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T2 EXAMINATION- OCT. 2019

B.Tech. III Sem.

COURSE CODE: 10B11EC311 MAX. MARKS: 25
COURSE NAME: ELECTRICAL MACHINES AND INSTRUMENTS
COURSE CREDIT: 04 MAX. TIME: 1.30 HR.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. (a) Explain why hysteresis and eddy-current loss occur in the core of a transformer. [2]

(b) Draw the equivalent circuit of a transformer with (i) the primary quantities referred to the secondary side, and (ii) the secondary quantities referred to the primary side. [3]

Q-2. Explain the different methods of excitation of a dc generator with diagrams. Write the expression for the terminal voltage in each case. [5]

Q3. (a) Derive emf equation of dc generator. [2]

(b) How a self-excited dc shunt generator build up voltage as it is run by a prime mover. Explain with the help of no-load characteristics. What are the important conditions for this voltage build-up process? [3]

Q4. (a) A 4-pole, shunt generator with lap-connected armature has field and armature resistances of 50 Ω and 0.1 Ω, respectively. It supplies power to sixty 100-V, 40-W lamps. Calculate the total armature current, the current per armature path, and the generated emf. Allow a contact drop of 1 V per brush. [2]

(b) How can you operate the same dc machine as motor and generator? Give detailed description with circuit connections. [3]

Q5. (a) Explain the following terms w.r.t. dc machine: [2]
(i) Critical speed
(ii) Critical resistance
(iii)Load characteristics
(iv) Internal characteristics

(b) Describe the torque characteristics of a dc motor. [3]