

**II B. Tech I Semester Supplementary Examinations, May - 2018**  
**ELECTRICAL MACHINES – I**  
 (Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**

**PART -A**

1. a) Explain the significance of interpoles in DC machines (2M)
- b) Write the applications of series, shunt and compound DC motors (3M)
- c) What is Hopkinson's test and give its merits over other tests (3M)
- d) Why is the core of a transformer laminated? (2M)
- e) Explain why parallel operation of transformer is necessary? (2M)
- f) How to eliminate third harmonic voltages in polyphase transformers (2M)

**PART -B**

2. a) Why most practical energy conversion devices use magnetic field as the coupling medium between electrical and mechanical systems? (7M)
- b) State the electromagnetic phenomena useful for the electromagnetic energy conversion in rotating electric machines (7M)
3. a) Explain why the emf generated in the armature of a DC Motor is called 'back emf' (7M)
- b) The armature of a 4 pole lap wound dc machine has core length = 45 cm, diameter = 50 cm, total conductors = 500, speed =1200 rpm and current = 25 A. For an average flux density of 0.6 T, find the electromagnetic (or gross mechanical) power developed and the internal torque. (7M)
4. a) Explain with a neat connection diagram , the working of a Three point starter used for a DC Shunt motor (7M)
- b) A 230 V dc Shunt motor takes 36 A at full load. Find the back emf on full load if the resistances of motor armature and shunt field windings are 0.26 ohms and 130 ohms respectively (7M)
5. a) Explain the operation of transformer on no load with a neat vector diagram (7M)
- b) A 220 V , 2.8 KVA single phase transformer has an iron loss of 120 W at 45 Hz and 70 W at 35 Hz. Find the hysteresis and eddy current losses at 50 Hz. (7M)
6. a) What is sumpner's test and explain its principle with a neat circuit diagram (7M)
- b) A single phase, 25 KVA, 2000/200V transformer has iron loss is 350W and full load copper loss is 400W. Calculate the efficiency at unity power factor on full load and half load? (7M)



7. a) Explain open delta (or V – V ) connection with neat diagrams (7M)
- b) In a Sumpner's test on two identical single – phase transformers rated 750 kVA, 11/0.5 kV, 50 Hz the wattmeter reading on h.v side is 8000 W and on the l.v side is 16000W. Find the efficiency of each transformer on half full load and 0.78 power factor. What will be its maximum efficiency (7M)

