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

Total No. of Questions : 09

B.Sc.(Agriculture) (2014 to 2018) (Sem.–2)

MATHEMATICS – II

Subject Code : BSAG-205A

M.Code : 72360

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 :

a) Evaluate $\lim_{x\to 0} \frac{\tan x - \sin x}{x^2}$.

b) Evaluate $\lim_{x\to \infty} \frac{e^x + e^{-x}}{e^x - e^{-x}}$.

c) Differentiate $y = \sqrt{\frac{1+x}{1-x}}$ with respect to x.

d) Show that $y = a \sin \sqrt{\mu} x$ is solution of $\frac{d^2y}{dx^2} + \mu y = 0$.

e) If $y = e^{ax}$, find y_n.

f) If radius of a sphere is 5 cm and is increasing at 0.1 cm/sec, how fast is its volume changing ?

g) Evaluate $\int \frac{\cot x}{\sin^2 x} dx$.

h) Show that $\int x e^x \, dx = e^x(x - 1) + c$.

i) Prove that $\int \frac{dx}{(x-1)(x-2)} = \log\left(\frac{x-2}{x-1}\right) + c$.

j) Evaluate $\int (2x^3 - 3\sin x + 5\sqrt{x})\, dx$.

SECTION-B

2. Show that $\lim_{x\to\infty}\left(1-\frac{1}{x}\right)^x = \frac{1}{e}$.

3. Find $\frac{dy}{dx}$ for $y = x^{\sin x}$.

4. Find the equation of the tangent and normal to the curve $y = x^3 - 3x^2 - x + 5$ at the point (3, 2).

5. Evaluate $\int e^{ax} \sin bx\, dx$.

6. Prove that $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\frac{x}{a} + c$.

SECTION-C

7. Evaluate $\int \frac{dx}{\sqrt{x^2 + x^2}}$.

8. Evaluate $\int \frac{dx}{(x-1)(x^2+x+1)}$.

9. If $y = \tan^{-1} x$, show that $(1 + x^2)\, y_2 + 2xy_1 = 0$ and deduce that $(1 + x^2)\, y_{n+2} + 2\,(n + 1)\, xy_{n+1} + n\,(n + 1)\, y_n = 0$. Hence determine y_n when $x = 0$.

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.