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S.E. (E&TC and Electronics) (I Semester) EXAMINATION, 2019

ELECTRICAL CIRCUITS AND MACHINES

(2015 PATTERN)

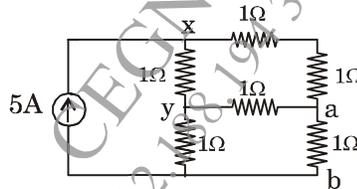
Time : Two Hours

Maximum Marks : 50

N. B.

- i. Figures to the right indicates full marks**
- ii. Draw neat diagrams wherever necessary**
- iii. Use of non-programmable electronics pocket calculator is allowed**
- iv. Assume suitable data if necessary**

- Q.1 a)** Using current source shifting and source transformation technique obtain equivalent voltage across the terminal a - b in the circuit shown below. All resistors are in ohms (6)



- b)** Derive the EMF equation of single phase transformer (6)
- OR**
- Q.2 a)** State and Explain Maximum Power Transfer Theorem (6)
- b)** Write a short note on Isolation Transformer (6)
- Q.3 a)** Derive the torque equation for DC motor. Draw the torque – current and torque – speed characteristics of a shunt motor using torque equation (6)
- b)** Discuss briefly different methods of speed control for three phase induction motors (6)
- OR**
- Q.4 a)** Explain Torque – Slip characteristics of three phase induction motor. Explain the effect of rotor resistance on its characteristics with near diagram (6)
- b)** Explain the difference between squirrel cage induction motor and slip ring induction motor (6)

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- Q. 5 a)** Explain the construction and working of BLDC motor. Also draw the speed – torque characteristics (7)
- b)** Write a short note on reluctance motor (6)
- OR**
- Q. 6 a)** Explain the construction and working principle of Universal motor (7)
- b)** Distinguish between BLDC and Conventional DC motors (6)
- Q. 7 a)** What are stepper motors ? Explain any one type of Stepper motor in detail with its applications (7)
- b)** Compare variable reluctance motor with permanent magnet stepper motor (6)
- OR**
- Q.8 a)** Explain construction & working of AC Servomotor. State its applications (6)
- b)** What are induction motors ? Explain operating principle of shaded single phase Induction Motor (7)