QP Code: RM20MSC131 Reg. No | | | | | | | | | | | AR 20

GIET UNIVERSITY, GUNUPUR – 765022

M. Sc. (First Semester) Examinations, May – 2021

20BTPC106 – BASICS OF MATHEMATICS AND STATISTICS (Biotechnology)

Time: 2 hrs Maximum: 50 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

Q.1. Answer ***ALL*** questions

a. Solve $\frac{(3x-2)}{3}+\frac{(2x+3)}{3}=\frac{x+7}{6}$.

b. Express $\left(\frac{1}{5}+i\frac{2}{5}\right)-\left(4+i\frac{5}{2}\right)$ in $a+ib$ form.

c. If $2\begin{bmatrix}3 & 4\\ 5 & x\end{bmatrix}+\begin{bmatrix}1 & y\\ 0 & 1\end{bmatrix}=\begin{bmatrix}7 & 0\\ 10 & 5\end{bmatrix}$, then find $(x-y)$.

d. Find $f''(x)$ of $f(x)=6x^3-9x+9$.

e. Integrate: $\int x\sin x\,dx$.

f. Define metabolism.

g. Explain the difference between exogenous and endogenous rhythms?

h. How many of the numbers, 100, 101, . . . , 999, have three different digits in increasing order or in decreasing order?

i. What is analysis of variation? What are the assumptions necessary to read analysis of variation?

j. What are independent and dependent events?

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks

2. Find the values of k such that the equation $\frac{p}{x+r}+\frac{q}{x-r}=\frac{k}{2x}$ has two equal roots. (6)

3. If $A=\begin{bmatrix}7 & 3 & -5\\ 0 & 4 & 2\\ 1 & 5 & 4\end{bmatrix}$ and $B=3A, C=B+2A-5I$. Find matrix D such that $D=2A+B-C$. (6)

4. Find the value of c such that the conclusion of the mean value theorem is satisfied for $f(x)=-2x^3+6x-2$ on the interval $[-2,\ 2]$. (6)

5. Evaluate (i) $\int\left(t^3-\frac{e^{-t}-4}{e^{-t}}\right)dt$. (ii) $\int_1^9\frac{2x^2+x^2\sqrt{x}-1}{x^2}\,dx$ (3+3)

6. What is population dynamics? Explain with diagram. (6)

7. A string balance has a scale that reads from 0 to 50kg. The length of the scale is 20cm. A body suspended from this balance, when displaced and released, oscillates with a period of 0.6 s. What is the weight of the body? (6)

8. What are the types of probability sampling? Discuss about them. (6)

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