M.E. METALLURGICAL & MATERIAL ENGINEERING 1st YEAR 2nd SEMESTER EXAM-2019

Subject: Joining of Materials

Time : Three Hours   Full Marks: 100

Answer any five questions

5x4

1.   i). What is the principle of welding?

ii). How arc is generated and become self-sustaining in arc welding?

iii). Why heat input is an important parameter in fusion welding?

iv). Why fusion is not a prerequisite for welding metals?

v). Write the effect of arc current and voltage on metal drop transfer rate.

4x5

2.   Distinguish between

i). Electroslag Welding & Submerge welding

ii). Soldering & Brazing

iii). Diffusion welding & cold welding

iv). DCSP & DCRP in arc welding

14+6

3.   i). Discuss the various types of metal transfer in arc welding.

ii). State the various forces affecting metal transfer.

4.   15+5

i). Discuss the fundamentals of electric resistance welding.

ii). Write and draw the various welding defects.

5. i). State the principle of operation for Gas metal arc welding(GMAW)

   ii). Discuss the principles of self-adjusted arc and self-controlled arc in MIG welding.

   iii). Write the advantages of MIG welding.

2+10+8

6. i). What are the various components which constitute the welding cost of a product?

   ii). A cylindrical boiler drum 2 mX 0.75m dia is to be made from 10mm thick mild steel plate.Cylindrical portion is welded along the longitudinal seam. Both the ends are to be closed by welding circular plates to be drum. Welding is done outer side only. Calculate the electric welding cost using the following data:

   Welding speed 5m/hour on outer side.

Length of electrode required	= 1.5 m/m of weld
Cost of electrodes	= Rs. 25 / m
Power consumption	=4.5 kwh/m of weld
Power cost	= Rs. 15 / kwh
Over head expenses	= 200% of labour cost
Labour wages	= Rs. 70 / hour.

   iii). Write the importance of welding and its applications.

7. Short notes: 2x10

   i). Electrode coatings

   ii). Spot welding electrodes