

**Code No: 123BZ****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year I Semester Examinations, September - 2021****ELECTRICAL MACHINES - I****(Electrical and Electronics Engineering)****Time: 3 hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

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- 1.a) What is co energy? Give an expression for it.  
b) What is electromechanical Energy conversion? Derive expression for – forces and torque in magnetic field system? [8+7]
- 2.a) An 8-pole dc generator has 500 armature conductors and a useful flux of 0.05 Weber per pole. What will be the EMF generated if it is lap-connected and run at 1200 rpm? What must be the speed at which it is to be driven to produce the same EMF if it is wave-wound?  
b) Why is output of DC Generator alternating in nature? Explain action of commutator. [8+7]
- 3.a) Differentiate between long shunt and short shunt compound generators. Give relations for voltage and current.  
b) Give the characteristics of various types of generators. [8+7]
- 4.a) Differentiate between lap and wave winding of D.C. Generators.  
b) Give the applications of D.C. Shunt and series generators. [8+7]
- 5.a) Derive the e.m.f equation of a d.c generator.  
b) What are the causes for failure to self excite in a d.c shunt generator? Explain. [8+7]
- 6.a) Explain the principle of operation and working of a dc motor.  
b) Derive an expression for torque of a dc motor from fundamentals. [8+7]
- 7.a) With a neat circuit explain the operation of a three point starter. Give the significance of NVC and OLR.  
b) With a neat diagram explain the ward Leonard method of control of speed for a dc motor. Give its merits and demerits. [8+7]
- 8.a) Explain the method of finding the efficiency of a dc machine as a generator and motor by indirect method. Give its significance. State its advantages and disadvantages.  
b) Explain the method of testing a D.C machine by regenerative method. Give procedure to find efficiency of motor and generator. [7+8]

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