U-53/2061

Set 2

5888/ML

B.Sc. AGRICULTURE HONS (SEMESTER 2)

SUBJECT : MATH- 102 : MATHEMATICS II (For medical students) XVI-A

TIME : 3 HRS M.M. : 75

INSTRUCTIONS FOR CANDIDATES :

ATTEMPT ANY TWO QUESTIONS EACH FROM SECTION A AND B AND ENTIRE SECTION C.

SECTION A

Question 1
a) Prove that : $\sin(-420^0)(\cos 390^0) + \cos(-660^0)(\sin 330^0) = -1$
b) Prove that in a quadrilateral $\cos(A+B) = \cos(C+D)$

Question 2
a) Sketch the graph for $y = 2\sin(2x-1)$
b) Prove that $\cos 18^0 - \sin 18^0 = \sqrt{2}\sin 27^0$

Question 3 Differentiate the following functions w.r.t x
a) $\text{Log}\,(x+\sqrt{a^2+x^2})$.
b) $\text{Log}\,\frac{a+b\sin x}{a-b\sin x}$

Question 4 Differentiate the following functions w.r.t x
a) $\frac{e^x+e^{-x}}{e^x-e^{-x}}$
b) $y = sin^3\,x$

2x15=30

Section B

Question 5 Evaluate
a) $\int \frac{1-\tan x}{1+\tan x}dx$
b) $\int \frac{\sin(x+a)}{\sin(x+b)}dx$

Question 6 Evaluate
a) $\int \frac{1}{1+e^{-x}}dx$
b) $\int \frac{\sin 2x}{a^2sin^2x + b^2cos^2x}dx$

Question 7 If $A = \begin{bmatrix}\cos a & -\sin a & 0\\ \sin a & \cos a & 0\\ 0 & 0 & 1\end{bmatrix}$, find Adj A and verify that
A (adj A) = (adj A) A = |A| I

Question 8 Find A^{-1}, Where $A = \begin{bmatrix}1 & -1 & 1\\ 2 & 1 & -3\\ 1 & 1 & 1\end{bmatrix}$.
Hence solve the system of equations:
x +2y + z = 4; -x + y + z = 0; x – 3y + z = 2.

2x15=30

Contd—2

Section C

Question 9

1. Prove that $\tan 70^0 = \tan 20^0 + 2 \tan 50^0$
2. If $A+B = \pi/4$ then prove that $(1+\tan A)(1+\tan B) = 2$
3. Find the value of
   1) $\sin 75^0$ 2) $\tan 15^0$
4. Differentiate $e^x \log \sin 2x$ w.r.t x
5. Evaluate $\int \frac{\sin 4x}{\sin 2x} dx$
6. Evaluate $\int \tan x \tan 2x \tan 3x \ dx$
7. Evaluate $\int \frac{1}{1+e^{-x}} dx$
8. Evaluate the determinant without expanding

$$\begin{vmatrix} 41 & 1 & 5 \\ 79 & 7 & 9 \\ 29 & 5 & 3 \end{vmatrix}$$

9. Show that $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$ satisfies $A^2 - 6A + 17 = 0$. Hence find A^{-1}
10. Show that the sine function is always continuous.

$10 \times 1\frac{1}{2} = 15$

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