Answer ten questions only

Q1:- Refinements in microstructure and improvements in toughness can all result from multi-run welding as compared to a single weld run of same Cross-section of weldment. Explain the reasons?   **(10 marks)**

Q2:- The most direct technique for measuring the fracture toughness is called the crack opening displacement (COD) test, explain with sketches?   **(10 marks)**

Q3:- The cause of liquation cracking are associated with grain boundary segregation by melting of boundaries near the fusion lines of weldment, explain this type of welding cracking?   **(10 marks)**

Q4:- Explain schematically the various sub-zones of the heat-affected zone in approximately to the alloy Co (0.6 wt % C) which may point out from the $Fe-Fe_3C$ equilibrium diagram.   **(10 marks)**

Q5:- In fusion welding, gases can be absorbed into the weld pool and, if excessive, may give rise to porosity or cracking problems after solidification, Discuss.   **(10marks)**

Q6 :- Fusion welding is a process that involves a very intense heat source and this inevitably leads melting back or dilution of the base metal, discuss?   **(10 marks)**

Q7:- A plate of 8% Ni steel is welded with an moneal by fusion (MMAW), the welding wire is of composition 90% Ni and 10% Cu. What will be the approximate composition of the final weld if there is 20% dilution?   **(10 marks)**

Q8:- Explain the advantages of Flux-cored electrodes in fusion welding FCW process?   **(10 marks)**

Q9:- A single full penetration weld pass by fusion (TIG) is made on aluminum using the following parameters, E=20v, I=200A, V=5mm/s, To=25°C, Tm=660°C, ρc=0.0025 $J/mm^3°C$, t=5mm, f1=0.9, calculate the approximate width of HAZ at Tp=572?   **(10 marks)**

Q10:- Explain the equation that should be used to obtain the particle coarsening as a function of weld thermal cycle, and discuss?   **(10 marks)**

Q11:- Consumables in welding usually include a combination of wire and flux, explain four consumable characteristics?   **(10 marks)**

Q12:- For high strength low alloy steel of composition 0.4% C, 0.3% Si, 1.2% Mn, 0.5% Cr, and 0.5% Ni. Calculate the preheating temperature for a plate of 50 mm thickness?   **(10 marks)**

..................GOOD LUCK...............