

Name of the Examinations:
B.E. METALLURGICAL AND MATERIAL ENGINEERING
FOURTH YEAR SECOND SEMESTER - 2024
Subject: JOINING OF METALS

Time: 3hrs.

Full Marks: 100

CO1: Compulsory- Answer any One

1. Why is the brightness of the GMAW arc light not uniform during welding, and how do you control its uniformity? Explain the mechanism of arc column with suitable sketch. What is MMAW electrode coating? 6+9+5=20
2. Explain through the Maxwell-Boltzmann equation that electrons carry the current in an arc. The degree of ionization is related to welding arc, what will be your suggestion,-Justify 12+8=20

CO2: Compulsory- Answer any One

3. Explain the function of gas and oxide in welding arc with examples. What is spatter? How will you control it? What is nonmetallic backing strip? What is the function of tubular core wire? 8+7+3+3=20
4. i. What is plasma in welding? Explain the use of plasma in welding. ii. Suppose you are a maintenance Engineer of Indian Railway and current job is welding of 16 mm thick plate joint. You have three types of welding facilities (Electroslag, Submerged and Thermit). What will be your suggestion,-Justify. 10+10=20

CO3: Compulsory- Answer any One

5. Explain principle and operation of LASER beam welding with a neat sketch and also discuss its advantages, limitations. What is projection welding? What are the advantages of projection welding? 12+8=20
6. Describe principle, working and application of Electron beam welding. What are the possible problems/difficulties in it and how it can be dealt with? What is seam welding? What are the advantages of seam welding? 12+4+4=20

CO4: Compulsory- Answer any One

7. Describe principle, working and application of Electron beam welding. What are the possible problems/difficulties in it and how it can be dealt with? Explain the working principle of Brazing process. What is braze filler? 8+5+5+2=20
8. i. State the basic theory and explain the mechanism of solid state welding. Give examples for solid state welding. ii. What is diffusion welding? Explain with a suitable sketch. ii. Explain ultrasonic welding. Give simple sketch for this welding process in support of your answer. 8+6+6=20

CO5: Compulsory- Answer any One

9. What is weldability? State and explain its importance. Explain the problems encountered during the welding of Aluminum and its remedies. Give schematic illustration of micro-structure during solidification of fusion weld zone. 8+7+5=20
10. Define heat affected zone (HAZ)? Explain with a schematic diagram showing subdivisions of HAZ for low carbon steels welds and their corresponding temperature ranges. What is type-IV cracking? Explain any one type weld defect and its significance. 4+8+3+5=20