Roll No .....

AU/IP/ME/PR - 302

B.E. III Semester Examination, December 2014

Production Process

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) Discuss principle of linear and angular measurements?
   b) Explain : (i) Interference fit (ii) Transition fit?
   c) Discuss Taylor's principle of Gauge Design?
   d) Explain principle and Mechanism of Rolling? Enlist process variables in rolling process?

Or

A strip with a cross-section of 150 mm×6 mm is being rolled with 20% reduction of area, using 400 mm diameter steel rolls. Before and after rolling, the shear yield of the material is 0.35 KN/mm^2 and 0.4 KN/mm^2, respectively. Calculate (i) The final strip thickness (ii) The average shear yield stress during the process (iii) The angle subtended by the deformation zone at the roll centre. Assume the coefficient of friction to be 0.1.

Unit - II

2. a) How are cutting tools classified?
   b) Discuss the following
      i) Side cutting edge angle.
      ii) Side relief angle.
   c) Give the comparison between 'Orthogonal cutting' and 'Oblique cutting'?
   d) Derive the following relation for the shear angle (ϕ): $\phi = \tan^{-1}\left(\frac{r\cos\alpha}{1 - r\sin\alpha}\right)$.

Or

During orthogonal cutting a bar of 90mm diameter is reduced to 87.6mm. If the mean length of the cut chip is 88.2mm and rake angle is 15°. Calculate:

i) Cutting ratio ii) Shear angle.

Unit - III

3. a) Enlist various types of pattern?
   b) List various types of pattern allowances?

c) What is a core? How are cores made?

d) Explain with a neat sketch cupola furnace? Briefly explain its working?

Or

Explain briefly the following casting processes:

i) Centrifugal casting

ii) Investment casting

iii) Continuous casting

Unit - IV

4. a) What do you understand by draft on forging?

b) How does hand forging differ from machine forging?

c) Enlist the difference between process of shearing and punching?

d) Explain briefly the various types of "forging equipments".

Or

Enumerate and describe very briefly the commonly used machines in sheet metal shop?

Unit - V

5. a) List the factors which affect the selection of electrodes for electric arc welding?

b) What is Arc cutting?

c) List the advantages and limitations of D.C and A.C power sources in arc welding?

d) It is required to weld a low carbon steel plate by the manual metal arc welding process using a linear V.I. characteristics D.C power source, the following data are available:
Open circuit voltage of power source = 62V.
Short circuit current = 130A.
Arc length, L = 4mm
Transverse speed of welding = 15 cm/min
Voltage is given as, V = 20+1.5L (L being arc length in mm)
Efficiency of heat input = 84 per unit.
Calculate the heat input to the workpiece.

Or

Determine the melting efficiency in the case of arc welding of steel with a potential of 22V and current of 230A. The cross-sectional area of the joint is 25 mm^2 and the travel speed is 6 mm/s. Heat required to melt steel may be taken as 10 J/mm^3 and the heat transfer efficiency as 86 percent.

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