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**IP/ME/PR- 603**

**B.E. VI Semester**

Examination, June 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 questions 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.

1. a) What is mandrel?  
b) What are the various methods available for taper turning a lathe?  
c) Find the angle at which the compound rest should be set to turn taper on the work piece having a length of 200 mm, larger diameter 45 mm and smaller diameter 30 mm.  
d) Describe the process of cutting internal threads on a lathe.

OR

What is difference between capstan and turret lathe. Give an example of component suited for capstan lathe.

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2. a) What are the various types of abrasive used for grinding wheel?
- b) Discuss the wheel balancing?
- c) Using a horizontal axis surface grinder, a flat surface of C65 steel of size 100 mm × 250 mm is to be ground. A grinding wheel with 250 mm diameter and 20 mm thickness is used. Calculate the grinding time required. Assume a table speed of 10 m/min and wheel speed of 20 m/s, approach distance of 125 mm and in feed rate of 5 mm/pass.
- d) Discuss the centre - less grinding with its advantage and limitations.

OR

Discuss the creep feed grinding with suitable sketch.

3. a) What are the work holding methods in milling?
- b) Name the various types of milling cutter used in milling?
- c) A 115 mm wide and 250 mm long surface is to be rough milled with a depth of cut of 6 mm by 16 - tooth cemented carbide face mill with a 150 mm diameter. The work material is alloy steel (200 BHN). Estimate the cutting time. Assume for the given alloy steel with carbide tool cutting speed as 60 m/min, and feed rate as 0.18 mm/tooth.
- d) What is difference between compound and differential indexing? Explain the relative merits.

OR

What are the various types of drills used? Explain the function of each type of drill.

4. a) What is the basic difference between the shaper and planer?
- b) Give the advantage of hydraulic shaper compared to mechanical shaper.
- c) Describe the operation of the quick return motion in a mechanical shaper.
- d) What is surface roughness? Discuss the methods of measuring surface roughness.

OR

Explain with suitable diagram the Gear forming.

5. a) What is difference between open loop and closed loop control system?
- b) Discuss the reasons why CNC machines used increasingly in manufacturing industry.
- c) Describe transfer function with an example.
- d) What is PLC? Discuss the components of PLC.

OR

Discuss the various types of sensors used in mechatronics.

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