B. Pharm Second Semester

35148 : Mathematics - 2.6

P. Pages : 2 **AU - 0663**

Time : Three Hours Max. Marks : 60

Notes : 1. All question carry equal marks.
2. Answer **any five** question from given seven Questions.
3. Use of calculator is permissible.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Attempt **any two** of the following.

a) The area of circle is 36π sq.cm find the angle made by an arc of length 8 cm at the centre of circle in degree measure. 3

b) Prove that $\sin^2 A + \cos^4 A = \cos^2 A + \sin^4 A$ 3

c) If $\cos\theta = 0.4$ find the value of $\cos 3\theta$. 3

b) Evaluate **any one** of the following.

a) Find $\lim_{x \to \pi/3} \frac{\sqrt{3} - \tan x}{\pi - 3x}$ 6

b) Prove that $\lim_{x \to a} \frac{x^n - a^n}{x - a} = n \cdot a^{n-1}$ 6

2. Evaluate **any three** of the following.

a) Find $\frac{dy}{dx}$ if $y = \log\left[\frac{\sin x}{1 + \cos x}\right]$ 4

b) Discuss continuity of 4

$$f(x) = \frac{12^x - 4^x - 3^x + 1}{x^2}, \quad x \neq 0$$

$$= \log 12, \quad x = 0 \text{ at } x = 0$$

c) Find $\frac{dy}{dx}$ if $y = \frac{1 - \sqrt{x}}{1 + \sqrt{x}}$ 4

d) Evaluate $\lim_{x \to 0} = \frac{\sqrt{a+x} - \sqrt{a-x}}{x}$ 4

3. Attempt **any three** of the following.

a) If $x^y = e^{x-y}$ then show that $\frac{dy}{dx} = \frac{\log x}{(1 + \log x)^2}$ 4

b) Evaluate $\int x \cdot \sec^2 x \cdot dx$ 4

c) Differentiate x^3 using first principle of derivative. 4

d) Evaluate $\int (\tan x + \cot x)^2 dx$ 4

4. Evaluate any two of the following.

a) If $0 \le a \le 2a$ then prove that $\int_0^{2a} f(x)dx = \int_0^a f(x)dx + \int_0^a f(2a - x)dx$ 6

b) Solve the differential equation $(x - y)\cdot\frac{dy}{dx} = x + y$ 6

c) Show that $y = x^2 \cdot e^x$ is solution of differential equation 6

$$x^2\frac{d^2y}{dx^2} - x\cdot\frac{dy}{dx} - 2y\cdot(x+1) = 0$$

5. Evaluate any three of the following.

a) A die is thrown find the probability of getting 4
i) a prime Number ii) A multiple of 3

b) Tickets numbered 1 to 20 are mixed together and one tickets is drawn at random find the probability that ticket is of numbered multiple of 3 or 7. 4

c) Write notes on Pie – diagram. 4

d) Discuss in brief the Histogram. 4

6. Attempt any two of the following.

a) The Mean and S. D. of x are 46 and 3.6 and that of y are 49 and 7.3 find the equation of two lines of regression if coefficient of correlation 0.75. 6

b) Find the mode and median of following data. 6

Class	60 – 90	90 – 120	120 – 150	150 – 180	180 – 210	210 – 240
Freq.	12	23	43	27	18	14

c) If 0 is an acute angle between the two lines of regression then prove that 6

$$\tan\theta = \frac{1 - \gamma^2}{\gamma}\cdot\frac{\sigma x\cdot\sigma y}{\sigma x^2 + \sigma y^2}$$

7. Evaluate any one of the following.

a) Find mean and coefficient of variance for following data using step deviation method. 12

Class	100–150	150–200	200–250	250–300	300–350	350–400	400–450
Freq.	25	75	125	175	125	85	60

b) Find the equation of line of regression of x on y for following data. 12

x :	105	104	102	101	100	99	98	96	93	92
y :	101	103	100	98	95	96	104	92	97	94

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