**24007**

**B.Tech. 1st Semester (F-Scheme) Examination,**

**December–2011**

**ELECTRICAL TECHNOLOGY**

**Paper–EE–101–F**

Time allowed : 3 hours ]          [ Maximum marks : 100

*Note :*  (i)  Question No. 1 is compulsory from Section–A.

(ii)  Attempt **four** questions from remaining four sections selecting **one** question from each section.

(iii)  Use of non-programmable calculator is allowed.

### Section–A

1.  (i)  Distinguish between Linear and Non-linear Network.                                    4

(ii)  What is the significance of Back e.m.f. in the working of DC Motor.                  4

(iii)  Derive the e.m.f. equation for 1-phase transformer.                                        4
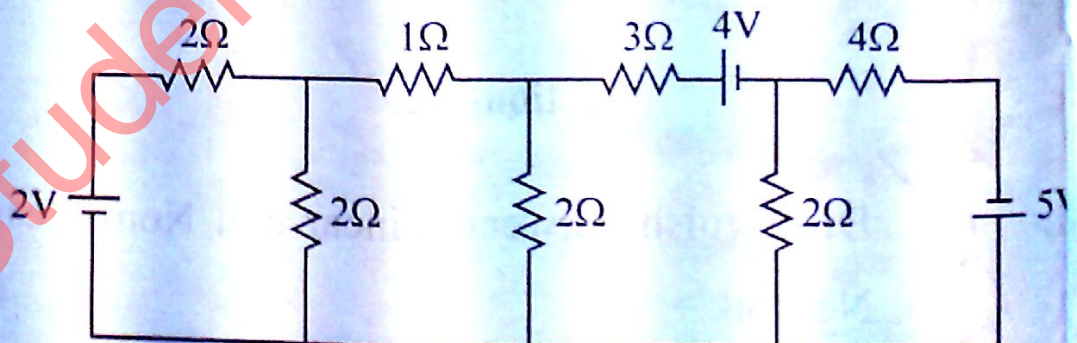
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(iv) Write short note on Damping torque in measuring instruments.

(v) Explain the significance of power factor in AC system.

## Section–B

2. (a) Explain the Kirchoffs voltage law and Kirchoff current law with some suitable example. 1(

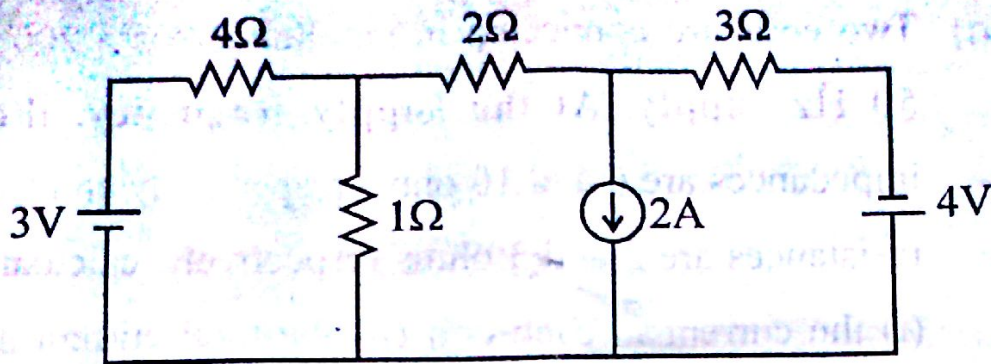(b) Find the value of current flowing through 3 ohm resistance in the given circuit by using Noda Analysis. 1(



3. (a) Find the value of current flowing through 4 ohr resistance in the given circuit by using Thevenin' theorem. 1

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(b) State and explain maximum power transfer theorem.    10

Section–C

4. (a) Define and explain the terms given below :

(i) RMS values and

(ii) Average values of an AC sinusoidal signal.    10

(b) A constant voltage source at a frequency of 0.75 M Hz is applied to an inductor in series with a variable capacitor. When the capacitor is set to 500 pF, the current has its maximum value, while it reduces to one half, when the capacitor is 600 pF. Find the quality factor of the inductor.    10

$$\frac{1}{R}\sqrt{\frac{L}{C}}$$

5. Two coils are connected in parallel across a 200 V, 50 Hz supply. At the supply frequency, their impedances are 6 and 10 ohms respectively and their resistances are 2 and 3 ohms respectively, calculate : (i) the current in each coil (ii) the total current and (iii) the total power. 20

## Section–D

6. (a) Explain two wattmeter method of power measurement in 3-phase AC system at balanced load. 10

   (b) Derive the relation between Line voltage and phase voltage, Line current and phase current for delta connection in 3-phase system. 10

7. Derive the equation for voltage regulation of 1-phase transformer at capacitive load by drawing the phasor diagram. 20

## Section–E

8. (a) Explain how the revolving flux is porduced in the stator of 3-phase induction motor. 10

(b) Prove that 1-phase induction motor is not self starting.

10

9.   (a) Explain the construction and working of

     (i) Energy Meter.

10

(b) A 230 V single phase energy meter has a constant load current of 8 A at unity power factor. If the meter disc makes 1120 revolution during 2 hours, calculate the meter constant. If the power factor were 0.8, what would be the number of revolutions made by the disc in that time ?

10