Printed Page:- 04 **Subject Code**:- **AME0301**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - CARRY OVER THEORY EXAMINATION - AUGUST 2023

Subject: Manufacturing Technology-I

Time: 3 Hours **Max. Marks: 100**

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 **20**

1. Attempt all parts:-

1-a. In cement bonded sand mold, sand mold material consists of what percentage of water? (CO1) 1

(a) 0.035

(b) 0.045

(c) 0.055

(d) 0.065

1-b. Which of the following is not a characteristic property of any moulding sand? (CO1) 1

(a) Flowability

(b) Hardenability

(c) Green strength

(d) Dry strength

1-c. What does a mould having adequate green strength, does not have? (CO2) 1

(a) Ability to retain its shape

(b) Ability not to get distorted

(c) Ability not to collapse

(d) Ability to retain hardness

1-d. Which of the following moulds or moulding is also known as sodium silicate process.(CO2) 1

(a) Permanent moulding

(b) Slush moulding

(c) Slush moulding

(d) Co2 moulding

1-e. Moving a small straight punch up and down rapidly into a die is done by a process known as? (CO3) 1

(a) Perforating

(b) Parting

(c) Nibbling

(d) Lancing

1-f. Sintering is done to _____. (CO3) 1

(a) increase final strength

(b) decrease final strength

(c) initially increase and then to decrease the strength

(d) initially decrease and then to increase the strength

1-g. The material of an HVAC duct is ____. (CO4) 1

(a) Galvanised iron

(b) Mild steel

(c) Tin

(d) None of these

1-h. Notching in sheet metal shop is (CO4) 1

(a) Removal of extra material that is generated during forging and casting.

(b) A finishing operation by which a small amount of material is cut from the edge of a blanked part.

(c) A process by which a series of notches is cut.

(d) Removal of small portion of metal along the edge of the sheet.

1-i. What is the maximum power supply needed for the working of spot welding process? (CO5) 1

(a) 135 kVA

(b) 140 kVA

(c) 145 kVA

(d) 150 kVA

1-j. Which of the following inert gas is used with DC power supply only? (CO5) 1

(a) Argon

(b) Helium

(c) CO_2

(d) Nitrogen

2. Attempt all parts:-

2.a. Name the various types of core boxes. 2

2.b. Define casting. 2

2.c. How does metal shearing differ from a metal punching? 2

2.d. Define spring back. 2

2.e. Differentiate between bare and coated electrode. 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. Explain the squeeze jolting machine with sketch.(CO1) 6

3-b. What is the need for providing chills in casting? (CO1) 6

3-c. Discuss any two commonly used heat treatments on castings.(CO2) 6

3-d. Describe the green sand molding process in detail (CO2) 6

3.e. How is clearance provided between the punch and die for blanking and piercing operations? (CO3) 6

3.f. Explain peen forming process.(CO4) 6

3.g. Explain projection welding process and its application (CO5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. Classify different types of moulds and state the advantages of loam moulds over dry sand moulds. (CO1) 10

4-b. Explain any four casting defects with causes and their remedies.(CO1) 10

5. Answer any <u>one</u> of the following:-

5-a. Explain various types of pattern allowances with sketch.(CO2) 10

5-b. For sand-casting a steel rectangular plate with dimensions 80 mm × 120 mm × 20 mm, a cylindrical riser has to be designed. The height of the riser is equal to its diameter. The total solidification time for the casting is 2 minutes. In Chvorinov's law for the estimation of the total solidification time, exponent is to be taken as 2. For a solidification time of 3 minutes in the riser, the diameter (in mm) of the riser is _____ (correct to two decimal places). (CO2) 10

6. Answer any <u>one</u> of the following:-

6-a. Classify forming process. Explain the term formability.(CO3) 10

6-b. A mild steel strip is rolled from 4.0 mm to 3.0 mm thickness in a single pass rolling mill. Dia of roller is 280 mm and the width of strip is 400 mm while coefficient of friction is 0.1. Take stress 150 MPa for metal. Calculate the roll separating force assume negligible spreading. (CO3) 10

7. Answer any <u>one</u> of the following:-

7-a. In a wire drawing operation determine the drawing stress and total drawing load. Using following data initial wire diameter = 5 mm. Final wire diameter = 4.5 mm. 10

Die angle = 18°; dia land = 5 mm; μ = 0.12; yield stress = 25 kg/mm² (CO4)

7-b. Drive the expression for drawings stress σ_{xa} for wire drawing through a conical die of die angle 2α and coefficient of friction is μ as (CO4) 10

$$\frac{\sigma_{xa}}{2k} = \frac{1+B}{B}\left[1-\left(\frac{D_a}{D_b}\right)^{2B}\right]$$

where, $B = \mu \cot \alpha$

8. Answer any <u>one</u> of the following:-

8-a. With neat sketches, mention the various components of laser beam welding equipments and explain their purpose. (CO5) 10

8-b. List out the different types of welding process. Briefly explain the working principle of any two welding process. (CO5) 10