A-1309

M. Sc. (Tech.) (Instrumentation) (Part-I) Examination
March/April – 2015
INS - 11 : Workshop Technology & Mechanism : Paper - I

Time : **3** Hours]   [Total Marks : **70**

Instructions : (1)

(2)   All questions are compulsory.

(3)   Figures on extreme right indicate maximum marks.

(4)   Assume data wherever required/not given.

1   Answer any FOUR of the following :   **14**

(1)   Which are the desirable properties of bearing materials? Explain the importance of any two properties.

(2)   What is rolling contact and sliding contact bearing? Explain.

(3)   Explain and discuss various types of Rigid Couplings.

(4)   Write down the name of various materials used in bearing.

(5)   What is tool signature? Why is a tool provided with rake angle?

2   Answer any THREE from the following :   **14**

(1)   Give complete classification of Shaper.

(2)   Explain the construction and working of Apron Mechanism of Lathe.

(3)   A Lathe has a lead screw having pitch as 4 TPI. The set of change gear has gears with 16,18,20,22, 24,26,28,32,40,44, 48,52,56,64,72,76, 80, 84, 86, 100 and 127 teeth.
Calculate change gear ratio to machine following threads on a job (a) 2.5 mm pitch (b) 11 TPI

(4) Calculate cutting speed and machining time for taking one complete cut on a plate of 700 mm × 400 mm on a shaper. The data associated with machining process are as under;

- Feed rate 1.25 mm/stroke
- Ratio of return time to cutting time 2 : 5
- Approach and over travel 30 mm each.
- Rotational speed of bull gear 45 rpm

3 Answer any THREE from the following : 14
(1) What do you understand by (a) quill (b) rest and (c) vice?
(2) Explain the construction and working of tool head of Shaper.
(3) A 1600 mm long shaft has a taper length of 1200 mm. The larger diameter is 100 mm and smaller diameter is 20 mm.
Calculate : (a) Conicity (b) Taper in mm per meter
(c) Tailstock Set over and (d) Angle of Taper in degrees.
(4) Calculate the index crank movements to divide a periphery of the job in.
(a) 123 divisions and (b) 87 divisions.

4 Answer any THREE from the following : 14
(1) Differentiate between up milling and down milling operation.
(2) What are the differences between grinding and other machining processes?
(3) Differentiate between drilling, boring and reaming operations.
(4) Explain the construction and working of cross rail of shaper.

5 Answer any TWO from the following : 14
(1) What are the common geometrical tests are performed for testing of machine tools?
(2) How accuracy of machine tools are measured? Explain.
(3) What are the acceptance tests of machine tools?