

Total No. of Questions—8]

[Total No. of Printed Pages—2

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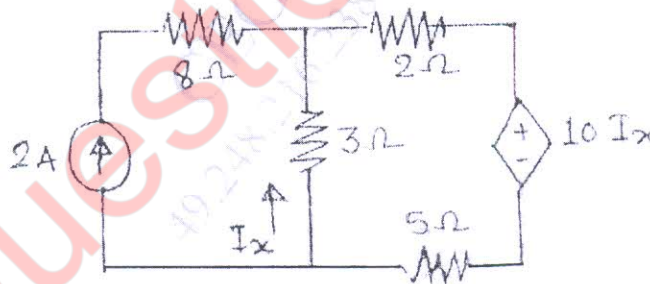
S.E. (E & TC AND ELECTRONICS)  
(FIRST SEMESTER) EXAMINATION, 2018  
ELECTRICAL CIRCUITS AND MACHINES  
(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

- N.B.* :— (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,  
Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8.  
(ii) Figures to the right indicate full marks.  
(iii) Neat diagrams must be drawn wherever necessary.  
(iv) Use of non-programmable electronic pocket calculator is allowed.  
(v) Assume suitable data, if necessary.

Q1. (a) Find current  $I_x$ . [6]



(b) Explain open circuit test and short circuit test to be performed on transformer with neat circuit diagram. [6]

OR

Q2. (a) A 50 KVA, 2200/22 V, 50 Hz single phase transformer has an iron loss of 300 W. The resistances of low and high voltage windings are  $0.005 \Omega$  and  $0.5 \Omega$  respectively. If the p.f is 0.8 lagging, calculate maximum efficiency. [6]

(b) State and explain: Maximum Power Transfer Theorem. [6]

P.T.O.

Q3. (a) Derive emf equation for DC generator. [6]

(b) Explain the working principle of synchronous motor. [6]

OR

Q4. (a) With the help of neat diagram explain the Torque slip characteristics of Induction motor. [6]

(b) A 4 pole, 250 V, DC series motor has a wave connected armature with 200 conductors. The flux per pole is 25 mWb when the motor is drawing 60 A from the supply. Armature resistance is  $0.15 \Omega$  while the series field winding resistance is  $0.2 \Omega$ . Calculate speed under this condition. [6]

Q5. (a) Explain the construction and working principle of BLDC motor. Also draw its speed torque characteristics. [7]

(b) Explain in detail the principle of working, types and applications of the Reluctance motor. [6]

OR

Q6. (a) Write a short note on Universal Motor. [7]

(b) Distinguish between Brushless DC motor and Conventional DC Motor. [6]

Q7. (a) Write short notes on servomotors. [7]

(b) What are Stepper motors? How are they classified? Plot static and dynamic characteristics of stepper motor. [6]

OR

Q8. (a) Describe the principal of operation of single phase split phase type induction motor along with its circuit and phasor diagram. [7]

(b) Write short note on Stepper Motors. [6]