Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
B. Pharm. – SEMESTER – VIII • EXAMINATION – WINTER • 2016

Subject Code: 2280017   **Date: 02-12-2016**
Subject Name: Elementary 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)** A box contains 7 aspirin, 6 Analgin and 9 Paracetamol tablets. If one tablet is chosen at random from the box, find the probability that (i) it is an Aspirin (ii) it is not a Paracetamol. **06**

(b) Solve the following differential equations: **05**
   (i) $(x^2 + y^2)\,dy = xy\,dx$, (ii)$(x + y)\,dy + (x-y)\,dx = 0$

(c) Find the rank of the matrix A= $\begin{pmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{pmatrix}$ **05**

Q.2 **(a)** A bag contains 3 white and 4 black balls. Another box contains 2 white and 3 black balls. A bag is selected at random and then a ball is drawn from it. What is the probability that the ball drawn is a white one? **06**

(b) Solve the given differential equation: **05**
$(3y+2x+4)\,dx - (4x+6y+5)\,dy = 0$

(c) Find the sum of all natural numbers between 200 and 400 which are divisible by 7. **05**

Q.3 **(a)** The probability that an infection in cured by a particular antibiotic drug within 5 days is 0.75. Suppose four patients are treated by this antibiotic drug. What is the probability that (i) no patient is cured (ii) exactly two patients are cured (iii) at least two patients are cured. **06**

(b) If an A.P. the sum of n terms is $S_n = n\,(n + 7)$. Find T_{10} and S_{10}. **05**

(c) If A(0,3), B(4,0) and C(7,4) are three vertices of a square , find its fourth vertex. **05**

Q.4 **(a)** Show that $_nP_r = {}_{(n-1)}P_r + r \times {}_{(n-1)}P_{(r-1)}$ **06**

(b) Find three numbers in G.P. such that their sum is 35 and their product is 1000. **05**

(c) Prove that the points (2, 3), (6, 5) and (12, 8) are collinear. **05**

Q.5 **(a)** Solve the equation: (i) $(x+1)\,(x+2)\,(x+3)\,(x+4) =120$ **06**
                                (ii) $3^{x+2} + 3^{-x} = 10$

(b) Solve the simultaneous equations: **05**
$3x - 2y = 1$ and $3x^2 - 2y^2 + 5 = 0$

(c) Prove that $\log_{10} 800 = 2 + 3 \log_{10} 2$ **05**

Q. 6 **(a)** Solve the following simultaneous equations using Cramer's rule: **06**
$2x + 2y + z = 4$
$X + y + 2z = -1$
$3x + y + z = 2$

(b) Square matrices A and B are such that AB = A and BA = B. Prove that **05**
  (i) $A^2 = A$ and (ii) $B^2 = B$

(c) Find the standard deviation of the following distribution: **05**

Age	20-25	25-30	30-35	35-40	40-45	45-50
No. of persons	170	110	80	45	40	35

Q.7 **(a)** A car moves at the rate of 40 km / hour on a circular road having radius 2 km. **06**
Find the measurement in radians of the angle subtended by the car at the centre
of the circle in one minute.

(b) Prove that **05**
  $\cosec^4 \theta (1 - \cos^4 \theta) - 2 \cot^2 \theta = 1$

(c) Prove that $(\tan \theta + \cot \theta)^2 = \sec^2 \theta \cosec^2 \theta$ **05**

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