BE/B'TECH (FULL TIME) DEGREE END SEMESTER EXAMINATIONS NOV/ DEC 2011

MATERIALS SCIENCE & ENGINEERING BRANCH -- THIRD SEMESTER

ML- 9201 FOUNDRY AND MACHINING (REGULATIONS 2008)

Time: 3 hours Max. Marks: 100

ANSWER ALL QUESTIONS

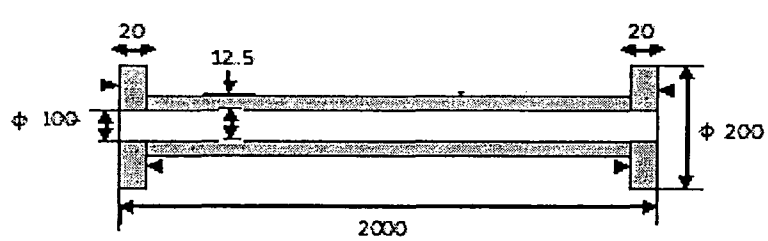
PART - A (10X2=20)

1. List some of the advantages and disadvantages of castings.
2. What part of the solidification process does the pattern making should take care of and why?
3. List the requirements of raw silica sand for core making.
4. What do you understand by "Full Mould Process"?
5. What is meant by modification in Al Alloy Melting?
6. Differentiate between "Orthogonal cutting" and "Oblique cutting". Which type of cutting Is most common in practice?
7. What type of chips you will get when machining Gray Cast Iron components and why?
8. What is the concept of Broaching?
9. When do you give preference for Planning over other machining processes?
10. List the various methods of cutting Gears.

PART—B (5X16=80)

11.

i. A Gray Cast Iron sand cast water pipe is required for use. The configuration of the pipe is shown below. The faces of the flanges are required to be machined as indicated by the symbol Δ in the sketch. As a foundry engineer, draw the required pattern layout drawing incorporating all pattern allowances clearly and the parting line. What type of? pattern material you will choose if the requirement of the pipe is 50 nos per month? (4)



Machining allowance - 3 mm at toolpoint. Assume suitable contraction alowance for Gray Cast Iron.

ii. Describe with neat sketches, the various stages involved in the "Shell Moulding" process with its merits and demerits. (8)

iii. Describe the CO2 sand moulding process of making castings with its merits and demerits.(4)

12a.

i. What are the different types of Electric Furnaces? Explain wit6h a neat sketch, the constructional details of an Electric Coreless Induction furnace and describe the steel melting process in this furnace. How is quality of steel melt ensured in this process? (8)

ii. Discuss the metallurgical reactions that take place inside a Cupola. (8)

OR

12b

i. Explain with a neat sketch how shaped products are produced by the continuous casting route. (8)

ii. Describe with neat sketches, the operational stages involved in the Investment Casting process for making precision castings with its merits and demerits. (8)

13a

i. What is BUE? Discuss in detail the formation of BUE and the factors responsible for BUE. (8)

ii. If the relationship for HSS tools is $VT^{1/8} = C_1$ and for WC tools $VT^{1/5} = C_2$ and assuming that at a speed of 25 m/min, the tool life was 3 hours in each case, compute their tool life at 32m/min speed. (8)

OR

13b.

i. What are the various types of tool wear and explain them in detail with necessary sketches. (8)

ii. A Carbide tool with mild steel work piece was found to give a life of 2hours while cutting at 0.50 m/min. Compute the tool life if the same tool is used at a speed of 25% higher than previous one. Also determine the value of cutting speed if the tool is required to have a tool ife of 3 hours. Assume Taylor's exponent "n" = 0.27. (8)

14a.

i. Describe in detail the problems encountered in Turning operations and their causes and remedies. (6)

ii. What are the various operations generally carried out in a Lathe. Explain in detail, with necessary sketches the different methods of Taper turning in a Lathe. (10)

OR

14b.

i. List the various cutting parameters. .Describe in detail how cutting forces and power required for cutting are determined. (8)

ii. Write notes on (a) Deep Hole Drilling (b) Hard Turning (c) High speed machining and (d) Ultra Precision machining. (8)

15a.

i. Why Quick return motion mechanism is prescribed in a Shaper? Explain in detail with necessary sketches , how quick return motion is obtained in a Hydraulic Shaper? (8)

ii. Differentiate between Pull and Push broaches. Explain in detail how continuous broaching operation is carried out? (8)

OR

15b.

i. Explain with a neat sketch, the process of Gear Hobbing and compare Gear Hobbing and Gear Shaping. (8)

ii. What are the different types of Milling operations? Explain with necessary sketches , the Up milling and Down milling operations and compare them. (8)