

Roll No.

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PHM-1.1.2

REMEDIAL MATHS.

(B.Pharm., 1st Semester, 2054)

Time : 3 Hours

Maximum Marks : 40

Note :- Section A is compulsory. Attempt any *Four* questions from Section B and any *Three* questions from Section C.

Section-A

Marks : 1 Each

1. (a) If $A = 30^\circ$ verify that

$$\sin 3A = 3 \sin A - 4 \sin^3 A.$$

(b) Prove that :

$$\sin 75^\circ = \frac{\sqrt{6} + \sqrt{2}}{4}.$$

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(1) $A = 30^\circ$ $\cos 30^\circ$

$\sin 30^\circ = \frac{1}{2}$ (2)

(c) Find the value of

$\frac{\sin 70^\circ \cos 20^\circ + \sin 30^\circ \cos 0^\circ + \sin 45^\circ \cos 45^\circ}{1}$
 $+ \sin 60^\circ \cos 30^\circ$

(d) What is the order and degree of the following differential equation :

(i) $x \cdot dx + y \cdot dy = 0$

(ii) $x^2 \cdot \frac{d^2y}{dx^2} - xy \cdot \frac{dy}{dx} = y$

(e) Differentiate x^{28} from the first principle.

(f) Evaluate :

$$\int_0^{\pi/2} (5 \sin x + 2 \cos x) \cdot dx$$

(g) If x increase from 3 to 3.1 find the corresponding change in $y = 2x + 1$.

(h) Prove that :

$$\frac{1 - \sin \theta}{1 + \sin \theta} = (\sec \theta - \tan \theta)^2$$

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- (i) Write the formula for calculating the mean by short cut method.
- (j) A contractor employs three types of workers, male, female and children. To a male worker he pays Rs. 40 per day, to a female worker Rs. 32 per day and to a child worker Rs. 21 per day. What is the average wage per day paid by the contractor ?
- (k) Evaluate :

$$\int \frac{dx}{1 + \sin x}$$

- (l) $\begin{bmatrix} 2 & 2 \\ 0 & 2 \end{bmatrix}$ is an example of :

- (i) Scalar matrix
(ii) Null matrix
(iii) Diagonal matrix
(iv) None of these

(m) $\lim_{x \rightarrow 2} \frac{|x - 2|}{x - 2}$ exist or does not exist.

(n) Find the product of AB of two matrices A and B where

$$A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \text{ and } B = [2, 3, 4, 5].$$

(o) Find the slope of a line whose inclination is $\pi/6$.

Section-B Marks : $2\frac{1}{2}$ Each

2. Prove that :

$$\begin{aligned} \cos^2 A + \cos^2 B - 2 \cos A \cos B \cos (A + B) \\ = \sin^2 (A + B). \end{aligned}$$

3. Evaluate :

$$\int \frac{dx}{3 \sin x + 4 \cos x}$$

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4. The marks obtained out of 50 kg 102 students in a test were according to the following frequency table :

Marks	No. of Students
20	8
22	15
23	28
24	27
26	20
31	2
38	1
43	1

Obtain the median.

5. If

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 3 & -1 \\ 3 & 4 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & -3 & -5 \\ -1 & 3 & -5 \\ -1 & 3 & -5 \end{bmatrix}$$

calculate AB.

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6. Find the equation of the straight line which passes through the point (3, 4) and has intercept on the axes :

- (a) equal in magnitude but opposite in sign
- (b) such that their sum is 14.

Section-C

Marks : 5 Each

7. If $A + B + C = 180^\circ$, prove that :

$$\cos^2 A + \cos^2 B + \cos^2 C = 1 - 2 \cos A \cdot \cos B \cdot \cos C.$$

8. Given that :

$$y = \frac{5x}{(1-x)^{213}} + \cos^2(2x + 1).$$

Show that

$$\frac{dy}{dx} = \frac{5}{3}(1-x)^{-513} \cdot (3-x) - 2\sin(4x + 2).$$

9. Evaluate :

$$\int \sin^{-1} \sqrt{\frac{x}{a+x}} \cdot dx.$$

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10. From the following data compute arithmetic mean by direct and short-cut method :

Marks	No. of Students
0-10	5
10-20	10
20-30	25
30-40	30
40-50	20

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