

**KADI SARVA VISHWA VIDHYALAYA**  
**LDRP INSTITUTE OF TECHNOLOGY & RESEARCH,**  
**GANDHINAGAR**

**B.E. Semester-II**

**MID-SEM EXAMINATION**

**Date: 04/03/2014**

**Branch: EE/ME/IT/AUTO**

**Subject Name: Basic Electrical Engineering**

**Time: 12:00 to 01:30**

**Max. Marks: 30**

**Instructions:**

- 1) All questions are **compulsory**
  - 2) Figures to the **right** indicate full marks.
  - 3) Use of scientific calculator is permitted
  - 4) Indicate **clearly**, the options you attempt along with its respective question number.
  - 5) Use the last page of main supplementary **for rough work**
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**Q.1 (a) Fill in the blanks**

**[5]**

- 1 Power factor of purely resistive circuit is \_\_\_\_\_
- 2 Tesla is unit of \_\_\_\_\_
- 3 The charge on an electron is known to be  $1.6 \times 10^{-19}$  coulomb. In a circuit the current flowing is 1 A. \_\_\_\_\_ electrons will be flowing through the circuit in a second.
- 4 The power consumed by a pure inductance connected to A.C. source is \_\_\_\_\_
- 5 Coulomb's law is given by  $F = KQ_1Q_2/d^2$  where K is a constant having value of \_\_\_\_\_.

**(b) State and explain Kirchhoff's voltage and current laws.**

**[5]**

**Q.2 (a) Derive an expression for the instantaneous value of alternating sinusoidal e.m.f.**

**[5]**

**(b) Define any five of the following terms: (1) Phase, (2) Phase Sequence, (3) Form Factor, (4) R.M.S value, (5) Average value, (6) Peak Factor, (7) Electric Flux Density.**

**[5]**

**OR**

**(a) Give the comparison between electrical and magnetic circuit.**

**[5]**

**(b) A coil is wound uniformly with 300 turns over a steel ring of relative permeability 900 having a mean diameter of 20 cm. The steel ring is made of a bar having cross section of diameter 2 cm. If the coil has a resistance of 50 ohms and is connected to 250 V d.c. supply, calculate (i) mmf (ii) field intensity in the ring (iii) reluctance of the magnetic path, (iv) flux**

**[5]**

**Q.3 Attempt any Two**

**[10]**

- 1 With necessary diagram derive the formula for star to delta transformation
- 2 Explain effect of temperature on resistance of: (i) Pure metals (ii) Alloys (iii) insulators, Semiconductors & Alloys. Explain temperature co-efficient of material.
- 3 Derive expressions for impedance, power factor and current for an R-L series circuit when an a.c. voltage is applied to it. Draw also the phasor diagram and waveform
- 4 An alternating e.m.f. is represented by  $e = 200 \sin 314t$  V. Determine : (i) Maximum value (ii) frequency (iii) time period (iv) angular frequency.

\*\*\*\*\*ALL THE BEST\*\*\*\*\*

**KADI SARVA VISHWAVIDHYALAYA**  
**LDRP-ITR, GANDHINAGAR**  
**BE 1<sup>st</sup> SEMESTER (EC/CE/ CIVIL)**  
**Mid Semester Exam (Reg. /ATKT) - 2014**

**Subject Code:** - CC102

**Subject Name:** - BASIC ELECTRICAL ENGINEERING

**Date:** -10/10/2014

**Time:** -02:00 pm to 03:30 pm

**Total Marks:** -30

**Instructions:**

1. Answer each section in separate Answer sheet.
  2. Use of Scientific Calculator is permitted.
  3. All questions are Compulsory.
  4. Indicate clearly, the options you attempt along with its respective question number.
  5. Use the last page of main supplementary for rough work.
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**Q-1 [A] Define & Explain the following: [05]**

1. Form factor 2. Dielectric strength 3. Flux density 4. EMF 5. Lenz law

**[B] Obtain expression for Delta to Star conversion. [05]**

**Q-2 [A] Derive the expression for charging of capacitor. [05]**

**[B] A capacitor of  $50\mu\text{F}$  is in series with  $100\ \Omega$  resistor. This branch is suddenly connected across a 100 V dc supply. Find (i) Time constant of the circuit (ii) initial current (iii) voltage across the resistor after 6 m sec. [05]**

**OR**

**Q-2 [A] Explain the phenomenon of generation of Alternating Voltages and currents and derive expression for it with suitable diagrams. [05]**

**[B] Find the rms value, average value and form factor for the full wave rectified sine wave shown in Figure. 1 [05]**

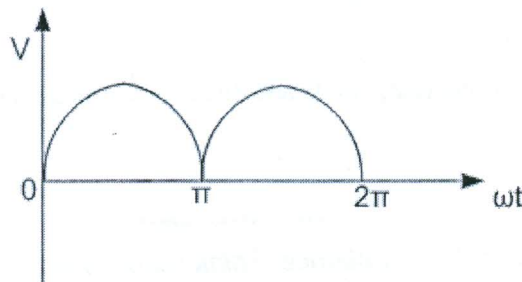


Figure: 1

Q-3 [A] Explain Faraday's law of electromagnetic Induction. [05]

[B] Compare electric circuit and magnetic circuit by their similarities and dissimilarities. [05]

OR

Q-3 [A] 1. State & Explain Kirchhoff's Point Law & Kirchhoff's Mesh Law. [02]

2. Find equivalent resistance between terminals A and B of the circuit shown in Figure:2 [03]  
Also find the current flowing through each resistance.

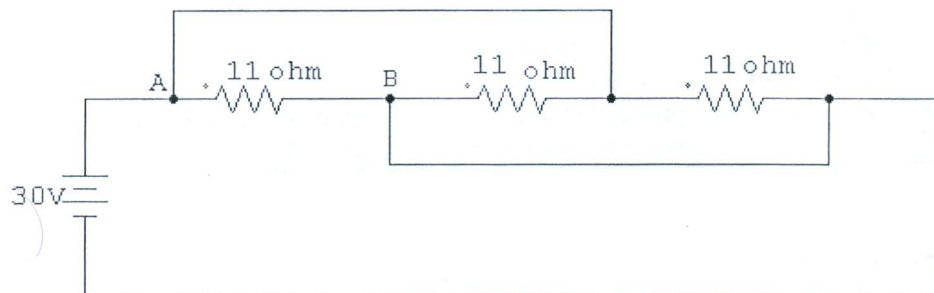


Figure: 2

[B] A circuit of 5 resistors and 3 batteries (see figure: 3); the connecting wires have all a negligible resistance. The values for  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  &  $R_5$  are  $10\ \Omega$ ,  $30\ \Omega$ ,  $50\ \Omega$ ,  $70\ \Omega$  and  $100\ \Omega$ , respectively. The batteries have a negligible internal resistance; their voltages  $V_1$ ,  $V_2$ , &  $V_3$  are  $12\text{ V}$ ,  $24\text{ V}$ , and  $36\text{ V}$ , respectively. [05]

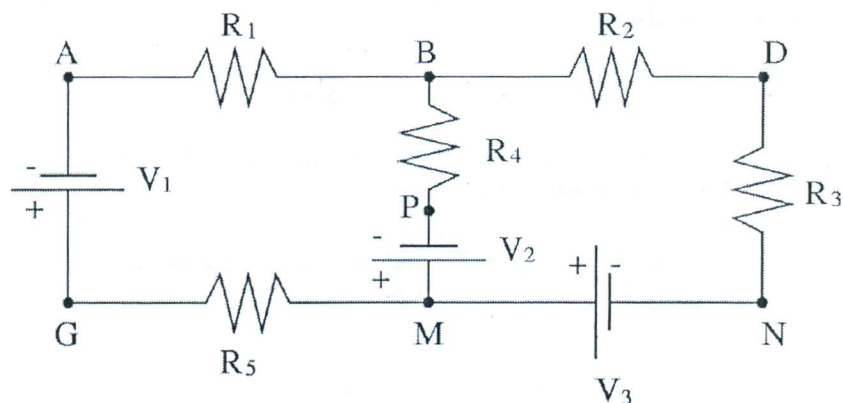


Figure:3

Calculate the current (magnitude and direction) through all the resistors.

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-----Use your brains, Have patience, Think hard, write well & Best of Luck-----