National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	: EEE and ECE.	**Semester**	: 1st
Title of the Course	: Introduction to Electrical &	**Course Code**	: EEB100
	Electronics Engineering		

Time: 2 Hours   **Maximum Marks: 25**

Note : 1. This paper contains 6 questions in 2 printed pages.

        2. Answer all the questions.

        3. Do not write anything on the question paper except Roll number

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1. A battery of 2V and negligible internal resistance is connected between terminals A and C of the Wheatstone bridge as shown in Fig. 1. A galvanometer of 40 Ω resistance is connected between B and D. Determine the magnitude and direction of current in the galvanometer using Thevenin's theorem. **[3]**
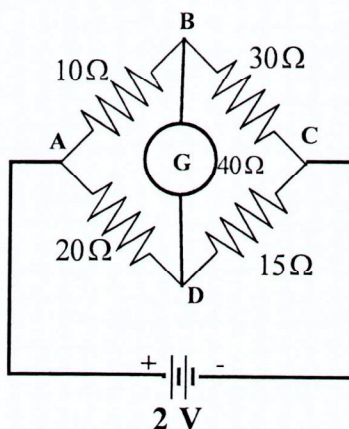

Fig. 1

2. Using delta/star transformation, find the galvanometer current in the Wheatstone bridge shown in Fig.1. **[4]**

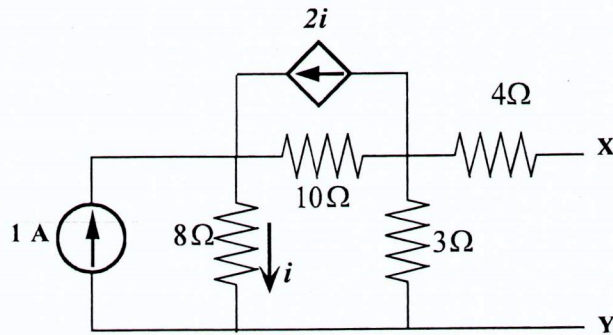3. Determine the Norton's equivalent between the terminals X and Y of Fig. 2.   [5]

Fig. 2

4. A resistance R, an inductance $L=0.01H$ and a capacitance C are connected in series. When an alternating voltage $v=400\sin(3000t-20^0)$ is applied to the series combination, the current flowing is $10\sqrt{2}\sin(3000t-65^0)$. Find the values of phase angle, R and C.   [4]

5. (a) Derive the equations for resonant frequency and Q-factor of a series resonance circuit,
   (b) Derive the equations for resonant frequency, Q-factor and circuit impedance at resonance of a practical parallel resonance circuit.   [2+3]

6. A balanced three phase system supplies an unbalanced delta load made up of 2 resistances of 100Ω and 200Ω and a coil having an inductance of $0.3H$ with negligible resistance. The line to line voltage is $100V$ and supply frequency is $50Hz$. Calculate (a) Total Active power in the system, and (b) total reactive volt amperes.   [4]