

EA-45

B.E. (IInd Sem.) CGPA Examination-2011

BASIC ELECTRICAL & ELECTRONICS  
ENGINEERING

Paper - CE-203

Time Allowed : Three Hours

Maximum Marks : 60

Note : All questions are compulsory. Solve all parts of a questions in sequence.

Q.1 Choose the correct answer— 1 each

(i) An electrical lamp consumed 100 W of power. If the supply voltage is 220V. The energy consumed in 30 minutes is—

- |               |              |
|---------------|--------------|
| (a) 0.005 KWh | (b) 0.05 KWh |
| (c) 0.5 KWh   | (d) 5 KWh    |

(ii) One Tesla is equal to—

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (a) $1 \text{ Wb} / \text{mm}^2$ | (b) $1 \text{ Wb} / \text{m}$    |
| (c) $1 \text{ Wb} / \text{m}^2$  | (d) $1 \text{ mWb} / \text{m}^2$ |



(a) If the efficiency of a machine is to be high, what should be low—

- (a) Input power
- (b) Losses
- (c) True component of power
- (d) KWh consumed

(b) Electric current passing through the circuit produces —

- (a) Magnetic effect
- (b) Luminous effect
- (c) Thermal effect
- (d) All above effects

(c) A transformer is working at its maximum efficiency. Its iron loss is 1KW. Its copper loss will be —

- (a) 0.2 KW
- (b) 0.25 KW
- (c) 0.5 KW
- (d) 1 KW

(d) The rotating part in a DC machine is generally called —

- (a) Staton
- (b) Pole
- (c) Armature
- (d) Rotor



(vii) The commutator in a dc generation is used for ---

- (a) Converting dc to ac
- (b) Changing ac to dc
- (c) Reducing friction
- (d) Collecting the current

(viii) An alternating voltage is expressed by  $e = 282 \sin 132 t$ . The rms voltage and frequency will be—

- (a) 282V, 50Hz
- (b) 200V, 25Hz
- ~~(c)~~ 200V, 21Hz
- (d) 282V, 25Hz

(ix) The flux density is equal to—

- (a) Flux x area
- (b) Flux x area<sup>2</sup>
- (c) Flux / area
- (d) None

(x) What is the highest value of power factor in ac circuit—

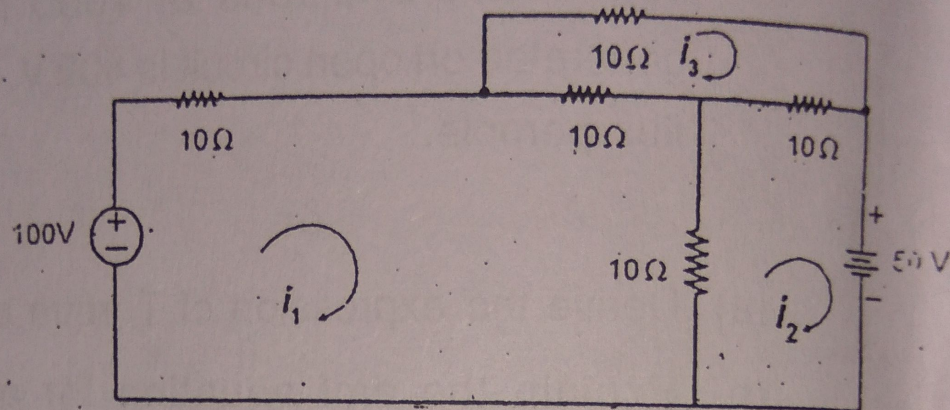
- (a) 1000
- (b) 100
- (c) 10
- (d) 1

$B = \frac{\phi}{A}$



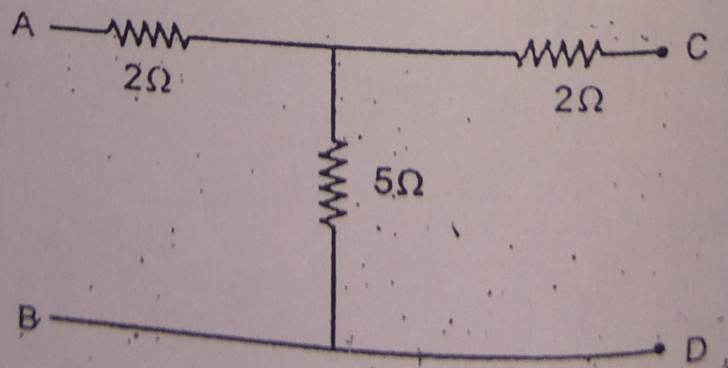
## Unit-I

- Q.II (a) Derive the equations for transforming a delta network into an equivalent star network. 4
- (b) Find the mesh currents  $i_1$ ,  $i_2$  and  $i_3$  in the circuit given below— 6



or

- (a) What is maximum power transfer theorem for DC circuit. Give statement and formula. 5
- (b) Show that the given circuit is reciprocal between AB & CD. 5



## Unit-II

- Q.III (a) Explain and state Ampere's law. 4



(5)

(b) An electromagnet of shape ring having a cut of 0.4 cm, whose area of cross-section of core is  $12 \text{ cm}^2$ . Mean length of iron path is 50 cm. It is excited by two coils each having 400 turns. When the current in the coils is 1.0A, the resulting flux density gives a relative permeability of 1300. Calculate — 6

- (i) Reluctance of iron part of the magnetic circuit
- (ii) Reluctance of the air gap
- (iii) Total reluctance
- (iv) Flux density in the airgap. Neglect leakage and fringing.

or

(a) Derive the expression of electrostatic energy stored in Electric field. 6

(b) Explain statically and dynamically induced emf. 4

### Unit-III

Q.IV (a) A non-inductive load takes 20 A at 200V. Calculate the inductance of the reactor to be connected in series in order that the same current be supplied from 230V, 50 Hz mains. Also determine the phase angle between the 230 V supply and the current. Neglect the resistance of the reactor. 6

(b) Explain Average value, RMS value, Form factor and Peak factor. 4



or

- (a) Determine the relation between line and phase voltage for star connected load. 4
- (b) A sinusoidal alternating current of frequency 25 Hz has a maximum value of 100A. How long will it take for the current to attain values of 20, 50 and 100 A.

### Unit-IV

- Q.V (a) Draw the exact equivalent circuit of a transformer referred to secondary and describe briefly the parameters involved in it. 4
- (b) A 40 KVA transformer has got a maximum efficiency of 97% at 80% of load at unity power factor. During the day it is loaded as follows—6
- |       |       |             |
|-------|-------|-------------|
| 9 hrs | 6 KW  | 0.6 lagging |
| 8 hrs | 25 KW | 0.8 lagging |
| 7 hrs | 30 KW | 0.9 lagging |
- Find all-day efficiency.

or

- (a) Explain construction and working principle of auto-transformer. 5
- (b) Draw and explain phasor diagram of transformer on load condition, with taking load as of-capacitive in nature. 5



(7).

## Unit-V

Q.VI (a) Explain open circuit characteristics of DC generator. 4

(b) A six pole, wave-connected armature has 300 conductors and runs at 1000 rpm. The emf generated on open circuit is 400 V. Find the useful flux per pole. 6

or

(a) Derive the expression of Torque of DC Motor. 5

(b) Explain the emf equation for all type of DC generator and also draw their equivalent circuit. 5