

FACULTY OF ENGINEERING AND TECHNOLOGY
Third Engg (EEP/EE/EEE) Examination - DEC – 2014
Special Purpose Electrical Machines (Revised)

[Time: THREE Hours]

[Max. Marks: 80]

“Please check whether you have got the right question paper.”

- N.B** 1) *Q. 1 & Q. 6 are compulsory.*
 2) *Solve any two questions from remaining four in each section (2-section A & 2-section B) total 6.*
 3) *Assume suitable data wherever necessary.*
- SECTION A**
- Q.1 Solve any five from following 10
- Why the induction generator is often called as an asynchronous generator?
 - Is the circle diagram valid for induction generator?
 - Show monitoring action with neat diagram.
 - What are the advantages of BLDC motor?
 - Write any two applications of LIM.
 - Write the minimum angle of step, available in stepper motors.
 - Draw equivalent circuit of self excited induction generator.
 - What is the maximum available power rating of any FHP motors?
- Q.2 a) Explain with block diagram of closed loop control of a BLDC motor, with voltage fed inverter. 08
 b) An induction generator has rated synchronous speed of 1000 rpm. The stator output is 10KW. If the rotor is short circuited, the rotor copper loss is 8% of output. Find the driven speed in rpm. 07
- Q.3 a) Explain the application of induction generator, in mini & micro hydel systems; with neat sketches. 08
 b) Explain the working of synchronous reluctance motor & also write its operating principle. 07
- Q.4 a) A single sided LIM has an application to drive a electric vehicle, with speed of 20KMPH; when operated on 60 Hz supply. The slip is 0.3. if motor has pole pitch of 60cm; find the no. of poles. 08
 b) Explain the operating principle & working of a Radial air gap synchronous reluctance motor. 07
- Q.5 a) Explain the difference in working of single stack & multi stack configuration hybrid stepping motors with neat sketches. 10
 b) Explain in short working of BLDC motor. 05
- SECTION B**
- Q.6 Solve any five from following: 10
- Define convection of Heat.
 - Define current efficiency in electrolytic processes.
 - State faraday's first law of electrolysis.
 - Give one example of application of rectifier transformer.
 - Write two ways of extraction of metals.
 - List out types of welding equipments.
 - Write two examples of applications of high freq. transformer.
 - Name two gases used in MIG welding.
- Q.7 a) Write the process of induction heating & give example of its applications, also draw a sketch of the process execution. 08
 b) Determine the amount of energy required to melt the metal at the rate of 500kg/hr in a furnace, where specific heat of the metal is 0.09, latent heat of fusion is 35K cal/kg. Initial temp. is 30°C, melting point of metal is 680°C, assume the efficiency is 60%. 07
- Q.8 a) Explain the process of TIG welding & name the gases used for it with purpose of their use. Draw neat sketches to support your explanation. 07
 b) Dielectric heating is used to heat the polymer piece of dimensions (4 × 10 × 15) millimeters. The area to be heated is (10 × 15)mm². The power factor is 0.04. the heating process takes 200 watts, when supplied by 415V 50 Hz supply. Determine the permittivity; of the insulating material. 08
- Q.9 a) Explain the refining process of metals using laws of electrolysis. Use proper sketches to support your write up. 05
 b) Explain with neat connection diagram. How a conventional single phase transformer can be used to measure current & voltage by back Or Boost action. 10
- Q.10 a) With neat sketch, explain in details the operating principles & working of an ARC furnace & give any two applications. 10
 b) Explain in brief the principle of electro deposition. 05