D 27115 (Pages 2) Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2006

ME 04 505—METAL CUTTING AND FORMING

(2004 admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

I. (a) What is the importance of tool layout in automates ?

(b) Define the terms tolerance, limits and fits with reference to the dimensional measurement.

(c) What are the requirements of a good tool material ?

(d) What are the common types of cutting tools used in milling ?

(e) Define Die cutting of metal.

(f) What are proper scrap allowances ?

(g) Explain the principle of EDM.

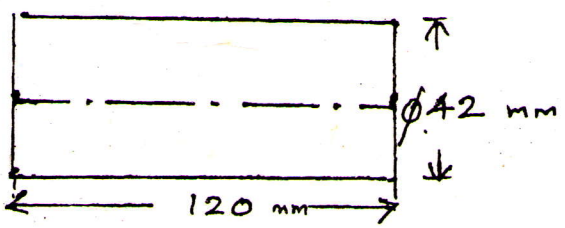
(h) What are the principal features of an ECM process ?

(8 × 5 = 40 marks)

II. (a) Explain the economic justification for purchasing a turret lathe in preference to a conventional lathe.

Or

(b) Estimate the actual machining time required for the component (C–40 steel) shown in figure. The available spindle speeds are 70, 110, 176, 280, 440, 700, 1110, 1760 and 2800. Use a roughing speed of 30 m/min and finish speed of 60 m/min. The feed for roughing is 0.24 mm/rev while that for finishing is 0.10 mm/rev. The maximum depth of cut for roughing is 2 mm. Finish allowance may be taken as 0.75 mm. Blank to be used for machining is 50 mm in diameter.



III. (a) A 100 mm bar is turned by means of a tool with a rake angle of 15° Orthogonally. The depth of cut is 5 mm while the feed rate is 0.25 mm/rev. If the mean length of a cut chip representing one rotation of the work piece is 90.5 mm, find the shear plane angle.

Or

(b) Explain how effective tungsten carbide is as a cutting tool material in comparison to other cutting tool materials. What are the improvement caused by coated carbides ?

Turn over

IV. (a) What is the function of a stripper ? When should a spring-loaded stripper be used ?

Or

(b) What are the general rules for die-block thickness and its margin ?

V. (a) Briefly explain the electrolyte flow methods used in ECM giving their relative merits and applications.

Or

(b) Explain the working of an USM machine showing important elements.

(4 × 15 = 60 marks)