Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. Pharm. – SEMESTER – I (OLD Syllabus) • EXAMINATION – SUMMER • 2015

Subject Code: 210006 **Date: 08-06-2015**

Subject Name: Elementary (Remedial) Mathematics

Time: 02:30 pm - 05:30 pm **Total Marks: 80**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 (a) Solve the following system of equations using inverse of a matrix : **06**

$$x + y + z = 3$$
$$2x + y + z = 4$$
$$x + 2y + 3z = 6$$

(b) Show that if the sum of the roots of the equation $\frac{1}{x+a} + \frac{1}{x+b} = \frac{1}{c}$ is zero then the product of the roots is $-\frac{1}{2}\left(a^2 + b^2\right)$. **05**

(c) Solve by Cramer's rule $\begin{aligned} x + 2y &= -4 \\ 5x + 3y &= 1 \end{aligned}$ **05**

Q.2 (a) Find mean and standard deviation of the following data : **06**

Protein intake/day	15-25	25-35	35-45	45-55	55-65	65-75	75-85
Number of families	30	40	100	110	80	30	10

(b) In a pharmaceutical factory, three machines A, B and C manufacture 30%, 45% and 25% of the total product respectively. Of these outputs machine A, B and C produce 4%, 3% and 2% respectively, are defective tablets. A tablet is picked at random and is found to be defective. What is the probability that the tablet was produced by the machine B? **05**

(c) If the probability of a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals **05**

(i) Exactly 2.

(ii) more than 2 individuals

will suffer a bad reaction.

Q.3 (a) In a group of students there are 4 girls and 6 boys. In how many ways a committee of 5 members can be formed such that **06**

(i) There are at least 3 girls.

(ii) There are at the most 3 boys in the committee.

(b) The third term of an arithmetic progression (A.P.) is 10 and its 10th term is 31. Find the sum of first 50 terms of this A.P. **05**

(c) Find the first term in the expansion of $\left(x^2 - \frac{2}{x}\right)^6$. **05**

Q.4 (a)

(i) Prove that $\sin 2A = \dfrac{2\tan A}{1+\tan^2 A}$. **03**

(ii) Show that **03**

$$4\sin\frac{\pi}{6}\sin^2\frac{\pi}{3} + 3\cos\frac{\pi}{3}\tan\frac{\pi}{4} + \cos ec^2\frac{\pi}{2} = 2\sec^2\frac{\pi}{4}$$

(b) If $\sin A = \dfrac{3}{5}, \cos B = -\dfrac{12}{13}$, where A and B both lie in second quadrant, find the value of $\sin(A+B)$. **05**

(c) Prove that $\dfrac{\log 25 - \log 125 + \frac{1}{2}\log 625}{3\log 5} = \dfrac{1}{3}$ **05**

Q.5 (a)

(i) Find the area of the triangle whose vertices are (4, 4), (3, -2) and (-3, 16). **03**

(ii) Show that the vertices of a (7, 9), (3, -7) and (-3, 3) form a right angled isosceles triangle. **03**

(b) A point P(x, y) moves such that its distance from the fixed point (3, 2) remains 4 unit. Find the equation of its locus. **05**

(c) Find the equation of the line passing through the points (2, 3) and (5, -2). **05**

Q. 6 (a)

(i) Find the limit if it exists $\lim\limits_{x\to 3}\dfrac{\sqrt{x^2+7}+\sqrt{3x-5}}{x+2}$ **03**

(ii) Find $\dfrac{dy}{dx}$ for the function $y = 5^{x^5}$ **03**

(b) (i) Differentiate the following w.r.t. x **03**

$$x^3 + y^3 + 3x^2 y = a^3$$

(ii) Find $\dfrac{dy}{dx}$, if $x = at^2$, $y = 2at$ **02**

(c) Find $\dfrac{d^2y}{d\theta^2}$ when θ = 0 given that y = 4 sec 2 θ **05**

Q.7 (a) **06**

Evaluate $\displaystyle\int \frac{3x-5}{x^2-x-2}dx$

(b) (i) Evaluate $\displaystyle\int x\log x\, dx$ **03**

(ii) Evaluate $\displaystyle\int_0^{\frac{\pi}{2}} \sin^2 x\, dx$ **02**

(c) Solve $\dfrac{dy}{dx} + \dfrac{4x}{x^2+1}y = \dfrac{1}{(x^2+1)^3}$ **05**

****