c) Discuss advantages of transducers.

d) What is an automatic control system? What are its advantages and applications?

OR

Briefly discuss the classification of CNC machines?

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Roll No .....

IP/IEM/ME/PR - 603

B.E. VI Semester

Examination, December 2015

Metal Cutting and CNC Machine

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) Write the principles of operation in lathe machine.

b) Distinguish between steady rest and follower rest.

c) State the function of a lathe centre, sketch and show the elements of a centre.

d) 1 mm pitch screw thread (Internal) is to be cut in a centre lathe having a 6.T.P.I. lead screw. Calculate gearing arrangements for driver and driven assuming usual quadrant restrictions and change gears availability.

OR

1.5 mm pitch threads are to be cut by a lathe machine on 30 mm diameter M.S. rod at a cutting speed of 9 m/min to a length 200 mm. Calculate the thread cutting time.

Unit - II

2. a) Enlist the composition of a grinding wheel?

   b) Enlist the advantages of grinding machine over other conventional machining processes.

   c) State about the term speed, feed and depth of cut used in grinding operations.

   d) Compare between centreless grinding and cylindrical grinding?

OR

Calculate the wheel speed of a shaft with a diameter of 100 mm which is to be grinded. Assume peripheral speed of the work piece as 15 m/min.

Unit - III

3. a) Write the advantages of using a Broaching machine.

   b) Name the operations that may be performed by a Broaching machine.

   c) Sketch and write the steps to be followed in spur gear milling.

Contd...

   d) Calculate the feed/revolution to drill a hole of 20 mm in one minute to a plate thickness of 30 mm and using a spindle speed of 500 r.p.m.

OR

Compare between plain milling and universal milling machines.

Unit - IV

4. a) Specify a shaping machine.

   b) Sketch quick return mechanism adopted in a shaping machine.

   c) Explain the process of gear shaving.

   d) Calculate the machining time required for taking a complete cut by two rough cuts and one finish out on a grey C.I. Plate 800 mm × 600 mm, cutting speed = 12 m/min, return/cutting time ratio = 2:3, feed - 1.5 mm/cycle, allowances length-wise = 20 mm, allowances width-wise = 5 mm

OR

Write step by step how you will calculate the machining time of a flat surface in a shaping machine.

Unit - V

5. a) What is signal flow diagram?

   b) Enlist the steps for writing transfer function.

   c) Discuss advantages of transducers.

PTO