COLLEGE OF ENGINEERING, PUNE-5

(An Autonomous Institute of Govt. of Maharashtra)

End Semester Exam

(MT207) Electrical & Instrumentation Technology

Programme: S. Y. B. Tech Metallurgy

Year: 2013-14 Semester III

Duration: 3Hr. Max. Marks: 60

Instructions:

1. Figures to right indicate full marks.
2. Draw neat diagrams wherever required.
3. Solve section A and B on separate answer sheet

SECTION A (ELECTRICAL TECNOLOGY)

Q1	A	What is the necessity of a starter for a dc motor. Explain, with a neat sketch, the working of a 3 point dc shunt motor starter, bringing out the protective features incorporated in it.	4
	B	Suggest suitable motors for the following applications and justify your answer in one line 1) Traction 2) Centrifugal pumps 3) Rolling Mills.	6
Q2	A	State the methods employed for speed control of induction motors. Explain rotor resistance control method.	5
	B	Calculate torque exerted by an 8 pole, 50 Hz, 3phase Induction Motor operating with 4% slip which develops a maximum torque of 150kgm at a speed of 660 rpm. Resistance/ phase = 0.5 ohm.	5
Q3	A	List the properties of good heating element. (any 6)	3
	B	Explain briefly the modes of heat transfer (any two).	2
	C	A 30 kW, 3 phase , 440 V, resistance oven is to employ nickel-chromium strip 0.25 mm thick for the three star connected heating elements. If the temperature of the strip is to be 1200 ° C and that of the charge be 800 ° C estimate a suitable width for the strip. Assume emissitivity = 0.93 and the radiating efficiency is to 0.5 and the radiating efficiency to be 0.6 and the resitivity of the strip material is 101.6 * 10 -3	5

SECTION B (INSTRUMENTATION TECNOLOGY)

Q1	A	Draw a instrumentation scheme for measurement of temperature, pressure and flow of a pipeline carrying oil, also comment on selection of instrument and specification required.	5
	B	What do you mean by elastic force devices? Explain any two.	3
	C	A capacitive transducer uses two quartz diaphragms of area 750 mm2 separated by a distance of 3.5 mm. A pressure of 900 kN/m2 when applied to the top diaphragm produces a deflection of 0.6 mm. The capacitance is 370 pF when no pressure is applied to the diaphragms. Find the value of capacitance after the application of a pressure of 900kN/m2.	2
Q2	A	Suggest a suitable transducer for non-contact type temperature measurement and explain in detail.What are the advantages of the measurement?	5
	B	Flow can be measured by using thermistor. True or false. Justify	3
	C	Is it possible to use Gamma rays for the measurement of liquid level? Explain.	2
Q3	A	Which transducer is suitable for the measurement of high pressure? Explain in detail.	5
	B	Write a note on PID controllers	3
	C	Find the poles and zeros of the system whose transfer function is as follows.	2

$$T(s) = \frac{2(s+1)^2(s+2)(s^2+2s+2)}{(s+4)^2(s+1)(s^2+2s+2)}$$