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GUJARAT TECHNOLOGICAL UNIVERSITY

B. Pharm. – SEMESTER – I • EXAMINATION – WINTER • 2015

Subject Code: 210006 Date: 13-01-2016

Subject Name: Elementary (Remedial) Mathematics

Time: 10:30 am - 01:30 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 simultaneous equation $\sqrt{\frac{X}{Y}} + \sqrt{\frac{Y}{X}} = \frac{5}{2}$; $x + y = 10$ **06**

(b) $Prove\ that \begin{vmatrix} x^2 & y^2 & z^2 \\ x & y & z \\ 1 & 1 & 1 \end{vmatrix} = -(x-y)(y-z)(z-x)$ **05**

(c) Solve by matrix inversion method **05**

$$-3X_1 + 6X_2 - 11X_3 = 14$$
$$3X_1 - 4X_2 + 6X_3 = -5$$
$$4X_1 - 8X_2 + 13X_3 = -17$$

Q.2 **(a)** If $\cos\theta = \frac{9}{41}$ determine the value of the other five trigometry ratios. **06**

(b) Show that $\tan\left(X + \frac{\pi}{4}\right)\tan\left(X - \frac{\pi}{4}\right) = -1$ **05**

(c) Prove that $\tan^{-1}\frac{1}{7} + \tan^{-1}\frac{4}{7} + \tan^{-1}\frac{9}{7} = \frac{\pi}{2}$ **05**

Q.3 **(a)** Find K if ${}_8P_5 = {}_7P_5 + K{}_7P_4$ **06**

(b) In a group of students there are 4 girls and 6 boys. In how many ways a committee of five members can be formed such that (i) there are at least 3 girls (ii) there are at the most 3 boys in the committee. **05**

(c) Find the coefficient of $X - 12$ in the expansion of $\left(X - \frac{1}{x^3}\right)^{12}$ **05**

Q.4 **(a)** (i) Find the diatance between the points (2, -1) and (3,2) **06**

(ii) If the distance between A(5,a) and B (2,6) is $3\sqrt{2}$ find the value of a.

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(b) Torrent pharma. company had sales of Rs2,00,000 in its first year of operation. If the sales increased by Rs 30,000 per year there after, find Torrent's sale in the fifth year and its total sales over the first 5 years of operation. **05**

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

Q.5 **(a)** (i) Fine the differential coefficient of $\frac{1}{x^4}$ **06**

(ii) Find the derivative of Y = $3\sqrt{x}$

(b) Find the differential coefficient of $Y = \frac{4\sin x}{x^7}$ **05**

(c) Find $\frac{dX}{dy}$ If $x^3 + y^3 - 3axy = 0$ **05**

Q. 6 **(a)** (i) Integrate the following function w.r.t x **06**

$2x - 3\cos x + e^x$

(ii)Integrate w. r. t. x $\frac{1+sinx}{1+cosx}$

(b) Evaluate: $\int \frac{2x+1}{\sqrt{x^2-2x+5}}$ **05**

(c) Integrate w. r. t. x $\frac{1}{\sqrt{9x^2-6x+5}}$ **05**

Q.7 **(a)** Define and explain types of random variable and probability distribution. Write properties of Bernoulli Experiment. **06**

(b) A box contains 2 white and 4 black balls. Another box contains 5 white and 7 black balls. A ball is selected at random from the first box and is transferred to the second. Then a ball is drawn from the second box. What is the probability that it is a white ball? **05**

(c) Two unbiased dice are tossed simultaneously. Find the probability that sum of numbers on the upper face of disc is 9 or 12. **05**

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