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Total No. of Pages : 03

Total No. of Questions : 10

B.Pharma (2011 to 2016) (Sem.-3)
PHARMACEUTICAL MATHEMATICS
 Subject Code : BPHM-301
 Paper ID : [D1122]

Time : 3 Hrs.

Max. Marks : 80

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of **FIFTEEN** questions carrying **TWO** marks each. <http://www.punjabpapers.com>
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. Solve the following :**

- (a) Construct a 2×2 matrix $A = [a_{ij}]$ whose elements are given by $\frac{(i-j)^2}{3}$.

- (b) Compute the product of the matrices A and B , where

$$A = \begin{bmatrix} 5 & 1 \\ -1 & 2 \\ 3 & 1 \end{bmatrix} \text{ and } B = \begin{bmatrix} -1 & 3 & 6 \\ -1 & 0 & 1 \end{bmatrix}.$$

- (c) Find the value of $\sin 15^\circ$.

- (d) Prove that $\sin 3x = 3\sin x - 4\sin^3 x$.

- (e) Evaluate $\lim_{x \rightarrow 0} \frac{\sin 5x}{\tan 3x}$.

- (f) Find the derivative of $e^{2x} + (7 - 2x)^3$.

- (g) Calculate the median for the following :

Mid – Value	15	20	25	30	35	40	45	50	55
Frequency	2	22	19	14	3	4	6	1	1

(h) Find the mode of the data: 52, 75, 40, 70, 43, 40, 65, 35 and 41.

(i) Find the integrals: $\int \frac{x^3 - 1}{x^2} dx$.

(j) Find the integrals: $\int x e^{2x} dx$.

(k) Find the cofactor of each element of the determinant $\begin{vmatrix} 3 & 4 \\ 9 & -7 \end{vmatrix}$.

(l) Find the determinant $\begin{vmatrix} 0 & 3 & 2 \\ 5 & 4 & 7 \\ 4 & 2 & 8 \end{vmatrix}$.

(m) A perfect cubical die is thrown a large number of times in sets of 8. The occurrence of 5 or 6 is called a success. In what proportion of the sets you expect 3 successes.

(n) Find the mode of the following distribution : <http://www.punjabpapers.com>

Class	0-7	7-14	14-21	21-28	28-35	35-42	42-49
Frequency	19	25	36	72	51	43	28

(o) 6 dice are thrown 729 times. How many times do you expect atleast 3 dice to show a 5 or 6?

SECTION-B

2. Consider the following three data sets A, B and C.

$A = \{9, 10, 11, 7, 13\}$, $B = \{10, 10, 10, 10, 10\}$, $\{1, 1, 10, 19, 19\}$

(a) Calculate the mean of each data set.

(b) Calculate the standard deviation of each data set.

3. Find inverse of $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$.

4. Find the derivative of $\frac{5x}{\sqrt{1-x^2}} + \sin^2(2x+3)$.

5. Evaluate $\int \frac{2x-1}{(x-1)(x+2)(x-3)} dx$.

6. The following data are the number of seeds germinating out of 10 on damp filter for 80 sets of seeds. Fit a binomial distribution to these data :

x	0	1	2	3	4	5	6	7	8	9	10	Total
f	6	20	28	12	8	6	0	0	0	0	0	80

SECTION-C

7. (a) Solve the equations $2x + 3y = 10$ and $x + 6y = 4$, using Cramer's rule.

(b) Show that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$.

8. (a) Write the properties of Normal distribution curve.

(b) Prove that:
$$\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix} = 2 \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}.$$

9. (a) Find the value of other trigonometric functions if $\cos x = -\frac{1}{2}$, x lies in third quadrant.
<http://www.punjabpapers.com>

- (b) For what value of k following function is continuous at $x = 0$:

$$f(x) = \begin{cases} \frac{\sin 5x}{3x} & \text{if, } x \neq 0 \\ k & \text{if, } x = 0 \end{cases}.$$

10. (a) Find $\frac{dy}{dx}$ when $x = a \frac{1-t^2}{1+t^2}$, $y = b \frac{2t}{1+t^2}$.

(b) Evaluate the integral : $\int x \log (1+x) dx$.