



BASIRHAT COLLEGE

(ESTD-1947)

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From: *Department of Mathematics*

Date: 18.11.2020

Notice

Students of Mathematics (Honours & General) of Semester-II & IV are requested to submit your assignment online within 26th November, 2020, through your Google Classroom.

Instructions are mentioned below:

- (a) Prepare separate assignment for each CORE (For Honours students).
- (b) Scan and save the files separately in pdf format for each CORE.
- (c) Name the files as “**ASM-Core Code-Registration Number**”, and etc.
(As example: “**ASM-MTMGCOR**T-109*******”, and etc.)
- (d) Open the assignment of your Google Classroom.
- (e) Upload pdf files in the corresponding walls of that assignment of your Google Classroom.

N.B.: Wrong file name, upload in wrong wall of assignment, or submission after due date will be treated the assignment as cancel.

H.O.D.

Department of Mathematics
Basirhat College

Assignment for MTMACOR03T

Answer the following questions

- 3.1 Prove Archimedean property of real numbers.
- 3.2 State and prove Heine-Borel Theorem of compact set.
- 3.3 Prove Leibniz theorem of alternating series.

Assignment for MTMACOR04T

Answer the following questions

- 4.1 Find the particular integral of $(D^2 + 2)y = x^2$
- 4.2 Given that the vectors functions $x_1 = \begin{bmatrix} 1 \\ -1 \end{bmatrix} e^t$ and $x_2 = \begin{bmatrix} 2 \\ 6 \end{bmatrix} e^t + \begin{bmatrix} 8 \\ -8 \end{bmatrix} t e^t$ are solutions to the system $x'(t) = Ax(t)$. Find a fundamental matrix for the system and a general solution.
- 4.3 If $\vec{\alpha} = 2t \hat{i} + \frac{1}{3} t^3 \hat{j} + \frac{1}{5} t^5 \hat{k}$ then find the value of $\left\{ \left(\frac{d\vec{\alpha}}{dt} \times \frac{d^2\vec{\alpha}}{dt^2} \right) \cdot \frac{d^3\vec{\alpha}}{dt^3} \right\}$ at $t = 1$.

Assignment for MTMGCOR02T/ MTMHGEC02T

Answer the following questions

- G2.1 Verify that x^3 is an integrating factor of $2\sin y^2 dx + xy \cos y^2 dy = 0$.
- G2.2 Reduce the nonlinear differential equation $\frac{dy}{dx} + \frac{y}{x} = \frac{y^2}{x^2}$ to a linear differential equation and hence solve it.
- G2.3 Find the partial differential equation of plane having equal intercepts along x - axis and y - axis.

Assignment for MTMACOR08T

Answer the following questions

8.1 Evaluate $\int_{-1}^1 \frac{\exp(2 \tan^{-1} t)}{1+t^2} dt$ by Riemann Integration.

8.2 Determine the radius of convergence and interval of convergence for the following power series

$$\sum_{n=1}^{\infty} \frac{2^n}{n} (4x - 8)^n$$

Assignment for MTMACOR09T

Answer the following questions

9.1 Let $f(x, y) = \begin{cases} xy \frac{x^2 - y^2}{x^2 + y^2} & ; x^2 + y^2 \neq 0 \\ 0 & ; x^2 + y^2 = 0 \end{cases}$. Prove that $f_{xy} \neq f_{yx}$ at Origin.

9.2 Evaluate $\iiint e^{\sqrt{\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2}}} dx dy dz$ over the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} \leq 1$ ($a, b, c \geq 0$).

9.3 Evaluate $\iint_S \vec{F} \cdot \vec{n} dS$ over the entire surface of the region above the xy -plane bounded by the cone $z^2 = x^2 + y^2$ and the plane $z = 4$, where $\vec{F} = 4xz\hat{i} + xyz^2\hat{j} + 3z\hat{k}$.

9.4 Verify Green's theorem in the plane for

$$\int_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$$

where C is the boundary of the region defined by $y = \sqrt{x}$ and $y = x^2$.

Assignment for MTMACOR10T

Answer the following questions

10.1 State and prove ring isomorphism theorem-I, II, and III.

10.2 Discuss matrix representation of linear transformation.

10.3 Explain dimension of a subspace, null space, range rank and nullity of a linear transformation.

Assignment for MTMGCOR04T/ MTMHGEC04T

Answer the following questions

G4.1 Let (G, o) be a cyclic group generated by a . Then show that a^{-1} is also a generator of this group.

G4.2 State and prove the Lagrange's theorem in group.

G4.3 Prove that a non-trivial finite ring having no divisor of zero is a ring with unity.