P P SAVANI UNIVERSITY
P P SAVANI SCHOOL OF ENGINEERING
4th Semester of B. Tech Examination
Subject: Numerical & Statistical Analysis (SESH2022)
Branch: CV/ME/CH

18.05.2022, Wednesday **Time: 9:00 a.m. To 11:30a.m.** **Maximum Marks: 60**

Instructions:
1. The question paper comprises of two sections.
2. Section I and II must be attempted in same answer sheet.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q -1 (a) For decreasing the number of iterations in Raphson method **[02]**

a. The value of $f'(x)$ must be increased.
b. The value of $f'(x)$ must be decreased.
c. The value of $f''(x)$ must be increased.
d. The value of $f''(x)$ must be decreased.

Q -1 (b) The number of significant digits in the number 204.020050 is **[02]**

a. 3
b. 6
c. 4
d. 9

Q -1 (c) Define Interpolation? **[02]**

Attempt any four

Q - 2 Use Cauchy-Riemann equation to show that $f(z) = \bar{z}$ is not differentiable. **[06]**

Q -3 Using Newton-Raphson method find the root of $3x - \cos x - 1 = 0$, which between 0.5 to 0.7, correct to four decimal places. **[06]**

Q -4 If f(x) is known at the following data points **[06]**

x_i	0	1	2	3	4
$f(x_i)$	1	7	23	55	109

Then find f (0.5).

Q -5 Evaluate $\int_0^1 e^x dx$ by Simpson's 1/3 rule, with step-length h=1/6. **[06]**

Q - 6 Using Euler Methods, from $\frac{dy}{dx} = x^3 + y$, $y(0) = 1$, compute $y(0.02)$, up to four decimal places. **[06]**

SECTION – II

Q –1 (a) Two unbiased coins are tossed. What is the probability of getting at most one head? **[02]**

Q –1 (b) Find the mean of the set of data 75, 90, 63, 95, 82, and 78. **[02]**

Q –1 (c) The mean and variance of Poisson distribution are equal. [True/False] **[02]**

Attempt any four

Q - 2 You tossed a fair coin three times **[06]**

a. What is the probability of three heads?

b. What is the probability that you observe exactly one heads?

Q –3 Calculate the following from the following data, **[06]**

x	0	1	2	3	4	5	6	7
f(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Find, i) k ? ii) $P(X<6)$, $P(X\geq 6)$ and $P(0<X<6)$?

Q - 4 The coefficient of correlation is the geometric mean of the coefficients of regression line, i.e., **[06]**

$r=\sqrt{b_{yx}b_{xy}}$.

Q - 5 If the two lines of regression are $4x-5y+30=0$ and $20x-9y-107=0$, which of these **[06]** are lines of regression of x on y and y on x ? Find r_{xy} and σ_y when $\sigma_x=3$.

Q - 6 In a sample survey of public opinion, answer the questions, **[06]**

i) Do you drink?

ii) Are you in favour of local option in sale of liquor?

are tabulated below.

	Yes	No	Total
Yes	56	31	87
No	18	6	24
Total	74	37	111

Can you infer or not local option on the sale of liquor is depending on individual drink? (Given that, the value of χ^2 -Distribution of degree of freedom at 5% label of significance is 3.841)

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