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(Printed Pages 4)

(20517)

Roll No.....

B.Sc.(Micro.)-II Yr.

3500

B.Sc.(Micro.) Examination, May 2017

Bio-Mathematics

(B-207)

Time : Three Hours] *[Maximum Marks : 40*

Note : Attempt any **five** questions. Each question carries equal marks. Calculators and type of tables are allowed.

1. (a) If $\begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a+2 & b-2 \\ 8 & a-8b \end{bmatrix}$,

then find the value of (a-2b). 4

(b) If $A = \begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 & 1 \\ 6 & 8 & 4 \end{bmatrix}$,

find AB and BA whichever exists. 4

2. (a) Using properties of determinants, prove that 4

$$\begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & bc^2 \\ a^2c & cb^2 & 0 \end{vmatrix} = 2a^3b^3c^3$$

(b) Use matrix method to show that the system of equations 4

$$2x+5y=7$$

$$6x+15y=13$$

is inconsistent.

3. Find the real root of the equation $x^3-9x+1=0$ by Regular Falsi method. 8

4. (a) Find the real root of the equation

$$x^3-5x+2=0$$

by Newton Raphson's method. 4

(b) By Guass Elimination method solve the following system of linear equations : 4

$$5x-y-2z=142$$

$$x-3y-z=-30$$

$$2x-y-3z=-50$$

5. (a) Prove that 4

$$\left(\frac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta}\right)^2=\frac{1-\cos\theta}{1+\cos\theta}$$

(b) Show that 4

$$\frac{\sin A+\sin 3A+\sin 5A+\sin 7A}{\cos A+\cos 3A+\cos 5A+\cos 7A}=\tan 4A$$

6. (a) Prove that 4

$$\frac{1-\cos A}{\sin A}=\tan\frac{A}{2}$$

(b) Show that 4

$$\frac{\sin^2 A-\sin^2 B}{\sin A\cos A-\sin B\cos B}=\tan(A+B)$$

7. (a) Differentiate $\tan\sqrt{x}$. 4

(b) For $\cos(x+y)=y\sin x$ 4

find $\frac{dy}{dx}$.

8. (a) If $x=a(t+\sin t)$ 4

$y=a(1-\cos t)$,

Find $\frac{dy}{dx}$.

(b) If $u=\log(x^2+y^2)$, prove that 4

$$\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$$

9. (a) Evaluate 4

$$\int\frac{dx}{1+\sin x}$$

(b) Evaluate $\int x\sec^2 x\,dx$ 4

10. (a) Evaluate $\int\frac{(2x+3)}{(x-3)(x+1)}dx$ 4

(b) Show that $\int_0^{\pi/2}\log(\tan x)\,dx=0$. 4