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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (2025 - 2026)

Subject: Advanced Welding Technology

Time: 3 Hours

Max. Marks: 70

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

15

1. Attempt all parts:-

- (1.1) Heat affected zone in the case of welding refers to [CO1,K1] 1
- (a) The region close to the weld where the temperature exceeds the transformation temperature
 - (b) The region close to the weld where preheating is done
 - (c) The region where the weld metal has excess penetration
 - (d) The region covered by the weaving of the electrode
- (1.2) The protective layer formed on top of the weld pool is known as? [CO2,K1] 1
- (a) Flux
 - (b) Slag
 - (c) impurity
 - (d) Deoxidiser
- (1.3) In friction welding, heat is generated mainly by [CO3, K1] 1
- (a) Electric arc
 - (b) Chemical reaction
 - (c) Mechanical friction
 - (d) Laser beam
- (1.4) Which of the following is true regarding undercutting defect? [CO4,K1] 1
- (a) Undercutting is due to local increase of thickness of parent metal at weld toe
 - (b) It is due to insufficient current
 - (c) It can be corrected by depositing additional weld material
 - (d) It is not easy to detect

- (1.5) A robot that can take action based upon information is [CO5,K1] 1
- (a) Playback robot
 - (b) Intelligent robot
 - (c) Fixed sequence robot
 - (d) None

2. Attempt all parts:-

- (2.1) What is arc blow? [CO1,K1] 2
- (2.2) State the purpose of preheating before welding. What is post weld heat treatment (PWHT)? [CO2, K2] 2
- (2.3) What are the advantages and application of LBW? [CO3,K2] 2
- (2.4) Define weld joint? [CO4,K2] 2
- (2.5) what are the types of welding robots? [CO5,K2] 2

SECTION-B

20

Answer any one of the following:-

- (3.1) Explain the major problems associated with welding aluminum alloys. [CO1,K3] 4
- (3.2) What are the functions of coating in coated electrode? [CO1,K2] 4

Answer any one of the following:-

- (3.3) Explain Oxy-acetylene welding process used for welding stainless steel? [CO2,K3] 4
- (3.4) What are weldability considerations while welding Austenitic Stainless steel? [CO2,K2]. 4

Answer any one of the following:-

- (3.5) Explain the working principle of explosive welding and state its major applications. [CO3,K3] 4
- (3.6) Explain the principle behind LBW. Write some applications. [CO3,K3] 4

Answer any one of the following:-

- (3.7) Discuss the important aspects to be considered before planning a repair welding job. [CO4,K2] 4
- (3.8) Why the cast iron is difficult to weld? [CO4,K2] 4

Answer any one of the following:-

- (3.9) Describe the main applications of welding robots in manufacturing. [CO5,K2] 4
- (3.10) Discuss the importance of repeatability in welding robots. [CO5,K2] 4

SECTION-C

35

4. Answer any one of the following:-

- (4.1) How is brazing different from welding and soldering? [CO1,K2] 7
- (4.2) Discuss the welding characteristics, defects, and precautions for cast iron welding. [CO1,K2] 7

5. Answer any one of the following:-

- (5.1) Explain various zones for a typical weld with a neat sketch? [CO2,K3] 7
- (5.2) Explain heat transfer during welding and discuss its effect on penetration, bead 7

shape, and HAZ. [CO2,K3]

6. Answer any one of the following:-

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|-------|---|---|
| (6.1) | Discuss friction welding in detail, including principle, process stages, equipment, advantages, limitations, and applications. [CO3,K2] | 7 |
| (6.2) | Explain the mechanism of diffusion bonding and discuss factors affecting bond quality. [CO3,K3] | 7 |

7. Answer any one of the following:-

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|-------|--|---|
| (7.1) | Explain the repair welding procedure for cast iron components and discuss the precautions needed to avoid cracking. [CO4,K3] | 7 |
| (7.2) | Explain the classification of wear in detail and discuss the mechanism of each major type of wear with examples. [CO4,K3] | 7 |

8. Answer any one of the following:-

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|-------|---|---|
| (8.1) | Discuss in detail the applications of welding robots in automobile and fabrication industries. [CO5,K2] | 7 |
| (8.2) | Explain the concept and applications of collaborative robots (cobots) in welding. [CO5,K3] | 7 |