

CS/B.Tech/ME/PE(O)/ODD/SEM-7/ME-704B/2019-20



**MAULANA ABUL KALAM AZAD UNIVERSITY OF
TECHNOLOGY, WEST BENGAL**

Paper Code : ME-704B

PUID : 07195 (To be mentioned in the main answer script)

ADVANCED WELDING TECHNOLOGY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following : 10 × 1 = 10
 - i) Constant voltage characteristics of the power source is also called
 - a) dropping V-I characteristics
 - b) flat V-I characteristics ✗
 - c) gaping V-I characteristics ✗
 - d) exponential V-I characteristics. ✓
 - ii) Cleaning is important in welding because
 - a) it makes the process economical
 - b) it reduces the scope of oxidation
 - c) it reduces the consumption of filler metal
 - d) it increases current density. ✓

- iii) Strong root weld is obtained by
a) MIG welding b) Arc welding
c) Resistance welding d) TIG welding.
- iv) MAG welding uses which of the following shielding gas ?
a) Argon b) Helium
c) ~~CO₂~~ d) O₂.
- v) Which of the following range of voltage is used to create the arc while using alternating current ?
a) 60 - 80 volts b) 80 - 100 volts
c) 30 - 40 volts d) 15 - 25 volts.
- vi) Vacuum is an essential requirement in
a) electron beam welding
b) ultrasonic welding
c) thermit welding
d) laser beam welding.
- vii) Trimix is which of the following combinations of shielding gases ?
a) 74% CO₂, 15% Argon, 11% Helium
b) 60% CO₂, 20% Argon, 20% Helium
c) 75% Argon, 23% CO₂, 2% Oxygen
d) 75% Argon, 23% Helium, 2% O₂.
- viii) TIG welding uses the power source of
a) constant voltage type
b) constant current type
c) ~~constant current and voltage type~~
d) variable voltage type.
- ix) Temperature in inner cone of oxidising flame is
a) 3200°C b) 3400°C
c) 2900°C d) 3100°C.
- x) Cold cracking defect in welding is caused by
a) hydrogen b) nitrogen
c) ~~oxygen~~ d) all of these.

- xi) Acetylene is stored in acetone because
- a) combination gives a neutral atmosphere
 - b) acetone is a cheaper chemical
 - c) free acetylene forms explosive mixture with air
 - d) acetone has higher calorific value.
- xii) Ultrasonic testing for weld defect uses
- a) Pyrometer
 - b) Red dye
 - c) Excitation coil
 - d) Quartz.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is GMAW ? What are the advantages of it ? $1 + 4$
3. Describe the principle of operation of Stud Arc welding with neat sketch.
4. What do you mean by Flux ? Write down the fluxes used in gas welding of Cast iron, Copper alloys. $2 + 3$
5. Write down the functions of coating ingredients of stick electrode. <http://www.makaut.com>
6. Distinguish between A.C. welding and D.C. welding.
7. Define weldability. Write down the factors on which weldability of material depends. $1 + 4$

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. a) What are the advantages and disadvantages of Weaving in Metal Arc welding ?
- b) Distinguish between Leftward and Rightward welding techniques.
- c) What are the different types of welded joint used ? Write down the factors on which selection of the joints depend. $4 + 4 + 7$
9. a) What is Diffusion welding ? Illustrate the process of this welding.
- b) Write down the advantages of Ultrasonic welding.
- c) With the aid of sketch explain the process of Laser Beam welding. $5 + 5 + 5$

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10. a) Find the best welding speed to be used for the welding of 6 mm steel plates with an ambient temperature of 30°C with the welding transformer set at 25 V and current passing is 300 A. The arc efficiency is 0.9 and possible travel speeds are 6 to 9 mm/s. The limiting cooling rate for satisfactory performance is 6°C/s at a temperature of 550°C.

b) Write a short note on radiography testing of weld. 10 + 5

11. a) Discuss merits and demerits of underwater welding.

b) The voltage-length characteristics of DC arc is represented by $V = 18 + 25l$, where V is the arc voltage and l is the length of the arc in cm. The power source characteristics can be approximated by straight line with no load voltage of 75 volts and short circuit current of 800 amp. Find the optimum arc length.

c) Determine the bending stress developed in the following type of joint :



5 + 5 + 5

12. a) Distinguish between Upset butt resistance welding and Flash butt resistance welding.

b) Illustrate why MIG welding is semi-automatic process.

c) Describe the advantages of Electron Beam welding.

5 + 5 + 5

13. Write short notes on the following :

a) Plasma arc welding

b) Heat affected zone in welding

c) Hot cracking and cold cracking.

3 × 5