Ref. No. : EX/ME/5/T/223/2017

B. MECHANICAL ENGINEERING (Part Time) 2nd Year 2nd SemesterExamination 2017

MANUFACTURING PROCESS

Time: 3hrs. Full Marks: 100

Answer any *five (5)* questions of the following.
Use pencil for drawing works.
The figures in the margin indicate full marks.

1. (a) Discuss, with a neat figure, the green sand molding technique using cope and drag halves. Mention about the commonly used hand tools in molding process.
   (b) Discuss about the important properties of molding sand. How the property grain fineness number is tested in laboratory? Discuss with adequate diagram.
   (8+2)+(6+4)=20

2. (a) Drawing necessary figures discuss about four major casting defects with possible remedies.
   (b) A sphere, a cube and a cylinder (height equals to its diameter) have the same volume. Which one should be used as a riser? Discuss after Chvorinov's rule calculating the solidification time of each.
   (c) Drawing adequate diagram discuss about different components of an ideal gate.
   6+6+8=20

3. (a) What is 'precision or investment casting'? State the important advantages and limitations of this process?
   (b) Discuss in details about CO_2 molding process.
   (c) Discuss about pressurized and non-pressurized gates with proper examples.
   6+8+6=20

4. (a) Mentioning the advantages and limitations of each, discuss about three pattern making materials. What are the major pattern making allowances? Discuss clearly each of them.
   (b) Drawing a neat and explanatory diagram discuss about the operation of an electric induction furnace.
   15+5=20

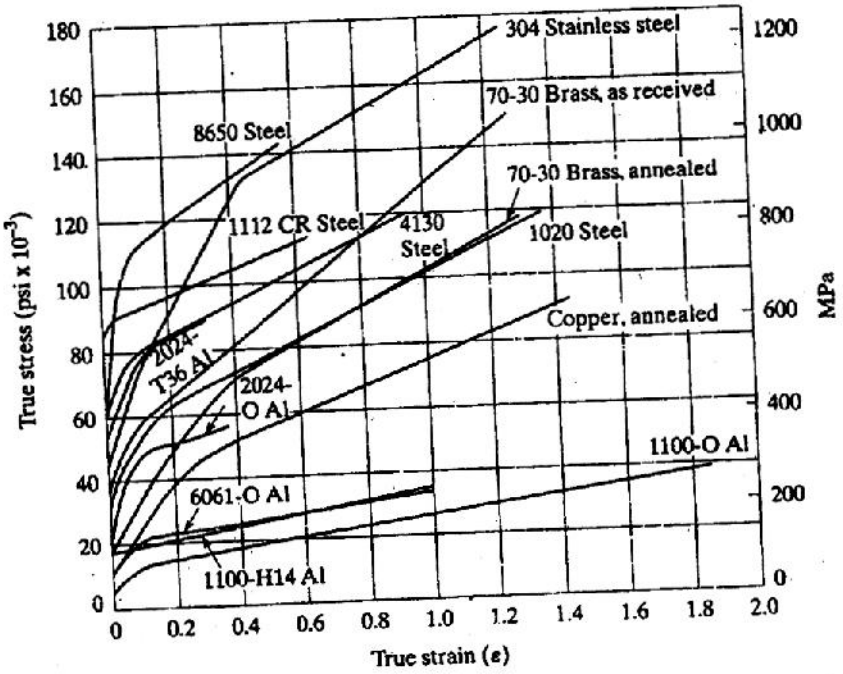
5. (a) Deduce the expression for coefficient of spread as given by Tomlinson and Stringer. Why a barrel shape is generated during upsetting operation?

(b) A solid cylindrical slug of 304 SS is 150mm in diameter and 100mm high. The height is reduced to 50% 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. (8+2)+10=20

6. (a) Show that the strip velocity at exit is much higher than that of at entry during a flat rolling operation. What is 'forward slip' and 'no slip' point? What is 'draft' in rolling?
(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? (6+2+2+2)+8=20

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? 8+6+6=20

8. Write explanatory note on the following:
(a) Flash butt and upset butt welding
(b) LASER beam welding
(c) Test for permeability of molding sand
(d) Anvil and furnace fuel used in forging 4×5=20



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