

Class: 7

Sub: Opt. math

Final term exam

Full mark: 100

Time: 3 hrs.

Pass mark: 40

Group 'A'

[10×2×3=60]

1. Prove that:

i. $\frac{1}{1 - \sin \theta} + \frac{1}{1 + \sin \theta} = 2 \sec^2 \theta$

ii. $\frac{1 - \cos^2 \theta}{\sin^2 \theta}$

2. Factorize:

i. $\cos^3 \theta - 4 \cos \theta$

ii. $\sin^2 \theta + 11 \sin \theta + 30$

3. Simplify:

i. $\frac{1 - \sin A}{\cos A} + \frac{1 + \sin A}{\cos A}$

ii. $(\sin \theta + \cos \theta)^2 - \sin^2 \theta$

4. i. Find the slope of line passing through the points A(2,3) & B(4,5).

ii. Find the distance between the points A(5,0) & B(8,4).

5. i. Find the area of triangle with the given vertices A(2,2), B(6,2) & C(4,4)

ii. Find the Co-ordinates of a point which divides the line segment AB in the given ratio;

i. A(1,1) & B(4,4); Ratio = 1:2

6. Find the co-ordinates of the mid point of the line segment joining the points A & B:

i. A(2,6) & B(6,4)

ii. A(-5,4) & B(-1,2)

7. i. Find the ratio in which the point p divides AB internally where A(1,1), B(4,4) & P(2,2).

ii. If $f(x) = x^4 + x^3 + 4x = 7$ & $g(x) = 3x^4 + 4x^3 + 7x + 9$; find $f(x) + g(x)$

8. i. If $A = \{m, n, r\}$ & $B = \{2, 4, 6\}$, find $B \times A$.

ii. Find the value of x & y if:

$$(x, y=2) = (4, 5)$$

9. Find arithmetic mean of the following data:

i.

X	8	10	15	20	25
F	4	3	7	8	2

ii.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	2	8	5	7	10

10. i. If the arithmetic mean of 6, 10, p, 12 & 16 is 11. Find the value of P.

ii. If $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$ $B = \begin{bmatrix} -4 & -1 \\ -3 & -2 \end{bmatrix}$ find $2A+B$

Group 'B'

[10×4=40]

11. Find the value of x & y if:

$$\begin{bmatrix} 2x & 3 \\ 0 & y-1 \end{bmatrix} = \begin{bmatrix} 4 & 3 \\ 0 & 4 \end{bmatrix}$$

12. Define diagonal matrix. If $A = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$, $B = \begin{bmatrix} -2 \\ -1 \end{bmatrix}$ & $C = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$,

find $A + B + C$

13. Find the median of the following data:

x	20	25	30	35	4
F	7	9	10	12	14

14. The vertices of ΔABC are A(2,3), B(4,5) & C(6,2). Reflect it in x-axis.

15. The vertices of ΔABC are A(2,5), B(1,2) & C(4,2).

Translate ΔABC by the translation vector $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$

16. If A(1,1), B(4,3), P(2,1) & Q(5,3) are four points.

Prove that AB=PQ.

17. Find the positive square root of $7 + 2\sqrt{10}$

18. If $\sin \theta = \frac{3}{5}$, find the value of $\cos \theta$ & $\tan \theta$.

19. Find the Co-ordinates of the point on y-axis which are at a distance of 10 units from the point (6,6).

20. If the slope of the line joining (2,4) & (6,x) is $\frac{2}{3}$, find the value of x.

The End