Roll no._____

BIOTECH III SEMESTER

SUPPLEMENTARY EXAMINATION 2019

Paper Code: MA251 /MC251 (Applied Mathematics)

Time: 3 Hrs.

max marks: 50

NOTE: All the questions are compulsory. All questions carry equal marks.

Q1. What are quartiles? Find all the quartiles for the data given below:

Class Interval	80-120	120-160	160-200	200-240	240-280	280-320	320-360	360-400
Frequency	10	140	390	265	98	35	14	05

Q2. Three technicians X, Y and Z service respectively 30%, 40% and 30% breakdowns when occur on an automated production line. The technician X makes an incomplete repair 1 time in 15, Y makes an incomplete repair 1 time in 10 and Z makes an incomplete repair 1 time in 20. For the next breakdown a repair made was found to be incomplete, find the probability that this repair was made by Y.

Q 3. If the average number of claims handled daily by an insurance company is 5, what proportion of days has less than 3 claims? What is the probability that there will be 4 claims in exactly 3 of the next 5 days? Assume that the number of claims on different days is independent.

Q 4. Define normal distribution and all its properties.

Q5. If the lifetime of a certain kind of automobile battery is normally distributed with a mean of 4 years and a standard deviation of 1 year, and the manufacturer wishes to guarantee the battery for 3 years, what percentage of the batteries will he have to replace under the guarantee?

Q6. Equation $f(x) = x^3 + 3x^2 + 4x - 1 = 0$ has a root near $x = 1/2$. Find a suitable function $g(x)$ to approximate the root using general iteration method $x_{n+1} = g(x_n)$. Also, calculate the root correct up to three places of decimal.

Q7. Define rate of convergence of an iterative method and find the rate of convergence of Newton Raphson method.

Q8. Use Secant method to approximate of the smallest positive real root correct up to three decimal places of the equation: $x^4 - x - 9 = 0$.

P.T.O

Q9. Apply Crout's method to solve the following linear system

$$2x_1 + x_2 + x_3 = 4$$

$$x_1 + 2x_2 + 2x_3 = 5$$

$$x_1 + 2x_2 + 9x_3 = 12$$

Q10. Use Gauss-Seidel method to solve the following system with initial guess as

$$x_1^{(0)} = 1, \ x_2^{(0)} = 1, \ x_3^{(0)} = 1.$$

$$5x_1 + 3x_2 - x_3 = 15, \quad -2x_2 + 4x_2 + x_3 = 12, \quad x_1 + 2x_2 + 6x_3 = 32.$$

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