Roll No. | | | | | | | | | | | | | 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 Refinary 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 $e^{\alpha}\cos\beta - \frac{e^{3\alpha}}{3}\cos 2\beta + \frac{e^{5\alpha}}{5}\cos 5\beta - \ldots\ldots \infty$

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 :

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

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

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

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 (Llog2)/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.

Student found sharing the question paper(s)/answer sheet on digital media or with any other person or any organization/institution shall also be treated under UMC.

Any student found making any change/addition/modification in contents of scanned copy of answer sheet and original answer sheet, shall be covered under UMC provisions.