2007 JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY B.TECH III SEMESTER INFORMATION TECHNOLOGY ELECTRICAL MACHINE AND INSTRUMENTATION

NOVEMBER 2007

TIME 3 HOUR MARK 80

ANSWER ALL QUESTIONS

1. The Iron and full load copper losses in a 40 KVA, single-phase transformer are 250W and 750W respectively. Calculate the efficiency at

(1) Full load 0.8 pf lagging,

(2) Half load 0.8 pf lagging,

(3) 1/4th of full load at 0.8 pf lagging,

(4) Find also load at which the efficiency is maximum.

2. A DC shunt motor runs at a speed of 1000 rpm on no load taking the current of 6 a from the supply, when connected to a 220 V DC supply. Its full load current is 50A. Calculate its speed on full load. Assume Ra = 0.30hm and Rsh = 1100hm.

3. Explain the working of a variable reluctance stepper motor with neat diagrams.

4. Explain the working principle and construction of permanent magnet moving coil instruments.

5. Why Kelvin's bridge is preferred? Derive the bridge balance equation for the Kelvin Bridge.

- 6. Describe different parts of CCRT with the help of diagram.
- 7. Answer the following.

(1) Relate the synchronous speed with slip with suitable expression.

(2) Derive the emf equation of DC generator.

- (3) Draw the load characteristics of DC shunt generator.
- (4) Define aquadag.
- (5) Draw the circuit of Hay's Bridge.