P P SAVANI UNIVERSITY

Fourth Semester of B. Tech Examination

Nov-Dec 2021

SESH2022 Numerical & Statistical Analysis

03.12.2021, Friday **Time: 12:30 p.m. To 03:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in same answer sheets.
3. Use of scientific calculator is allowed.

SECTION – I

Answer the following. (Attempt any Three)

Q – 1 Evaluate $\int_c \frac{\cos \pi z^2}{(z-1)(z-2)} dz$, where c is $|z| = \frac{3}{2}$. **[10]**

Q – 2 Evaluate $\int_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$, where c is $|z| = 3$. **[10]**

Q – 3 Using Gauss elimination method solve the system, **[10]**

$$8x_2 + 2x_3 = -7$$
$$3x_1 + 5x_2 + 2x_3 = 8$$
$$6x_1 + 2x_2 + 8x_3 = 26.$$

Q – 4 Using Newton-Raphson's method find the root of the equation $x^2 - 4x - 7 = 0$ near $x = 5$ to the nearest thousandth. **[10]**

Q – 5 Evaluate $J = \int_0^1 e^{-x^2} dx$ by trapezoidal rule with $n = 10$. **[10]**

SECTION – II

Answer the following. (Attempt any Three)

Q – 1 A questionnaire provides 60 Yes, 40 No, and 20 no-opinion answers. **[10]**

(a) In the construction of a pie chart, how many degrees would be in the section of the pie showing the Yes answers?

(b) How many degrees would be in the section of the pie showing the No answers?

(c) Construct a pie chart.

(d) Construct a bar chart.

Q – 2 The random variable x is known to be uniformly distributed between 100 and 200. **[10]**

(a) Show that graph of the Probability density function.

(b) Compute the $P(x < 150)$.

(c) Compute the $P(120 \leq x \leq 180)$.

(d) Compute the $E(x)$.

(e) Compute the $V(x)$.

Q – 3 A binomial experiment with $n = 20$ and $P = 0.70$, **[10]**

(a) Compute $f(12)$ and $f(16)$.

(b) Compute $P(x \geq 16)$ *and* $P(x \leq 15)$.

(c) Compute $E(x)$.

Q – 4 A process for making certain ball bearings is under control if the diameters of the bearings have a mean of 0.5000 cm. If a random sample of 10 of these bearings has a mean diameter of 0.5060 cm and standard deviation of 0.0040 cm, is the process under control? Use $t_{0.005} = 3.250$ with 9 degree of freedom. **[10]**

Q – 5 Is there reason to believe that the life expected in south and north India is same or not from the following data. **[10]**

South: 34.0, 39.2, 45.1, 48.7, 49.4, 45.9, 55.3, 42.7, 43.7

North: 49.7, 55.4, 57.0, 54.2, 50.4, 44.2, 53.4, 57.5, 61.9, 56.6, 58.2

Q – 6 Find the Karl-Pearson's coefficient of correlation. **[10]**

X	1	5	10	11	14	17
Y	5	7	8	4	3	7

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