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Roll No. | | | | | | | | | | | | | Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (Bio Tech) (2018 Batch) (Sem.–2)

BASIC MATHEMATICS-II

Subject Code : BTAM-207-18

M.code : 76258

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 & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer the following :

a) Find the point at which the tangent to the curve $y = \sqrt{4x-3}-1$ has its slope 2/3.

b) Find the range of the function $f(x)=\sqrt{16-x^2}$

c) Is every continuous function differentiable? Justify.

d) Find the derivative of $\cos(\sqrt{x})$ with respect to x.

e) Find f_y if $f(x,y)=\dfrac{y^2}{y+\sin x}$.

f) Solve $\int \cot(3x+4)\,dx$.

g) Evaluate the integral $\int e^x \sin x\,dx$.

h) Find the order and degree of the following differential equation $\left(\dfrac{d^2y}{dx^2}\right)^3+\left(\dfrac{dy}{dx}\right)^4+\sin x=3$.

i) Form a differential equation representing the family of curves $y^2 = a\,(b^2 - x^2)$.

j) Verify that the differentiable equation $(x-y)\dfrac{dy}{dx}=x+2y$ is homogeneous.

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SECTION-B

2. a) Find the values of a and b such that the function defined by : (4)

$$f(x)=\begin{cases} 5, & if\ x\le 2 \\ ax+b, & if\ 2<x<10 \\ 21, & if\ x\ge 10 \end{cases}$$

Is a continuous function.

b) Differentiate $\sqrt{\dfrac{(x-3)(x^2+4)}{3x^2+4x+5}}$. (4)

3. Find $\dfrac{dy}{dx}$, if $y^x + x^y + x^x = 7$ (8)

4. a) Find the absolute maximum and minimum values of the function f given by :

$f(x) = 12x^{4/3} - 6x^{1/3}, x \in [-1, 1]$ (4)

b) Find the intervals in which the function f given by $f(x) = \sin x + \cos x$, $0 \le x \le 2\pi$ is strictly increasing. (4)

5. a) Check whether the limit of the function $f(x, y) = \dfrac{x-y}{x+y}$ exist as $(x, y) \to (0, 0)$ (4)

b) Find the local extreme values of the function

$4x^2 - 6xy + 5y^2 - 20x + 26y$ (4)

SECTION-C

6. a) Evaluate $\int_0^a \dfrac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}\,dx.$ (4)

b) Solve the integral Evaluate $\int (\sqrt{\cot x}+\sqrt{\tan x})\,dx.$ (4)

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7. a) Find the area of the region bounded by = x^2 and $y^2 = x$. (4)

   b) Solve the integral $\int \frac{\sin x}{\sin(x-a)} dx$. (4)

8. Solve the differential equation :

   $ye^{x/y}dx = (xe^{x/y} + y^2)\, dy\ (y \neq 0)$ (8)

9. a) Solve the following differential equation :

   $xdy - ydx = \sqrt{x^2 + y^2 dx}$ (4)

   b) Form the differential equation of the family of circles touching the y-axis at origin. (4)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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