Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech.**
BSCM1210

4th Semester Back Examination 2017-18
MATHEMATICS – IV
BRANCH : AERO,
AUTO, BIOMED, CHEM, CIVIL, ENV, FASHION, FAT, MANUFAC, MANUTECH, MARINE, MECH, METTA, MME, PE, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : C583

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions :** **(2 x 10)**

a) Find the error when X = 3.1255678 is Rounded into four significant digit.
b) How many positive real root present in $x^6 - x - 1 = 0$.
c) What is the rate of convergence of Secant method ?
d) Write the Condition when Gauss-Seidel method fails to solve the system of linear equations.
e) Find smallest positive root of the equation $x^3 - 5x + 1 = 0$ in the interval (0,1) after two iterations by Newton-Raphson method.
f) Evaluate $\int_0^1 \frac{dx}{x^2+4}$ using Trapezoidal rule.
g) Two dice are rolled once,find the probability of surface whose sum is at least eight.
h) What is the relation between Distribution function and Density function.
i) Let X be a continuous Random variable with distribution function is f(x) = a(1+x^2) $for\ 2 \le x \le 5$ and 0 for othervalue of x,then find 'a' .
j) The mean and variance of binomial distribution are 4 and 3 respectively Then find P(X≥ 1)

Q2 **a)** Using Newton's divided difference formula find f(8) from the following table **(5)**

x	5	7	11	13	21
f(x)	150	392	1452	2366	9702

b) For the function $\frac{1}{x}$, prove that the third divided difference with argument a, b and c is equal to $\frac{1}{abc}$. **(5)**

Q3 **a)** Evaluate y =$f(x)$ for $x = 7.5$ using the following table **(5)**

x	1	2	3	4	5	6	7	8
y =$f(x)$	1	8	27	64	125	216	343	512

b) Find two iteration of Gauss-Seidel method to solve the following system of equations **(5)**
27x + 6y – z = 85; x + y + 54z = 110; 6x + 15y + 2z = 72.

Q4 **a)** Find smallest positive root of the equation $x^3 + x - 1 = 0$ in the interval (0,1) after four iterations by Newton-Raphson method . **(5)**

b) Find a root of the equation $\cos x - e^x = 0$ correct to three decimal places in the interval (0,1) after four iterations by Secant method . **(5)**

Q5 **a)** A continuous Random variable X has the probability density function $f(x) = \begin{cases} xe^{-kx}; & 0 < x < \infty \\ 0; & otherwise \end{cases}$ then **(5)**
(a) find the constant 'k' (b) find P$(20 < x < 30)$

b) If the Random variable X takes the values 1,2,3,4 such that **(5)**
2P(X = 1) = 3P(X = 2) = P(X = 3) = 5P(X = 4), Then Find the probability distribution.

Q6 **a)** A company has the head office at Calcutta and a branch at Bombay. The director wanted to know if the workers at the two places would like the introduction of a new plan of a work and a survey was conducted for this purpose. Out of a sample of 500 workers 41% were against the new plan. Is there any significant difference between the two groups in their attitude towards the new plan at 5% level? **(5)**

b) Find the regression and correlation coefficient from the following data **(5)**

x	1	2	3	4	5	6	7
f(x)	9	8	10	12	11	13	15

Q7 Let $\frac{dy}{dx} = y - x^2 + 1, y(0) = 0.5$ with step size h=0.2 then find the followings **(10)**
a) Using modified Euler method find (0.2) .
b) Using Runge-Kutta method find $y(0.4)$

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) If a Random variable has a poissondistribution such that P(1) = P(2), find P(4) .

b) Solve the following system of equations
2x + 3y + z = 9; x + 2y + 3z = 6; 3x + 2y + 2z = 8, using LU decomposition method with $l_{11} = l_{22} = l_{33} = 1$?

c) Find t$f(x)$he mean value of the Random variable whose probability density function is t$f(x) = \frac{3}{5}10^{-5}x(100 - x), 0 \leq x \leq 100$.

d) Let $\bar{x} = 970, \bar{y} = 18, \sigma_x = 38, \sigma_y = 2$,correlation coefficient r = 0.6, find the line of regression and obtain the value of x when $y = 20$.