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Total No. of Pages : 02

Total No. of Questions : 08

B.Tech. (Aeronautical Engg./Aerospace Engg./ Automation &
Robotics/Automobile Engg./BT/CE/CSE/Electrical & Electronics
Engg./EE/ECE/Electronics & Electrical Engg./IT/ICE/Marine Engg./Mechanical
Engg./Petroleum Refinery Engg./Textile Engg.) (2012 to 2017) (Sem.-2)

ENGINEERING MATHEMATICS – II

Subject Code : BTAM-102

M.Code : 54092

Time : 2 Hrs.

Max. Marks : 30

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE question(s), each question carries 6 marks.

1. Sum the series $e^\alpha \cos \beta - \frac{e^{3\alpha}}{3} \cos 2\beta + \frac{e^{5\alpha}}{5} \cos 5\beta - \dots \infty$

2. Verify Cayley's Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$ and hence obtain the inverse of the given matrix.

3. Test the convergence of the following series :

$$1 + \frac{2}{2!}x + \frac{3^2}{3!}x^2 + \frac{4^3}{4!}x^3 + \dots$$

4. a) Prove $\log_i^i = \frac{4m+1}{4n+1}$ where m, n are integers.

- b) Discuss the convergence of $\sum n e^{-n^2}$.

5. Solve $(2x^2y - 3y^4)dx + (3x^3 + 2xy^3)dy = 0$

6. a) Solve : $(1 + y^2)dx = (\tan^{-1} y - x)dy$

- b) Solve $y'' - 6y' + 9y = \frac{e^{3x}}{x^2}$ by variation of parameter method

7. Solve $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + y = \log x \frac{\sin(\log x) + 1}{x}$.
8. A constant electromotive force E volts is applied to a circuit containing a constant resistance R ohms in series and a constant inductance L henries. If the initial current is zero, show that the current builds up to half its theoretical maximum in $(L\log 2)/R$ seconds.

Note: Any student found attempting answer sheet from any other person(s), using incriminating material or involved in any wrong activity reported by evaluator shall be treated under UMC provisions.

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