Roll No. | | | | | | | | | | | | | **Total No. of Pages :02**

Total No. of Questions : 09

B.Sc.(Agriculture)(Sem.–2)

MATHEMATICS – II

Subject Code :BSAG-205A

M.Code :72360

Date of Examination : 09-07-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1. Write briefly/Solve the following :

a) If $\lim_{x\to -a} \frac{x^9 + a^9}{x + a} = 9$, find value of a.

b) The radius of balloon is increasing at rate of 10cm/sec. At what rate surface area of balloon increase when radius is 15 cm.

c) Evaluate $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2 dx$.

d) Evaluate $\int x^3 e^x \, dx$

e) Define even and odd function.

f) Define Leibniz theorem.

g) Evaluate $\lim_{x\to\infty} \frac{5x^3 - 6}{\sqrt{9 + 4x^6}}$.

h) Find $\frac{d^2y}{dx^2}$, when $x = at^2, y = 2at$

i) Find horizontal asymptotes of curve $x^2y^2 + y^2 = 1$

j) Evaluate $\int \frac{\sec^2 x}{3 + \tan x}$.

SECTION-B

2. Evaluate the limit (a) $\lim_{x \to a} \frac{\sqrt{x} - \sqrt{a}}{x - a}$ (b) $\lim_{x \to 0} \frac{e^{\sin x} - 1}{x}$

3. If $y = e^{ax} \sin bx$, prove that $y'' - 2ay' + (a^2 + b^2)\, y = 0$.

4. Find nth derivative of $x^3 \cos x$.

5. Evaluate $\int \frac{1}{2x^2 + x - 1}\, dx$.

6. Find all points of local maxima and minima of function $f(x) = x^3 - 6x^2 + 12x - 8$

SECTION – C

7. If $y = \log(x + \sqrt{1 + x^2})$, prove that $y_{n+2}(0) = -n^2 y_n(0)$

8. Evaluate (a) $\int \frac{2x - 1}{(x - 1)(x + 2)(x - 3)}\, dx$ (b) $\int x \sqrt{x + 2}\, dx$

9. a) Find equation of tangent to curve $y\ 5x^2 + 6x + 7$ at point $\left(\frac{1}{2}, \frac{35}{4}\right)$.

   b) Find $\frac{dy}{dx}$ of $\frac{x + 3}{x^2 + 1}$.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.