

Code: R7210405

B.Tech II Year I Semester (R07) Supplementary Examinations December 2015

ELECTRICAL TECHNOLOGY

(Common to ECE, EIE, E.Con.E & ECC)

(For 2008 Regular admitted batch only)

Time: 3 hours

Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) List out the possible reasons for a DC generator fails to build up voltage when it runs at rated speed.
(b) Briefly explain the load characteristics of different types of compound generators.
- 2 (a) Mention the various speed control methods of DC shunt motors.
(b) With the help of neat circuit diagram, explain Swinburne's test and derive the relations for efficiency (both for generator and motor). Also state the merits and demerits of this method.
- 3 (a) Draw and explain the phasor diagram of transformer when it is operating under load.
(b) Explain the construction and operation of single phase transformers.
- 4 (a) What are the different losses occur in a transformer?
(b) The corrected instrument readings obtained from open and short-circuit tests on a 15 kVA, 450/120 V, 50 Hz transformer are:
O.C. test: $V_1 = 120$ V, $I_1 = 4.2$ A, $W_1 = 80$ W, V_1 , I_1 & W_1 were read on low voltage side.
S.C. test: $V_1 = 9.65$ V, $I_1 = 22.2$ A, $W_1 = 120$ W with low voltage winding short circuited.
Calculate: (i) The equivalent circuit (approximate). (ii) Efficiency and voltage regulation for 0.8 lagging factor. (iii) The efficiency at half full-load and 0.8 lagging power factor load.
- 5 (a) Derive the equation for torque developed by an induction motor. Draw a typical torque-slip characteristic and deduce the condition for maximum torque.
(b) Explain with schematic diagram, the methods of starting of squirrel cage and slip-ring three phase induction motors.
- 6 (a) What are the advantages of making the field rotating in place of armature?
(b) A stator has two poles of arc equal to two-thirds of the pole pitch, producing a uniform radial flux of density 1 Wb/m². The length and diameter of the armature are both 0.2 m and the speed of rotation is 1500 r.p.m. Neglecting fringing, calculate the form factor of the emf generated in a single full pitch armature coil of 10 turns.
- 7 (a) Draw a diagram showing the construction of a stepper motor and discuss its operation.
(b) Discuss the function of an ac tachometer. Explain its construction and operation.
- 8 (a) PMMC instrument has FSD current of 50 milliampere and 2 ohm resistance. How the instrument can be converted to $0 - 5$ A range ammeter and $0 - 100$ V range voltmeter?
(b) Explain the principle of operation, construction and the expression for deflection of a moving iron instrument.
