Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 12208

M.E./M.Tech. DEGREE EXAMINATIONS, JANUARY 2022.

First Semester

Manufacturing Engineering

MF4102 – ADVANCES IN CASTING AND WELDING

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why risers are not used in the die casting?
2. State the causes for the shrinkage that occurs in casting process.
3. List out the ways to govern the flow of molten metal top reduce turbulence.
4. Define chrorimer's rule.
5. State any three difficulties in casting of copper alloy.
6. Why grain size and grain shape are very important factors for cast products?
7. What is hydrogen embrittlement in weldments?
8. How residual stresses are formed during welding?
9. What is diffusion bonding?
10. Enumerate the principle of high frequency induction welding.

PART B — (5 × 13 = 65 marks)

11. (a) Describe the different modes of heat transfer between metal and mould in metal casting? Also explain how this affects the casting quality with a sketch describe the heat transfer between metal and mould. (13)

Or

(b) (i) Explain the differences between progressive and directional solidification? (5)

(ii) Describe the various factors in deciding the location of risers in casting with suitable sketches. (8)

12. (a) Discuss the castability of the (8)

(i) following metal/alloy. Also mention any two applications for each

(1) steel

(2) Aluminium alloys

(ii) Discuss the solidification mechanism of pure metal and an alloy. (5)

Or

(b) (i) List any five casting defects and explains the reasons and remedy for item. (8)

(ii) Explain any one method of degasification. (5)

13. (a) Explain the material handling and pollution control processes in a steel foundry? Also name the different material handling equipments/ machineries used in foundries. (13)

Or

(b) Enumerate the different steps involved in the computer aided design of casting. With an example/application, describe the different steps, softwares and hardwares used for CAD of casting. (13)

14. (a) Explain the heat affected zone and its characteristics while welding stainless steel. Also describe the weld ability aspects of stainless steel. (13)

Or

(b) Name and explain any three tests carried out on weldments. Also enumerate any three welding defects, their causes and remedies. (13)

15. (a) With suitable sketches, describe the process mechanism of the following. Also mention any two applications. (13)

(i) Friction stir welding

(ii) Plasma welding

Or

(b) Describe the following welding processes with necessary diagrams (13)

(i) Electron beam welding

(ii) Electro slag welding

Also mention any two applications

PART C — (1 × 15 = 15 marks)

16. (a) With an example and line diagram, explain the working of a mechanized steel foundry. Also specifically discuss the type of plant layout, machineries/equipments and software used for mechanization of foundries. (15)

Or

(b) With a suitable diagram, explain the explosive welding process. Also discuss the process parameters, metallurgical changes is the product and industrial applications. (15)