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BIME-014

B.Tech. – VIEP – MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

00006

June, 2015

BIME-014 : PRODUCTION TECHNOLOGY – II

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. use of scientific calculator is permitted.*

1. (a) Explain briefly the parts of a lathe. How is the size of a lathe specified ? 7

(b) A 150 mm long, 12 mm diameter rod is reduced to 11 mm diameter in a single pass straight turning. If the spindle speed is 400 rpm and feed rate is 200 mm/min, determine the material removal rate and cutting time. 7

2. (a) Explain the following terms in relation to a lathe : 7

(i) Cutting speed

(ii) Feed

(iii) Depth of cut

(iv) Threading

(v) Knurling

(vi) Forming

(vii) Reaming

(b) Determine the time required to machine a workpiece 170 mm long, 60 mm diameter to 165 mm length, 50 mm diameter. The workpiece rotates at 440 rpm, feed is 0·3 mm/rev and maximum depth of cut is 2 mm. Assume total approach and overtravel distance as 5 mm for turning operation. 7

3. (a) Why should the cutting edge and top face of the tool be given a high finish ? 7

(b) The following data relate to a metal cutting test conducted on a lathe :

Vertical force on the tool = 2,000 N;

Depth of cut = 3·0 mm;

Feed = 6 cuts/mm;

Overall efficiency of the machine = 80%.

Determine :

(i) Pressure (in MN/m^2) of the chip cross-sectional area on the tool.

(ii) Power required for cutting the material. 7

4. (a) Why are rake and clearance angles provided on cutting tools and on what factors do the values of these angles depend ? 7

(b) A cast iron plate measuring 300 mm × 100 mm × 40 mm is to be rough shaped along its wider face. Calculate the machining time taking,

approach = 25 mm,

overtravel = 25 mm,

cutting speed = 12 m/min,

return speed = 20 m/min,

allowance on either side of the plate width = 5 mm, and feed per cycle = 1 mm. 7

5. (a) What is grinding wheel and why is better surface finish obtained when this is used as a tool ? Explain. 7

(b) What are the advantages, limitations and applications of broaching ? 7

6. (a) How are shapers classified ? Explain briefly with a neat sketch, the principal parts of a shaper. 7

(b) A workpiece of 300 mm diameter and 600 mm length is to be turned down to 282 mm for the entire length. The suggested feed is 1·2 mm/revolution and the cutting speed is 162 m/min. The maximum allowable depth of cut is 4·5 mm. Calculate the following :

(i) Spindle rpm

(ii) Feed speed

(iii) Material removal rate

(iv) Cutting time

Assume tool overtravel is 12·0 mm. Neglect tool approach. 7

7. (a) How are drilling machines classified ? Explain briefly the radial drilling machine with the help of a neat sketch. 7

(b) Calculate the time taken to face a workpiece of 80 mm diameter. The spindle speed is 90 rpm and cross feed is 0·3 mm/revolution. 7

8. (a) Discuss the applications of milling machines. 7

(b) Enumerate the reasons for popularity of CNC controlled production machine tools. 7