AV – 2294

First Year B. Pharm. (Annual Pattern) Examination

(New Course)

MATHEMATICS AND STATISTICS

Paper – 1–T–7

(USC – 35007)

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) All questions carry equal marks.
(2) Answer any **Eight** questions.
(3) Use of slide rule, logarithmic tables, Steam tables, Mollier's Chart, Drawing instrument, Thermodynamic table for moist air, Psychrometric Charts and Refrigeration charts is permitted.
(4) Use of simple calculator is permitted.
(5) Use pen of Blue/Black ink/refill only for writing the answer book.

1. Solve the following (any **Two**) :—

(i) Evaluate

$$\lim_{x \to 0} \frac{1 - \cos x}{x^2}$$ 5

(ii) Evaluate

$$\lim_{x \to 0} \frac{\sqrt{2} - \sqrt{1 + \cos x}}{\sin^2 x}$$ 5

(iii) Evaluate

$$\lim_{x \to 0} \frac{1 - \cos 2x + \tan^2 x}{x \sin x}$$ 5

2. Solve the following :—

(i) If $f(x) = \frac{2 \sin x - \sin 2x}{x^3}$ for $x \neq 0$

$= K$ for $x = 0$

is contineous at $x = 0$ then find value of k. 5

(ii) Discuss the continuity of function at $x = \pi/2$ where f (x) is defined as

$$f(x) = \frac{1 - \sin x}{(n - 2x)^2} \qquad \text{for } x \neq \pi/2$$

$$= \frac{1}{8} \qquad \text{for } x = \pi/2$$

5

3. Solve the following

(i) Find derivative of sin x w. r. t. x by first principle of derivatives. 5

(ii) If $y = \log (\text{cosec } x - \cot x)$ Find $\frac{dy}{dx}$. 5

4. Solve the following

(i) If $y = x^x$ find $\frac{dy}{dx}$ 5

(ii) If $x = a(\theta + \sin\theta)$ $y = a(1 - \cos\theta)$, Find $\frac{dy}{dx}$. 5

5. Examine the function for maxima and minima $f(x) = 2x^3 - 3x^2 - 12x + 12$. 10

6. Solve the following (any **Two**) :—

(i) Evaluate $\int \frac{\sin x}{1 + \sin x}\, dx$ 5

(i) Evaluate $\int \frac{e^x (1 + x)}{\cos^2 (x\, e^x)}\, dx$ 5

(iii) Evaluate $\int_0^{\pi/2} x \cos x \, dx$ 5

7. Solve the following

(i) Find the order and degree of differential equation

$$\sqrt{\frac{dy}{dx} + y} = \frac{d^2y}{dx^2} + 2x\,\frac{dy}{dx}$$ 5

(ii) Solve the D. E.

$$\frac{dy}{dx} = \sin(x + y) + \sin(x - y)$$ 5

8. Solve the following :—

(i) Find L { t sin t} 5

(ii) Find L $\{t^2\, e^{3t}\}$ 5

9. Solve the following :—

(i) Find mean, mode and median from the following data :—

class :	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200
Freq. :	12	18	26	14	6

6

(ii) Write short note on following :—

(a) Pidiagram (b) Bar diagram. 4

10. Find coefficient of correlation between height of father and height of son from given data.

Height of father (X)	Height of son (Y)
160	165
163	168
165	163
168	170
170	175
173	170
175	180

10