

Please check that this question paper contains _____ questions and _____ printed pages within first ten minutes.

[Total No. of Questions: 09]

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Uni. Roll No.

23 MAR 2021

Program: B.Tech. (Batch 2018 onward)

Semester:.....1/2..

Name of Subject: Mathematics 2

Subject Code: BSC-104

Paper ID: 15940

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) Write Dirichlet Conditions.
- b) What is point of inflexion.
- c) What is Lagrange's method of Multipliers.
- d) Define Green Theorem.
- e) What is divergence.
- f) What is homogeneous function.

Part – B

[Marks: 04 each]

Q2. State and prove Euler Theorem.

Q3. Trace the curve $r = a + b \cos \theta (a > b)$

Q4. if $u = x$, show that $\frac{\partial^3 u}{\partial x^2 \partial y} = \frac{\partial^3 u}{\partial x \partial y \partial x}$

Q5. What is the condition for $f(x,y)$ to be maximum or minimum.

Q6. Find the gradient of the function $\phi = y^2 - 4xy$ at (1,2)

Q7. Write the physical interpretation of curl of vector point function.

- Q8. Calculate by double integration, the volume generated by the revolution of the cardioid $r = a(1 - \cos \theta)$ about its axis.

OR

If $u = \log(x^3 + y^3 + z^3)$ show that $(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z})^2 u = -9/(x+y+z)^2$

- Q9. Evaluate $\int_S \vec{A} \cdot d\vec{s}$, where $\vec{A} = x^3\vec{i} + y^3\vec{j} + z^3\vec{k}$ and S is the surface of sphere

$$x^2 + y^2 + z^2 = a^2$$

OR

Let $f(x) = (x + x^2)$, $-\pi < x < \pi$, find the Fourier series

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