B.Tech. Degree VIII Semester Examination, April 2008

ME 801 PRODUCTION TECHNOLOGY
### (2002 Scheme)

Time: 3 Hours   Maximum Marks: 100

I   A 2 x 2 drive is required to be designed for transmitting 10HP with speeds ranging from 400 rpm with $\phi = 1.4$. Select a suitable structural form and optimum ray diagram. Hence, calculate the gear sizes, module, width of gears. Calculate shaft sizes. Sketch the gear box. (20)

OR

II   a)   Explain the feed mechanism in milling machine. Draw a schematic feed drive for the milling machine. (10)

      b)   Briefly explain the methods of step less regulation of speed by hydraulic means. (10)

III   a)   Sketch and explain any two types of tool feed systems used in USM. (8)

      b)   Discuss the effects of the following parameters on rate of material removal in AJM.

           i)   Grain size
           ii)   Jet velocity
           iii)   Stand off distance   (3 x 4 = 12)

OR

IV   a)   i)   Describe the chemistry involved in ECM process

              ii)   Derive a theoretical relationship for the determination of metal removal rate in ECM.

              iii)   What is self adjusting feature in ECM?   (3 x 4 = 12)

      b)   Write ***short notes*** on:

              i)   Process capabilities of EBM.
              ii)   Comparison between thermal and non thermal features of EBM   (2 x 4 =8)

V   a)   What are the advantages and limitations of following manufacturing process as compared with PM?

           i)   Casting
           ii)   Hot forging
           iii)   Hot extrusion
           iv)   Machining   (4 x 2 =8)

      b)   Describe the events that occur during sintering. (12)

OR

VI   a)   Explain the purpose of blending metal powders. (5)

      b)   Explain the difference between impregnation and infiltration. (5)

      c)   Explain the various characteristics of metal powders. (10)

VII   Explain the purpose, construction and operation of various flow control valves. What is 'meter in' and 'meter out' flow control valve systems? (20)

OR

VIII   a)   Draw and explain the working of hydraulic circuit used for the control of shaper. (8)

       b)   Differentiate between a pressure relief valve, a pressure regulating valve, a sequence valve and an unloading valve. (12)

(Turn Over)
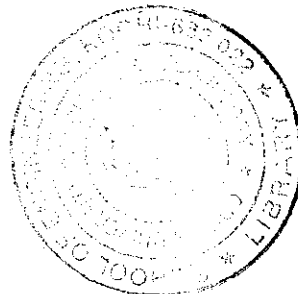
IX   a)   Discus the concept of costing. What are the objectives and elements of costing.   (10)

        b)   A 15 cm long MS bar is to be turned from 4 cm diameter in single cut in such a way that for 5 cm length its diameter is reduced to 3.8cm and remaining 10 cm length is reduced to 3.4 cm. Estimate the total time required for turning it, assuming cutting speed as 30m/min, feed as 0.02cm/rev. and time required for setting and mounting in a 3 jaw chuck is 30 seconds. Neglect the tool setting time.   (10)

<div align="center">OR</div>

X   a)   Estimate the material cost for welding 2 flat pieces of MS 15 x 6 x 1 cm size, at an angle of 90° by gas welding. Neglect edge preparation cost and assume.

      i)   Cost of O_2 =   Rs. $10/m^3$

      ii)   Cost of C_2H_2 =   Rs.$60/m^3$

      iii)   Density of filler materials =   7 gm/cc

      iv)   Cost of filler metal   =   Rs. 12/Kg   (10)

        b)   Estimate the total cost of 20CI flanged pipe casting shown in figure:
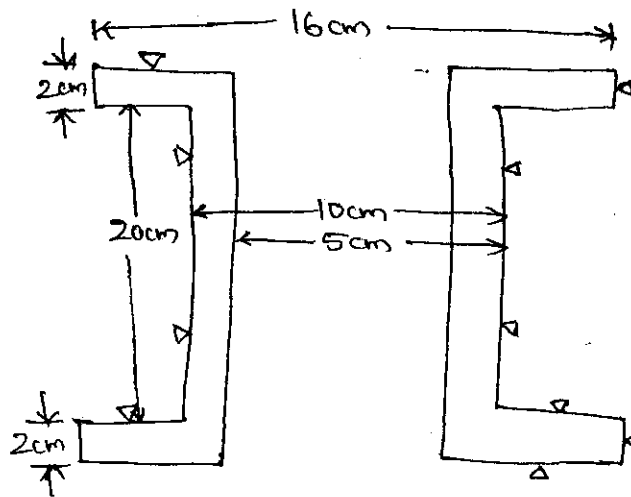
Assume the following data:

i)	Cost of CI	=	Rs. 5 per Kg
ii)	Cost of Process Scrap	=	Rs. 2 per Kg
iii)	Process Scrap	=	2% of net weight
iv)	Moulding and pouring charges	=	Rs. 2.00/piece
v)	Casting removal and cleaning	=	Rs. 0.05/piece
vi)	Administration overheads	=	5% Factory cost
vii)	Setting overheads	=	70% administration overheads	(10)

<div align="center">***</div>