P P SAVANI UNIVERSITY

First Semester of B. Tech. Examination

November 2022

SESH1070 Fundamentals of Mathematics

18.11.2022, Friday **Time: 01:00 p.m. To 03:30 p.m.** **Maximum Marks: 60**

Instructions:

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

SECTION – I

Answer the Following: (Attempt any Five)

			CO	BTL
Q - 1	Examine for convergence of the series $\frac{x^2}{2\sqrt{1}}+\frac{x^3}{3\sqrt{2}}+\frac{x^4}{4\sqrt{3}}+\cdots$	[06]	4	4/5
Q - 2	Test the convergence of the series $\frac{1}{1\cdot2}-\frac{1}{3\cdot4}+\frac{1}{5\cdot6}-\frac{1}{7\cdot8}+\cdots$	[06]	4	4/6
Q - 3	Test the convergence of the series $\sum_{n=1}^{\infty}\left(\sqrt{n+1}-\sqrt{n}\right)$	[06]	2/4	4/6
Q - 4	Verify CMVT for $\frac{1}{x}$ and $\frac{1}{x^2}$, $\forall\, x \in [a,b], a>0$	[06]	1	3/4
Q - 5	Find y_n, for $y = x^2 \log x$	[06]	1	5
Q - 6	Verify LMVT for $f(x) = (x-1)(x-2)(x-3), x \in [0,4]$.	[06]	1	3/4
Q - 7	Find the maxima and minima of the function $10x^6 - 24x^5 + 15x^4 - 40x^3 + 108$	[06]	1	2/5

SECTION – II

Answer the Following: (Attempt any Five)

			CO	BTL
Q - 1	Expand $3x^3 + 8x^2 + x - 2$ in the powers of $(x-3)$.	[06]	4	3/5
Q - 2	Expand $\sin\left(\frac{\pi}{4}+x\right)$ in powers of x. Hence find the value of $\sin 44°$ and $\sin 46°$.	[06]	4	5/6
Q - 3	Use Maclaurin's series to determine the expansion of $(3+2t)^4$.	[06]	4	5/6
Q - 4	Solve the following: (i) $\lim_{x\to0}\frac{\cosh x-\cos x}{x\sin x}$ (ii) $\lim_{x\to0}\left(\frac{1}{x}\right)^{\tan x}$	[06]	1/2	5
Q - 5	Find the solution using Gaussian elimination: $x+3y+8z=4$, $x+4y+3z=-2$, $x+3y+4z=1$	[06]	3	2/5
Q - 6	Find the inverse of $A=\begin{bmatrix}7&6&2\\-1&2&4\\3&6&8\end{bmatrix}$ by Gauss Jordan Method.	[06]	3	2/5
Q - 7	Using Cayley-Hamilton theorem, find A^2, A^{-1} and A^{-2}, from $A=\begin{bmatrix}-2&1\\2&4\end{bmatrix}$	[06]	3	2/5

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create