[Nov-23]

GITAM (Deemed to be University)
[MATH1001]
GST/GSS/GSB/GSHS Degree Examination

III SEMESTER

SINGLE VARIABLE CALCULUS
(Effective for the admitted batch 2021-22)

Time: 2 Hours **Max. Marks: 30**

Instructions: All parts of the unit must be answered in one place only.

Section-A

1. Answer all Questions: **(5×1=5)**

a) Find $\lim_{x\to 2} \frac{2x+5}{11-x^3}$

b) Find the slope of the curve $y = \frac{1}{x}$ at $x = -1$.

c) Evaluate $\int_0^2 (2t - 3)\, dt$.

d) Evaluate $\int \frac{e^x}{e^x+1} dx$

e) Find $\int_0^{\pi} \sin\theta \; d\theta$.

Section-B

Answer the following: **(5×5=25)**

UNIT-I

2. Evaluate $\lim_{x\to 0} \frac{\sqrt{x^2+100}-10}{x^2}$.

OR

3. Evaluate $\lim_{y\to 0} \frac{\cos y - 1}{y}$.

UNIT-II

4. If $y = 6u - 9, u = \left(\frac{1}{2}\right)x^4$, find $\frac{dy}{dx}$.

OR

5. Find the absolute maximum and minimum values of $f(x) = x^{\frac{2}{3}}$ in the interval [-2, 3] .

UNIT-III

6. Evaluate $\int x(x^2 + 5)^{-4}\ dx$

OR

7. Find the length of the curve $\mathbf{y} = \left(\frac{x}{2}\right)^{\frac{2}{3}}$ from $x = 0\ to\ x = 2$.

UNIT-IV

8. Evaluate the integral $\int_3^5 \frac{2x-3}{x^2-3x+1}\,dx$.

OR

9. Evaluate $\int \cos 3x \cos 4x\ dx$

UNIT-V

10. Evaluate $\int \frac{1}{\sqrt{9+x^2}}\,\mathbf{dx}$

OR

11. Evaluate $\int \tan^4 x \sec^4 x\ dx$