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 $\lim_{x \to -a} \dfrac{x^9 + a^9}{x + a} = 9$, 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 $\int \left(\sqrt{x} + \dfrac{1}{\sqrt{x}} \right)^2 dx$.

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

e) Define even and odd function.

f) Define Leibniz theorem.

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

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

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

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

SECTION-B

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

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 $\displaystyle\int \dfrac{1}{2x^2 + x - 1} \, dx$.

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) $\displaystyle\int \dfrac{2x - 1}{(x - 1)(x + 2)(x - 3)} \, dx$ (b) $\displaystyle\int x \sqrt{x + 2} \, dx$

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

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

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.