FACULTY OF ENGINEERING

B.E. (AICTE) I-Semester (Backlog) Examination, July 2021

Subject : Basic Electrical Engineering

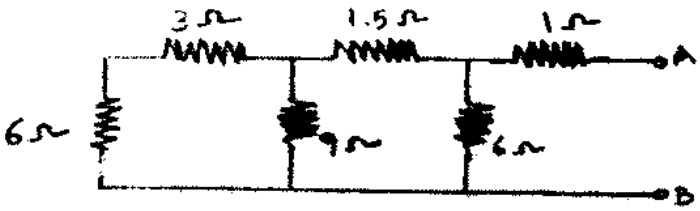
Time: 2 Hours **Max marks: 70**

Note : Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Five questions**. **(5x2=10 Marks)**

1. Find the Total Resistance across terminals A & B?

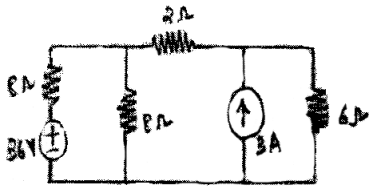


2. Derive the expression for energy stored in inductor?
3. A series RC circuit having R = 20Ω and Xc = 15Ω. Determine (i) Impedance (ii) p.f. of the circuit?
4. Write the relationship between phase & line values of voltage, current and power in Star Connected System & Delta connected system
5. Draw the No load Phasor diagram for practical 1- ɵ transformer?
6. Define (i) Synchronous Speed (ii) Slip
7. Write applications of DC Shunt motor?
8. 1- ϕ induction motors are not self starting, Why?
9. Compare MCB & MCCB?
10. Write the essential components of Battery backup?

PART- B

Note: **Answer any Four questions**. **(4x15=60 Marks)**

11. a) State & Explain Thevinin's theorem?
    b) Find the current through 6Ω resistor using Super Position Theorem?



…2

12. a) A 230 V, 1 – ϕ 50Hz AC supply is applied across series connection of R = 20Ω, C=10μF. Calculate (i) Impedance (ii) Total Current (iii) power factor (iv) Active Power (v) Reactive Power?
    b) Show that $I_L = \sqrt{3} I_{ph}$ in 3 - ϕ balanced delta connected system with the help of phasor diagram.

13 a) Explain Rotating Magnetic Field Theory for 3 - ϕ Induction Motor?
    b) A 3kVA, 1 - ϕ 50 Hz, 230/115V transformer gave the following test results:
    OC test : 115V, 1A 36W; **SC test** : 90V 13A, 240W
    Calculate the equivalent circuit parameters of a given transformer and also efficiency at full load at 0.8 p.f. lagging?

14. a) A4-pole, lap wound DC shunt generator has a useful flux per pole of 0.07 wb. The armature winding consists of 440 conductors and the armature resistance of 0.055Ω Calculate the terminal voltage when running at 900 rpm. If the armature current is 50A.
    b) Classify & Draw the different types of DC motors and write it's voltage equations?

15. a) What is Earthing? What are the types of Earthing? Explain any one type of Earthing with neat diagram?
    b) Explain p.f. improvement using Static Capacitors method?

16 a) State Kirchhoff's Laws and explain with one example?
    b) Derive the RMS value of current for sinusoidal waveform?

17. a) What is Auto transformer? What are the advantages, disadvantages & applications of Auto Transformer?
    b) Explain briefly about Capacitor Start Induction motor with neat diagram?

****

Code No. 15167/AICTE

FACULTY OF ENGINEERING

B.E. I-Semester (AICTE) (New) (Main) Examination, July 2021

Subject: Basic Electrical Engineering

Time: 2 hours **Max. Marks: 70**

Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.
ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any, may suitably be assumed.

Answer any four questions from the following. (4 x 4 = 16 Marks)

1 (a) Explain Ohm's law and its limitations.

(b) Draw the power triangle of RC circuit and explain in detail.

(c) What is meant by slip of an Inductor motor and why it must be present for motor action?

(d) The primary winding of an electric train transformer has 400 turns and the secondary has 50. If the input voltage is 120V (rms) what is the output voltage?

(e) Why is there phase difference between voltage and current in an a.c. circuit? Explain the concept of power factor.

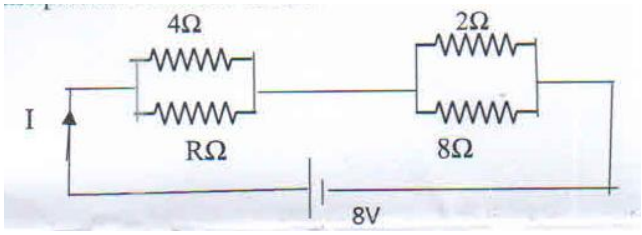
(f) What are the advantages of 3 phase circuits over single phase circuits?

(g) List the applications of DC shunt motor.

(3 x 18 = 54 Marks)

2 (a) Explain the mesh analysis of solving a network with an example.

(b) The total power consumed by the given network is 16W. Find the value of R, power dissipated in R & total current.



3 (a) The current in an inductive circuit is given by 0.3 in (200t – 40°)A. Write the equation for the voltage across it if the inductance is 40 mH.

(b) A 440V, 3 phase. 50 Hz supply is fed to three coils, star connected each having a resistance of 25Ω & an inductive reactance of 20Ω. Calculate
(i) line current (ii) power factor (iii) power supplied

(c) Mention any three advantages of AC over DC.

4 (a) Describe the operation of single phase transformation explaining clearly the functions of the different parts. Why cores are laminated?

(b) A 3 phase, 460V, 100 H.P, 60Hz 4 pole Induction machine delivers rated output power at a slip of 0.05. Determine the (i) synchronous speed (ii) motor speed (iii) frequency of rotor current (iv) slip speed.

..2

5 (a) Explain what is meant by back emf. Derive the torque equation of DC motor from the fundamentals.

(b) Which type of motor is used for following applications?
(i) sewing machines (ii) mixer (iii) dishwasher (iv) washing machine

(c) Explain the open circuit characteristics of DC Generator and significance of critical resistance.

6 (a) In a house, there are 5 lamps 25 Watt used 14 hours per day, a 200 Watt refrigerator used 24 hours per day, and 125 Watt water pump used 8 hours per day. How much electrical energy used for a month (30 days).

(b) List the different methods to improve p.f. & explain any one of them.

(c) What is the significance of CB and what are its basic requirements?

7 (a) A 50KVA, 3300/220V, 50Hz single phase transformer is built on the core having an effective cross section of 150 cm^2. It has 80 turns in low voltage winding.
Calculate :
(i) maximum flux density
(ii) number of turns in high voltage winding and
(iii) full load currents in both low and high voltage windings.

(b) A straight metal wire crosses a magnetics field of flux 4mWb in a time 0.4s. Find the magnitude of the emf induced in the wire.

(c) Give an illustration of determining direction of induced current by using Lenz's law.

*****