Total No. of Questions—8]

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Seat
No.

[5057]-2044

S.E. (E&TC and Electronics) (I Sem.) EXAMINATION, 2016

ELECTRICAL CIRCUITS AND MACHINES

(2015 PATTERN)

Time : Two Hours   Maximum Marks : 50

N.B. :— (i) Solve Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,

Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

(ii) Figures to the right indicate full marks.

(iii) Neat diagrams must be drawn wherever needed.

(iv) Use of non-programmable electronic pocket calculator is

allowed.

(v) Assume suitable data, if necessary.

1. (a) Find the current through Z_L by using Thevenin's theorem in

the circuit shown below :   [6]
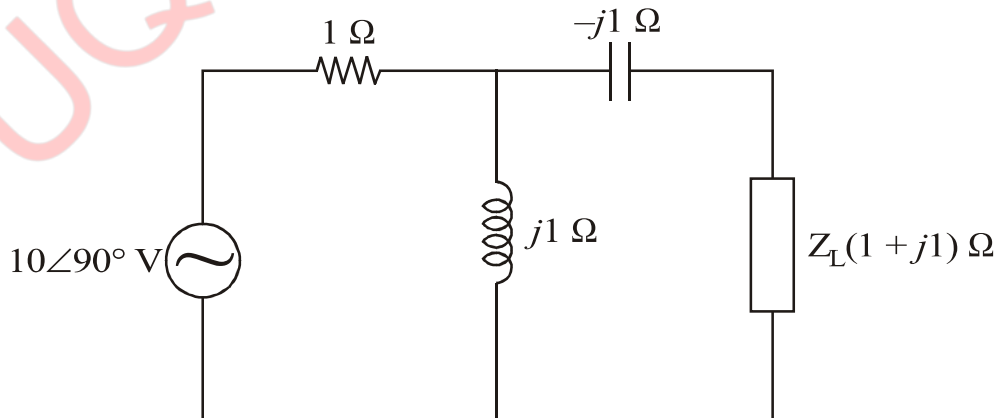
(*b*) Explain and draw the equivalent and approximate circuit of the single phase transformer referred to primary. [6]

Or

2. (*a*) A 10 kVA transformer has a full load efficiency of 96%. The copper loss and iron loss are equal. Table given below shows the loading schedule of the transformer during a day. Calculate all day efficiency : [6]

Loading	No. of hours
No load	10
Full load	2
Half load	5
Quarter load	7

(*b*) State and explain : Maximum power transfer theorem and Norton's theorem. [6]

3. (*a*) Derive the torque equation for D.C. motor. Draw the torque-current, speed-current and torque-speed characteristics of a shunt motor using torque equation or otherwise. [6]

(*b*) Discuss briefly different methods of speed control for three phase induction motors. [6]

Or

4. (*a*) Explain the difference between the squirrel cage induction rotor and slip ring induction rotor. [6]

(*b*) A 100 kW belt driven D.C. shunt generator running at 500 rpm on 220 V supply, continues to run as a motor when the belt breaks. When it runs as a motor, it draws 12 kW from supply. Find the speed at which it will run as a motor. The resistances of armature and field are 0.025 Ω and 55 Ω respectively. The total brush contact drop is 2 V. [6]

5. (*a*) Explain the construction and working principle of BLDC motor. Also draw its speed torque characteristics. [7]

(*b*) Write a short note on Reluctance motor. [6]

Or

6. (*a*) Explain the construction and working principle of Universal Motor. [7]

(*b*) Distinguish between Brushless D.C. motor and Conventional D.C. motor. [6]

7. (*a*) Explain the working principle of permanent magnet Stepper motor with constructional diagram. [7]

(*b*) Draw and explain characteristics of D.C. Servomotor. [6]

Or

8. (*a*) Describe the principle of operation of single-phase split phase type induction motor along with its circuit and phasor diagram. [7]

(*b*) What is Stepper motor ? Explain the concept of Stepper motor. [6]