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Total Number of Pages: 02

**B.Tech**  
**BEEE2215**

**4<sup>TH</sup> Semester Regular / Back Examination 2015-16**  
**ENERGY CONVERSION TECHNIQUES**

**BRANCH(S): MECH, METTA, MINERAL, MINING, MM**

**Time: 3 Hours**

**Max Marks: 70**

**Q.CODE: W446**

**Answer Question No.1 which is compulsory and any five from the rest.**  
**The figures in the right hand margin indicate marks.**

**Q1** Answer the following questions: **(2 x 10)**

- a) Explain the term "Critical Field resistance" in case of DC Generator ?
- b) Which type of DC Motor used for traction purpose and why ?
- c) Explain the power division in DC generator ?
- d) A 3 phase induction motor is wound for 6 pole and supplied with 50Hz .Calculate the rotor speed if the slip is 3% ?
  
- e) Short circuit test of a single phase transformer is conducted on which side & why ?
- f) How does eddy current and hysteresis losses are affected with the increase in frequency ?
- g) What is the function of NVR coil in a DC motor starter ?
- h) Mention the names of any two starting methods used in case of single phase induction motor ?
- i) Name two methods of starting squirrel cage induction motor?
- j) What is the basic difference between synchronous motor & induction motor ?

**Q2 (a)** Explain the voltage build up process in case of a DC generator with the help of OCC ? **(5)**

**(b)** A Long Shunt Generator delivers 50 Amp at 500V .Given  $R_a=0.05\Omega$ ,  $R_{sh}=250\Omega$ ,  $R_{se}= 0.05\Omega$ .Calculate the Generated EMF allowing 1V/ brush contact drop? **(5)**

**Q3** A 4 pole wave connected 250V DC shunt motor gives 10Kw when running at 900 rpm and drawing an armature current of 60A and field current of 1A. It has 560 conductors and  $R_a=0.2\Omega$ . Allow a brush drop 1V/brush. Determine **(10)**

- a) Total torque developed ?
- b) Useful torque ?
- c) Flux per pole ?
- d) Rotational losses ?
- e) Efficiency ?

**Q4 (a)** Explain a method by which DC motor speed can be controlled above the rated speed drawing a neat diagram ? **(5)**

**(b)** A Separately excited generator with constant excitation is connected to a constant resistance circuit. When the speed is 1200 RPM it delivers 120 A at 500V. At what speed will the current be reduced to 60A ? If the armature resistance =  $0.1\Omega$ , contact drop per brush = 1V. (Armature reaction be ignored) **(5)**

**Q5 a)** Explain the significance of no load phasor diagram for a single phase transformer ? **(5)**

**b)** A 600 KVA single phase transformer has an efficiency 92% at both full & half load at upf. Determine the efficiency at 60% of full load at 0.8 pf (lag) ? **(5)**

**Q6 a)** Explain how three single phase transformers connected as a bank of three phase transformer ? **(5)**

**b)** Explain the starting method of synchronous motor by using damper winding ? **(5)**

**Q7 a)** Explain the principle of operation of alternator ? **(5)**

**b)** A 3phase, 6 pole, 50Hz induction motor has a slip of 2% at no load and 4% at full load Find **(5)**

- a. The synchronous speed
- b. No load speed
- c. Full load speed & also frequency of rotor current at Stand still?

**Q8** Write Short Notes (Any Two) **(5 x 2)**

- a) Three point starter
- b) Armature control of DC shunt motor
- c) Principle of operation of single phase induction motor