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Roll No. | | | | | | | | | | | | |  Total No. of Pages : 03

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B.Pharmacy (Sem.–3)

# PHARMACEUTICAL MATHEMATICS

Subject Code : (PHM-233)

M.Code : [46125]

Time : 3 Hrs. Max. Marks : 80

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of FIFTEEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains FOUR questions carrying TEN marks each and students have to attempt any THREE questions.**

## SECTION-A

**1. Answer the following :**

a) Evaluate the determinant $\begin{vmatrix} 102 & 18 & 36 \\ 1 & 3 & 4 \\ 17 & 3 & 6 \end{vmatrix}$.

b) Find the adjoint of a matrix of order 2 whose elements are given by $a_{ij} = 3i + j$

c) For any two square matrices A and B, Is AB = BA? Justify your answer.

d) Find the value of tan 75°.

e) Evaluate the limit $\lim_{x \to 0}(x^2 + \sin x + 5)$

f) Show that $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$.

g) Find the derivative of the function $f(x) = e^{x^2} \sin x$ w.r.t. $x$.

h) If $\log (xy) = \cos x$, find $\frac{dy}{dx}$.

i) Evaluate $\int \log x \, dx$.



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j) Solve the integral $\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx$.

k) Find the mean and variance for first $n$ natural numbers.

l) Define Binomial distribution.

m) What are the measures of dispersion?

n) Six coins are tossed 6400 times. Using the Poisson distribution, find the approximate probability of getting six heads $r$ times.

o) If X is a normal variate with mean 30 and S.D. 5. Find P ($26 \le X \le 40$).

## SECTION-B

2. Prove that $\frac{\sec 8\theta - 1}{\sec 4\theta - 1} = \frac{\tan 8\theta}{\tan 2\theta}$.

3. Differentiate $\sqrt{\frac{(x-3)(x^2+4)}{3x^2+4x+5}}$ with respect to $x$.

4. Solve the integral $\int \frac{xe^x}{(1+x)^2} dx$.

5. Find the inverse of the matrix $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$.

6. Calculate mean, variance and standard deviation of the following frequency distribution :

| **Classes :** | 1-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| **Frequency :** | 11 | 29 | 18 | 4 | 5 | 3 |

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## SECTION-C

7. Prove that $\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = 4a^2b^2c^2$.

8. a) A set of 8 symmetrical coins was tossed 256 times and the frequencies of throws observed were as follows :

| **No. of heads** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| **Frequency of throws** | 2 | 6 | 24 | 63 | 64 | 50 | 36 | 10 | 1 |

Fit a binomial distribution to above data :

b) Write properties of Normal distribution curve.

9. a) If $y = x^{\sin x} + (\sin x)^x = 7$, then find $\frac{dy}{dx}$.

b) Show that $\sqrt{3}\,\text{cosec}\,20^0 - \sec 20^0 = 4$.

10. a) Solve the integral $\int \frac{x}{(x-1)(x-2)(x-3)}dx$.

b) Find the values of $a$ and $b$, so that the function defined by

$$f(x) = \begin{cases} 5 & x \le 2, \\ ax+b & 2 < x < 10 \\ 21 & x \ge 10 \end{cases}$$

is a continuous function.

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**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



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