JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- December 2017

B.Tech VII Semester

COURSE CODE: 10B11EC311

MAX. MARKS: 35

COURSE NAME: Electrical Machines and Instruments

COURSE CREDITS: 04

MAX. TIME: 2 hr.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. A permanent-magnet moving coil meter movement has a current sensitivity of 0.1 mA and internal resistance of 100 Ω. This movement is to be converted into a multirange ammeter with ranges 10 mA, 50 mA and 100 mA. Calculate the values of shunt resistances needed for each range.   (2)

Q2. What is a stepper motor? Why is it named so? Explain the working of a VR stepper motor in its half step operation. Is there any other name given to this type of operation?   (4)

Q3. What are various torque in indicating instruments? Explain the various techniques by which these forces are produced in an indicating instrument.   (3)

Q4. Describe the operating principle of dynamometer-type instrument. Why it has square-law response?

            (3)

Q5. Sketch a CRT with electric focussing and deflection system. What are its main parts? Give the function of each part.   (4)

Q6. (a) What is double-field revolving theory of single phase induction motor?   (2)

(b) A 220-V, 50-Hz, split-phase induction motor has main-winding resistance of 5 Ω and inductive reactance of 4 Ω, and starting-winding resistance of 12 Ω and inductive reactance of 5 Ω. Determine at the start

(a) the current in the main winding, (b) the current in the starting winding,

(c) the line current, (Draw the phasor diagram of currents wrt voltage)

(d) the phase displacement between the two winding currents, and (e) the power factor (5)

Q7. What is transducer? Explain various inductive transducers.   (4)

Q8. Write short notes on the following: (8)

(a) Use of transformer for impedance matching

(b) Performance comparison of 3-phase Induction motor and D.C. shunt motor.

(c) Why we indicate capacity of transformer in KVA not in KW

(d) Why one should not start the DC series motor without any load.