

B.E. MECHANICAL ENGINEERING (PART TIME), 1<sup>st</sup> Year 2<sup>nd</sup> Semester Examination  
2017 (OLD)

MANUFACTURING PROCESS

Time: 3hrs.

Full Marks: 100

Answer Question No. 1 and any *four (4)* questions from the rest

Use pencil for drawing works.

*The figures in the margin indicate full marks.*

1. (a) (i) Autoclave is a \_\_\_\_\_ (ii) Thermoplastic polystyrene resin is used in \_\_\_\_\_ casting (iii) Molasses is highly \_\_\_\_\_ in nature (iv) Loam sand mold is used for \_\_\_\_\_ (v) Sand tempering is \_\_\_\_\_ (vi) 'Antioch' is a process of \_\_\_\_\_ followed by \_\_\_\_\_ (vii) Hot blast cupola uses..... (viii) Arc furnace may be either .....lining or .....lining (ix) Radioactive materials can be casted by ..... casting process (x) sprue pins are used for .....and .....
- (b) Draw necessary diagram for (i) Gating system showing pouring basin, skim core, splash core and other necessary elements (ii) hanging and cover cores (iii) 3-high and 4-high rolling mills. (10×1)+(6+2+2)=20
  
2. (a) Discuss, with a neat figure, the green sand molding technique using cope and drag halves as was done in your workshop using a wooden pattern of a reversing gear handle of lathe.
- (b) Discuss about the important properties of molding sand. How the property grain fineness number is tested in laboratory? Discuss with adequate diagram. 10+10=20
  
3. (a) What is 'precision or investment casting'? State the important advantages and limitations of this process?
- (b) Discuss in details about lost wax molding process.
- (c) Drawing adequate figures discuss about the following casting defects along with the possible remedies:  
 (i) warpage (ii) cold shut and miss run (iii) hard spot 6+8+(2×3)=20
  
4. (a) What is meant by pressurized and non-pressurized gates? Discuss with proper examples.
- (b) Why a sprue pin is made tapered? Discuss clearly drawing necessary figures.
- (c) Define core, core prints and chaplets. Draw all necessary diagrams. 6+4+6=20

5. (a) Mentioning the advantages and limitations discuss about three pattern making materials.  
(b) Drawing a neat and explanatory diagram discuss about the operation of a Cupola furnace. 6+14=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  $\mu=0.08$  and the roll diameter is 600mm. What will be the reduction for hot rolling when  $\mu=0.5$ ? (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) Cogging operation and coefficient of spread  
(c) Test for clay content in molding sand  
(d) Basic hand tools used in pattern making 4×5=20