H.T.No. | | | | | | | | | | |

Code No: MA1503 **GEC-R14**

I B. Tech II Semester Supplementary Examinations, January 2017

MATHEMATICS-II

(Common to All Branches)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from PART-A are to be answered at one place.
Answer any FOUR questions from PART-B.

PART-A

6 × 2 = 12M

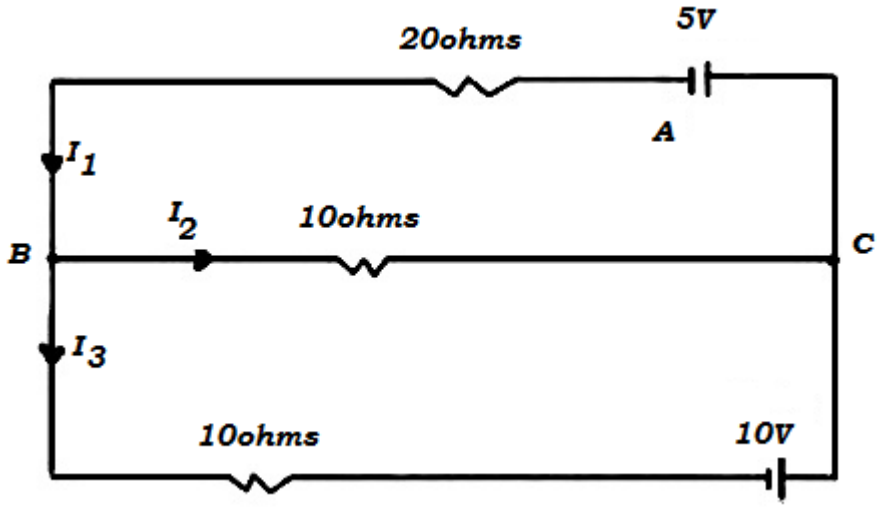
1. Define consistency and inconsistency of Linear system of equations.
2. Find the sum and product of the Eigen values of $\begin{bmatrix} 3 & 0 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$.
3. If the Fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$ exist, then obtain a_0.
4. Write the formula for the Fourier transform of $f(x)$.
5. Solve $p + q = pq$.
6. Write the Laplace equation in two dimensional steady state heat flow.

PART-B

4 × 12 = 48M

1. a) Test for consistency and solve
   $2x - 3y + 7z = 5$
   $3x + y - 3z = 13$
   $2x + 19y - 47z = 32$ (6M)

   b) Determine the currents I_1, I_2 *and* I_3 for the following electrical network using Kirchoff's laws. (6M)



2. Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$ (12M)

3. a) Find the Fourier series to represent the function $f(x)$ given by $f(x) = x \; for$ $0 \leq x \leq \pi$ (6M)

   b) Find the half range cosine series for $f(x) = (x-1)^2$ in the interval $0 < x < 1$. (6M)

4. a) Find the Fourier transform of $f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a \end{cases}$ (6M)

   b) Find the Fourier sine transform of $\frac{1}{x(x^2+a^2)}$ (6M)

5. a) Solve $(y+z)p - (z+x)q = x - y$. (6M)

   b) Solve $1 + p^2 = qz$ by charpits method (6M)

6. A homogeneous rod conducting material of length 100 cm has its ends kept at zero temperature and the temperature initially is

$$u(x,0) = \begin{cases} x, & 0 \leq x \leq 50 \\ 100 - x, & 50 \leq x \leq 100. \end{cases}$$

   Find the temperature $u(x,t)$ at any time. (12M)

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