DE-1309
M. Sc. (Part - I) (Tech.) (Instrumentation) Examination
March / April - 2016
Workshop Technology & Mechanism : Paper - I

Time : 3 Hours] [Total Marks : 70

Instructions :

(1) Fill up strictly the details of signs on your answer book.

Name of the Examination :
M. SC. (PART - I) (TECH.) (INSTRUMENTATION)

Name of the Subject :
WORKSH. TECHN. & MECHANISM : PAPER - 1

Subject Code No. : 1 3 0 9 Section No. (1, 2, ....) Nil

(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 Classify types of Slideways. Also the advantage and disadvantages of any one Slideways.
2 Classify the bearings based on type of lubrications.
3 Give complete classification of a Lathe
4 Discuss the basic requirements for chip formation.
5 Discuss the formation of continuous chips with built up edge. Under which conditions they likely to be formed?

2 Answer any THREE from the following [14]

1 Explain the construction and working of Tumbler gear mechanism of lathe.
2 Explain Crank and slotted link type quick return mechanism.
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) 1.5 mm pitch (b) 12 TPI
4 Calculate cutting speed and machining time for taking one complete cut on a plate of 500 mm X 350 mm on a shaper. The data associated with machining process are as under:
- Feed rate 2.25 mm/stroke
- Ratio of return time to cutting time $3 : 5$
- Approach and over travel 20 mm each.
- Rotational speed of bull gear 40 rpm

3 Answer any THREE from the following [14]

1 Explain the construction and need for Arbor in Milling machine. Which are the different types of Arbor?
2 Discuss relative merits and demerits of Step cone pulley driven head stock Vs All geared head stock?
3 A 1000 mm long shaft has a taper length of 750 mm. The larger diameter is 150 mm and smaller diameter is 50 mm. Calculate: (a) Conicity (b) Taper in mm per meter (c) Tailstock Set over and (d) Angle of Taper in degrees.
4 Explain tool signature of single point cutting tool.

4 Answer any THREE from the following [14]

1 Differentiate between up milling and down milling operation.
2 Discuss Boring, Counter boring and Counter sinking operation.
3 Calculate the machining time for drilling 4 holes of 16 mm diameter on a flange from the following data. Flange thickness = 30 mm, cutting speed = 22 m/min and feed = 0.2 mm/rev.
4 Calculate the index crank movements to divide the periphery of a job in (i) 51 divisions and (ii) 99 divisions.

5 Answer any TWO from the following [14]

1 How accuracies of machine tools are measured? Explain
2 Define following statistical terms (i) Average (ii) Median (iii) Standard Deviation (iv) Range (v) Variance
3 What are the common geometrical tests performed for checking the machine tools?