BACHELOR OF ENGINEERING (MECHANICAL ENGINEERING) SECOND YEAR SECOND SEMESTER - 2019

MANUFACTURING PROCESS

Time: 3hrs.   Full Marks: 100

Answer any *four (4)* questions of the following.
Use pencil for drawing works.
The figures in the margin indicate full marks.

1. (a) Drawing a neat figure discuss about green sand molding technique using cope and drag halves. The pattern used in this case may be considered as a reversing gear handle of a lathe. Also draw the figure of the pattern used.
    (b) Discuss about the important properties of molding sand. How the property 'permeability' is tested in laboratory? Discuss with adequate diagram   10+(10+5)=25

2. (a) Define the term 'precision or investment casting'. What are the advantages and limitations of this process?
    (b) Discuss in details about carbon di oxide molding process.
    (c) Drawing necessary figures discuss about the following casting defects along with the possible remedies:
    (i) open blow and blow holes (ii) shift (iii) cold shut and miss run.   (3+6)+10+(2×3)=25

3. (a) What are the different components of an ideal gating system? Discuss with necessary diagram. What is meant by pressurized and non-pressurized gates? Discuss with proper examples.
    (b) Why a sprue pin is made tapered?
    (c) A sphere, a cube and a cylinder with a height equal to its diameter have the same volume. Which one should be used as a riser? Justify your answer considering solidification times of each.   (8+4)+5+8=25

4. (a) Discuss about different materials used in making a pattern and also mention their advantages and limitations. What are the major pattern making allowances? Discuss clearly each of them.
    (b) Drawing a neat and explanatory diagram discuss about the operation of a cupola furnace. What is mean by hot blast cupola?   (6+9)+10=25

5. (a) Deduce the expression for coefficient of spread as given by Tomlinson and Stringer. What is 'pancaking'?

[Turn over

(b) A solid cylindrical slug of copper, annealed is 150mm in diameter and 100mm high. The height is reduced to 30% by cold, open die forging. Assuming a coefficient of friction of 0.2 calculate the forging force needed at the end of stroke. The necessary graph is given below (Fig.1). (10+5)+10=25

6. (a) Drawing explanatory diagram discuss about different geometrical considerations and forces acting during a flat rolling operation. Show that the strip velocity at exit is much higher than that of at entry. What is 'forward slip' and 'no slip' point?

(b) Determine the maximum possible reduction for cold rolling of a 300mm thick slab when μ=0.08 and the roll diameter is 600mm. What will be the reduction for hot rolling when μ=0.5 ? (9+4+4)+8=25

7. (a) How arc is established in between the electrodes during arc welding? Discuss in the light of electron theory in this regard.

(b) What is meant by DCSP and DCRP? What are the advantages of the same?

(c) How acetylene gas is preserved in gas cylinder?

(d) Briefly discuss about different types of electric resistance welding. Draw explanatory diagram of each. 7+4+4+10=25
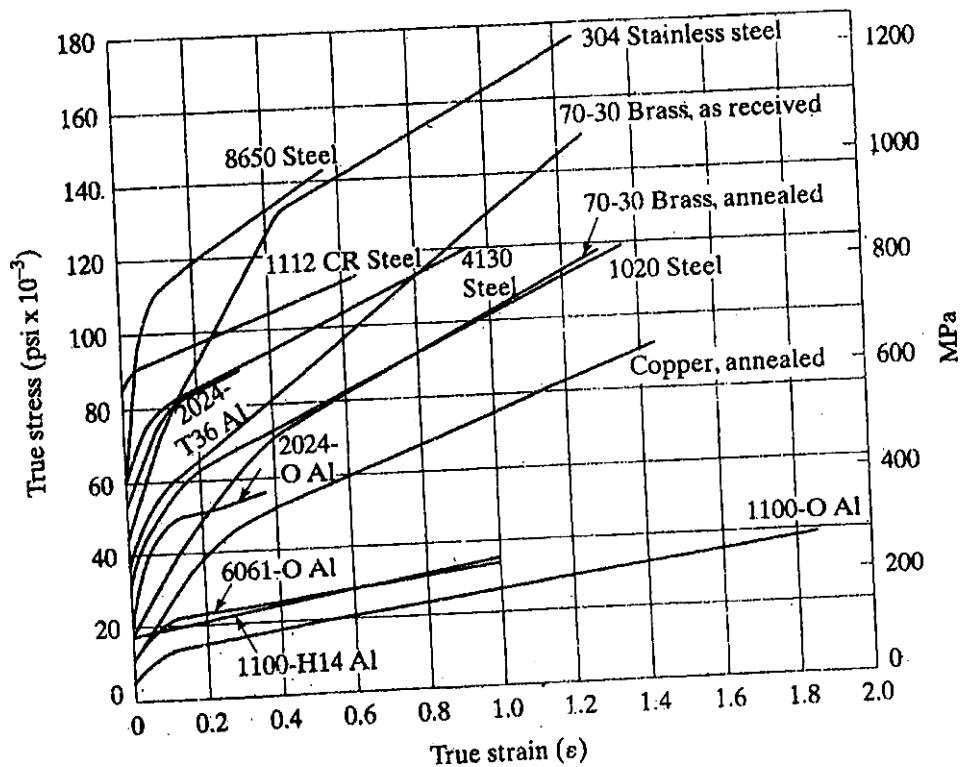

Fig. 1.Graph of true stress vs. true strain in connection with question no.5(b)