

Code No: R161214

R16**SET - 1**

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2017
ELECTRICAL AND MECHANICAL TECHNOLOGY
(Com. to ECE, EIE, ECom E)

Time: 3 hours

Max. Marks: 70

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

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**PART -A**

1. a) What are the functions of no-volt release coil in a three-point starter? (2M)
- b) Define voltage regulation of an alternator. (2M)
- c) Why is the core of a transformer laminated? Which material is used to build the transformer core? (2M)
- d) What is the need for damping torque in measuring instruments? (2M)
- e) What is conduction heat transfer? How does it differ from convective heat transfer? (2M)
- f) List out various non renewable energy resources. (2M)
- g) Why a roller follower is preferred to that of a knife-edged follower? (2M)

**PART -B**

2. a) Derive an expression for the emf induced in a transformer winding. Show that emf per turn for both primary and secondary windings are same. (7M)
- b) A separately excited dc generator supplies 50 A at 200 V to a circuit of constant resistance, while running at 1500 rpm. What will be the current when the speed is reduced to 1200 rpm? Field excitation and load resistance remain constant. Armature resistance is 0.05  $\Omega$  and brush drop is 2.5 V. Neglect the effect of armature reaction. (7M)
3. a) Explain the procedure to find regulation of an alternator using synchronous impedance method. (7M)
- b) A 6-pole, three-phase induction motor operates from a supply whose frequency is 50 Hz. Calculate (i) the speed at which the magnetic field of the stator is rotating (ii) the speed of the rotor when the slip is 0.035 (iii) the frequency of rotor currents when the slip is 0.02 (iv) the frequency of the rotor currents at standstill. (7M)
4. a) Explain the various techniques by which damping torque is produced in an electrical measuring instrument. (7M)
- b) Describe the working of a moving iron attraction type meter. (7M)

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5. a) What is a gray body? Derive the expression for radiation heat exchange between two gray surfaces connected by single refractory surface. (7M)
- b) A 60mm thick plate with a circular hole of 30mm diameter along the thickness is maintained at uniform temperature of  $277^{\circ}\text{C}$ . Find the loss of energy to the surroundings at  $20^{\circ}\text{C}$ , assuming that the two ends of the hole to be as parallel discs and the metallic surfaces and surroundings have black body characteristics. (7M)
6. a) Explain the functioning of lathe and Write down its specification. (7M)
- b) Explain the causes of welding defects and their remedies with neat sketch. (7M)
7. a) Define a Performance parameter for an I.C. Engines. Identify some of them. (7M)
- b) How do you classify petrol and diesel engine? (7M)