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(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID : ME30

Roll No.

M. TECH. (Sem.II)
THEORY EXAMINATION 2015-16
PRODUCTION TECHNOLOGY

Time : 3 Hours Total Marks : 100

Note : Attempt any five questions. Each question carries equal marks.

1. (a) Describe the principle of an oxy-fuel-gas welding process.

(b) Two steel sheets of 1.0 mm thickness are resistance welded in a projection welding with a current of 30000 A for 0.005 s. The effective resistance of the joint can be taken as 100 micro ohms. The joint can be considered as a cylinder of 5 mm diameter and 1.5 mm height. The density of steel is 0.00786 g/mm^3 and heat required for melting steel is 10 J/mm^3.

2. (a) What do you understand by the term '*Kerf*' in gas cutting? Explain its relevance.

(b) Explain the characteristics of arc welding machines viz., constant current and constant voltage. Mention the applications of each of them.

3. (a) Describe the electron beam welding process?

(b) Explain briefly the process of non-ferrous metals cutting.

4. (a) Describe the plastic deformation and yield criterion.

(b) What are the defects that are generally found in welding? Describe their cause and remedies.

5. (a) Derive the relation to determine the forging force of a strip.

(b) Explain high energy rate forming process.

6. (a) A steel wire is drawn from an initial diameter of 12.7 mm to a final diameter of 10.2 mm at a speed of 90 m/min. The half-cone angle of the die is 6 and the coefficient of friction at the job-die interface is 0.1. A tensile test on the original steel specimen gives a tensile yield stress 207 N/mm^2. A similar specimen shows a tensile yield stress of 414 N/mm^2 at a strain of 0.5. Assuming a linear stress-strain relationship for the material, determine the drawing power and the maximum possible reduction with the same die. No back tension is applied.

(b) Write short notes on lubrication of metal forming processes.

7. (a) A strip with a cross section of 150 mm x 6 mm is being rolled with 20% reduction of area, using 400 mm diameter steel rolls. Before and after rolling, the shear yield stress of the material is 0.35 kN/mm^2 and 0.4 kN/mm^2 respectively. calculate (i) the final by the deformation zone at the roll center and (iv) the location of neutral point 0_n. Assume the coefficient of friction to be 0.1.

(b) Explain right hand single point cutting tool with neat sketches and also write short note on tool signature.

8. (a) Mild steel is being machined at a cutting speed of 200 m/min with a tool of rake angle 10°. The width of the cut and uncut thickness are 2 mm and 0.2 mm. respectively. If the average value of the coefficient of friction between the tool and chip is 0.5 and the shear stress of the work material is 400 N/mm^2, determine (i) the shear angle and (ii) the cutting and thrust components of the machining force.

(b) Discuss the different mechanisms of tool wears.

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