B)  $e^{kt}/k$       C)  $te^{kt}$       D)  $ke^{kt}$
- Q 12)**  $y = \frac{1}{x+1}$ . Find  $\frac{dy}{dx}$
- Q 13)** Differentiation of  $\sin(x^2)$  w.r.t  $x$  is -
- Q 14)**  $y = (2x+3)^4 - (7x-1)^2 + \frac{2}{(3x-1)^3} + \frac{4}{(3x-2)^3}$ . Find  $\frac{dy}{dx}$

<b>DPP</b> <b>Daily Practice Problem</b> <b>Physics</b>	<b>Topic : Mathematical Tools</b> <b>DPP No. 7</b>	<b>Time : 30 min.</b> <b>Total Marks : 52 Max.</b>
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**Type of Questions**
**Single choice Objective ('-1' negative marking) Q. 1 to Q. 11**
**Subjective Questions ('-1' negative marking) Q. 12 to Q. 13**

- Q 1)** If velocity of particle is given by  $v = 2t^4$  then its acceleration ( $dv/dt$ ) at any time  $t$  will be given by :
- A)  $8t^3$       B)  $8t$   
C)  $-8t^3$       D)  $t^2$
- Q 2)** If  $y = \sin x$  &  $x = 3t$  then  $(dy/dt)$  will be -
- A)  $3\cos(x)$       B)  $3\cos(3t)$   
C)  $\cos(x)$       D)  $-\cos x$
- Q 3)** If  $\alpha = \sec(3\beta)$  then  $\frac{d\alpha}{d\beta}$  will be -
- A)  $3 \sec(3\beta) \tan(3\beta)$       B)  $3\alpha^2 \sin(3\beta)$   
C)  $\sec(3\beta) \tan(3\beta)$       D)  $3 \sec^2(3\beta)$
- Q 4)** The derivative of  $f(x) = x^3 + 3x \ln x + 5$  with respect to  $x$  is
- A)  $3x^2 + 3x$       B)  $3x^2 + 3 \ln x + 5$   
C)  $3x^2 + 3 \ln x + 3$       D)  $3x^2 3 \ln x + 8$
- Q 5)** If  $f(x) = x^3 \ln(x)$  then  $f'(x)$  is :
- A)  $x^2 + 3x^2 \ln(x)$       B)  $x^2(1 + \ln x)$   
C)  $4x^2$       D) None of these
- Q 6)** Differentiation of  $\sin(x^2)$  w.r.t.  $x$  is-
- A)  $\cos(x^2)$       B)  $2x \cos(x^2)$   
C)  $x^2 \cos(x^2)$       D)  $-\cos(2x)$
- Q 7)** If  $y = e^{kt}$  then  $\frac{dy}{dx}$  will be
- A)  $e^{kt}$       B)  $e^{kt}/k$   
C)  $te^{kt}$       D)  $ke^{kt}$
- Q 8)**  $y = \sin^3 x$   $\frac{dy}{dx}$  will be
- A)  $3\sin^2(x)\cos(x)$       B)  $3\sin(x)\cos(x)$   
C)  $3\sin^2(x)$       D)  $\cos^3(x)$
- Q 9)** The displacement of a body at any time  $t$  after starting is given by  $s = 15t - 0.4t^2$  The velocity of the will be  $7 \text{ ms}^{-1}$  after time:
- A) 20 sec      B) 15 sec      C) 10 sec      D) 5 sec
- 
- If  $S = ut + \frac{1}{2}at^2$
- S=displacement, u= intial velocity(constant), v=final velocity, a=acceleration(constant)
- Q 10)** Differentiation of 'S' w.r.t. 't' will be-
- (i)  $u + \frac{at}{2}$       (ii)  $u + at$       (iii)  $u + 2at$       (iv)  $\frac{ut^2}{2} + \frac{at^3}{6}$
- Q 11)** Differentiation of above result w.r.t. 't' will be-
- A)  $a$       B)  $u + a$       C)  $u$       D) none
- Q 12)**  $y = (2x+3)^4 - (7x-1)^2 + \frac{2}{(3x-1)^3} + \frac{4}{(3x-2)^3}$  Find  $\frac{dy}{dx}$
- Q 13)** Find  $\frac{dy}{dx}$  of the following :  $y = \sin x^3$

**Type of Questions**

**Single choice Objective ('-1' negative marking) Q. 1 to Q. 10**

**Subjective Questions ('-1' negative marking) Q. 11 to Q. 14**

- Q 1)**  $\int \left[ (x)^{1/3} - \frac{1}{(x)^{1/3}} \right] dx$  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)  $\frac{3}{4}x^{4/3} - \frac{3}{2}x^{2/3} + c$
- Q 2)**  $\int x^3 dx$  can be equal to :
- A)  $3x^2$       B)  $\frac{x^4}{4} + c$   
C)  $\frac{x^4}{4} - 3$       D)  $4x^3$
- Q 3)**  $\int x^2 dx$  is be equal to :
- A)  $\frac{x^3}{3} + c$       B)  $\frac{2x^3}{3}$   
C)  $2x$       D) *Meaningless*
- Q 4)**  $\int_0^{\pi/2} \cos 3t dt$  is
- A)  $\frac{2}{3}$       B)  $-\frac{1}{3}$   
C)  $-\frac{2}{3}$       D)  $\frac{1}{3}$
- Q 5)**  $\int_{-1}^1 x^5 dx$
- A) 0      B)  $\frac{1}{3}$   
C)  $\frac{1}{6}$       D) 2
- Q 6)**  $\int 2 \sin x dx$  is equal to
- A)  $-2 \cos x + C$       B)  $2 \cos x + C$   
C)  $-2 \cos x$       D)  $2 \cos x$
- Q 7)** if  $y = x^2 \sin x^3$  then  $\int y dx$  will be
- A)  $-\cos x^3 + C$       B)  $-\frac{\cos x^3}{3} + C$   
C)  $\cos x^3 + C$       D)  $\frac{\cos x^3}{3} + C$
- Q 8)** The value of  $\int_0^{\pi/2} \sin^2 x dx$  will be
- A) 1      B) 0  
C)  $\frac{\pi}{4}$       D)  $\frac{\pi}{2}$
- Q 9)** The area of region between  $y = \sin x$  and  $x - axis$  in the interval  $\left[0, \frac{\pi}{2}\right]$  will be :
- A) 1      B) 0      C) 2      D) -1
- Q 10)**  $\int (x^2 + \sin x) dx =$
- A)  $3x + \cos x + C$       B)  $\frac{x^3}{3} - \cos x + C$   
C)  $\frac{x^3}{3} + \cos x + C$       D)  $3x - \cos x + C$
- Q 11)** Solve the following integrals :
- $\int \frac{\cos^3 \theta}{1 - \sin \theta} d\theta$
- Q 12)** Integrate the following :
- $\int (2t - 4)^{-4} dt =$
- Q 13)**  $\int_0^1 \frac{x-1}{x^2-1} dx$
- Q 14)**  $\int (x+1) dy$  if  $y = 6x^2$

<b>DPP</b> <b>Daily Practice Problem</b> <b>Physics</b>	<b>Topic : Mathematical Tools</b> <b>DPP No. 9</b>	<b>Time : 30 min.</b> <b>Total Marks : 64 Max.</b>
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**Type of Questions**
**Single choice Objective ('-1' negative marking) Q. 1 to Q. 8**
**Subjective Questions ('-1' negative marking) Q. 9 to Q. 16**

- Q 1)**  $\int (x^2 + \sin x) dx =$
- A)  $3x + \cos x + C$   
B)  $\frac{x^3}{3} - \cos x + C$   
C)  $\frac{x^3}{3} + \cos x + C$   
D)  $3x - \cos x + C$
- Q 2)** Find area under the curve  $y = 5e^x$  and the x=2 :
- A)  $5e^2$   
B)  $5(e^2 - 1)$   
C)  $e^2 - 1$   
D)  $\frac{e^2 - 1}{5}$
- Q 3)** Integrate  $x^2 - \cos x + \frac{1}{x}$  w.r.t.x .
- A)  $\frac{x^2}{2} + \sin x + \log_e x + c$   
B)  $\frac{x^3}{3} - \cos x + \log_e x + c$   
C)  $\frac{x^3}{3} - \sin x + \log_e x + c$   
D)  $\frac{x^2}{2} + \cos x + \log_e x + c$
- Q 4)** Evaluate  $\int_1^\infty \frac{1}{x^4} dx$
- A)  $\frac{1}{3}$   
B) 2  
C) 3  
D)  $\frac{1}{2}$
- Q 5)** Evaluate  $\int \frac{1}{\sqrt{x-1}} dx$ .
- A)  $3\sqrt{x-1} + c$   
B)  $2\sqrt{x-1} + c$   
C)  $\frac{2}{\sqrt{x-1}} + c$   
D)  $\frac{3}{\sqrt{x-1}} + c$
- Q 6)** Integrate  $\sqrt[5]{x}$  w.r.t.x .
- A)  $\frac{5}{6}x^{6/5} + c$   
B)  $\frac{1}{5}x^{1/5} + c$   
C)  $\frac{1}{6}x^{6/5} + c$   
D)  $\frac{1}{5}x^{6/5} + c$
- Q 7)** Integrate  $\sqrt{x} - \frac{1}{\sqrt{x}}$  w.r.t.x .
- A)  $\frac{2}{5}x^{5/2} - 2x^{1/2} + c$   
B)  $\frac{2}{7}x^{5/2} + 2x^{3/2} + c$   
C)  $\frac{2}{3}x^{3/2} - 2x^{1/2} + c$   
D)  $\frac{2}{3}x^{3/2} + 2x^{1/2} + c$
- Q 8)** Evaluate the following  $\int_0^{\pi/2} \sin x \cos x dx$
- A)  $\frac{1}{2}$   
B)  $\frac{1}{3}$   
C)  $\frac{1}{\sqrt{2}}$   
D)  $\frac{1}{4}$
- Q 9)** Evaluate  $\int_3^4 \frac{1}{x} dx$  .
- Q 10)** Evaluate  $\int_1^2 \frac{1}{1+y} dy$ .
- Q 11)** Evaluate  $\int_u^v mv dv$
- Q 12)** Evaluate  $\int x \cos x dx$ .
- Q 13)** Evaluate  $\int_{-\pi/2}^{+\pi/2} \cos x dx$
- Q 14)** Evaluate  $\int_0^{\pi/2} \cos^2 x dx$  .
- Q 15)** Evaluate  $\int_{-\pi/2}^{+\pi/2} \sin 2x dx$
- Q 16)** Evaluate  $\int_{-\pi/4}^{+\pi/4} \cos 2x dx$

<b>DPP</b> <b>Daily Practice</b> <b>Problem</b> <b>Physics</b>	<b>Topic : Mathematical Tools</b> <b>DPP No. 10</b>	<b>Time : 30 min.</b> <b>Total Marks : 56 Max.</b>
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**Type of Questions**
**Single choice Objective ('-1' negative marking) Q. 1 to Q. 8**
**Subjective Questions ('-1' negative marking) Q. 9 to Q. 14**

- Q 1)** If  $x = a(1 + \sin \theta)$  and  $y = a(1 - \cos \theta)$ . Find  $\frac{dy}{dx}$
- A)  $\tan \theta$       B)  $\tan 2\theta$   
 C)  $\tan \frac{\theta}{2}$       D)  $\sin \theta$
- Q 2)** Differentiate the  $\sin x^3$  w.r.t.  $x$ .
- A)  $3x \cos x^2$       B)  $3x^2 \cos x^3$   
 C)  $2x \cos x^2$       D)  $3x^2 \sin x^3$
- Q 3)** Differentiate the  $e^{-x} \cos x$  w.r.t.  $x$ .
- A)  $e^x(\cos x + \sin x)$       B)  $-e^{-x}(\cos x + \sin x)$   
 C)  $-e^x(\cos x + \sin x)$       D)  $e^x(\cos x - \sin x)$
- Q 4)** Differentiate the  $e^3$  w.r.t.  $x$ .
- A)  $3e^2$       B)  $3e^3$   
 C)  $2e^3$       D) zero
- Q 5)** The area in  $\text{m}^2$  of a blot of ink is growing such that after  $t$  second, its area is given by  $A = 2t^2 + \frac{t}{3} + 5$ . Determine the rate of increase of area at  $t=10$  second.
- A)  $20 \text{ m}^2 \text{ s}^{-1}$       B)  $30.5 \text{ m}^2 \text{ s}^{-1}$   
 C)  $40.3 \text{ m}^2 \text{ s}^{-1}$       D)  $25.4 \text{ m}^2 \text{ s}^{-1}$
- Q 6)** A metal ring is being heated such that its area in  $\text{m}^2$  at any time  $t$  second is given by  $A = 3t^2 + \pi$ . Determine the rate of increase of area at  $t=5$  second.
- A)  $10 \text{ m}^2 \text{ s}^{-1}$       B)  $20 \text{ m}^2 \text{ s}^{-1}$   
 C)  $30 \text{ m}^2 \text{ s}^{-1}$       D)  $40 \text{ m}^2 \text{ s}^{-1}$
- Q 7)** A particle starts rotating from rest. According to the equation :  $\theta = \frac{t^4}{60} - \frac{t}{4} + 7$  where  $\theta$  is in radian and  $t$  is in second. Calculate the angular velocity of the particle after 10 second.
- A)  $62.6 \text{ rad s}^{-1}$       B)  $66.4 \text{ rad s}^{-1}$   
 C)  $64.6 \text{ rad s}^{-1}$       D)  $60.6 \text{ rad s}^{-1}$
- Q 8)** Integrate  $\int_0^{\pi/4} \sec^2 x \, dx$ .
- A) 2      B) 1  
 C)  $\infty$       D) zero
- Q 9)** The area of the circle of radius  $r$  is  $\pi r^2$ . Prove that the rate of increase of area w.r.t. radius is equal to the circumference of the circle.
- Q 10)** Evaluate  $\int_{\infty}^R \frac{GM_e m \, dx}{x^2}$ .
- Q 11)** Evaluate  $\int_0^{\pi/6} \sin 3x \, dx$ .
- Q 12)** Evaluate  $\int_{-\pi/2}^{+\pi/2} \sin 2x \, dx$ .
- Q 13)** Evaluate  $\int_0^{\pi/2} \sin \theta \, d\theta$ .
- Q 14)** Integrate  $\sqrt{x}$  w.r.t.  $x$  between the limits 4 and 9.