



VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT: FZ+TFZ

REG.NO.: 24BME054

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

Programme Name & Branch : B. TECH (Mechanical Engineering)
Course Code : BMEE302L
Course Name : Metal Casting and Welding
Faculty Name(s) : Dr. Ashish Kumar, Dr. Narendra Kumar U, Dr. Pandivelan C, Dr. Venkateswarlu B, Dr. Jeyapandiarajan P, Dr. Devasri Fuloria
Class Number(s) : VL2025260502441, 2823, 2476, 2809, 1103, 2808
Date of Examination : 22-03-2026
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes Statements:
 - CO. 2: Demonstrate working principle of various casting processes.
 - CO. 3: Use various melting practices and explore casting defects.
 - CO. 4: Apply suitable welding process for different functional requirements.

Q. No	Question	M	CO	BL
1.	An aluminium brake calliper shown below is designed for high-load braking applications, exhibits failure due to internal porosity when produced by high pressure die casting. Propose a suitable permanent mould casting process to eliminate this defect and justify your selection with respect to solidification pressure, microstructure, and mechanical properties. 	10	CO2	BL4
2.	A grey cast iron casting exhibits graphite flake morphology in its microstructure. With the aid of suitable diagrams: (a) Explain the principle and implementation of inoculation treatment used to control and modify graphite morphology during solidification. (b) Discuss the resulting microstructural changes expected after effective inoculation.	10	CO3	BL3



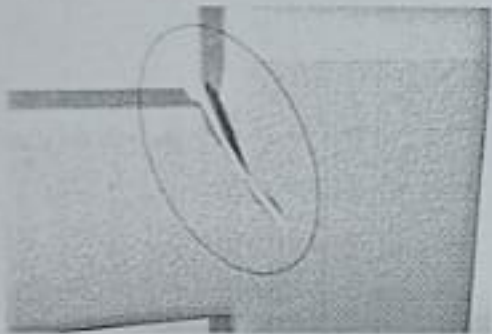
VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT: F2+TF2

REG.NO.:

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

3.	Identify the casting defect in the given images and explain the causes and remedial measures to prevent this defect. (a)  (b)  (c)  (d) 	10	CO3	BL4
4.	Analyse how the use of Direct Current Electrode Positive (DCEP) polarity in arc welding influences the cleaning action and metal deposition rate. Explain it by suggesting a suitable material.	10	CO4	BL4
5.	A fabrication company is manufacturing two different products using the MIG welding process: Product X: Thin stainless-steel enclosures (3 mm thick) welded using a 1.2 mm diameter electrode wire. Product Y: Heavy structural frames (18 mm thick) welded using a 3.2 mm diameter electrode wire with extended stick-out to improve deposition rate. The company currently owns both Constant Voltage (CV) and Constant Current (CC) power sources and must decide how to allocate them for optimal welding performance. Based on this answer the following questions: (a) Analyze how electrode diameter and electrode extension affect the dominant heat generation mechanism (b) Evaluate which power source is most suitable for Product X and Product Y, giving technical justification (c) Explain the concept of the self-regulating arc in CV power sources and discuss its significance in welding thin sections. (d) Assess the consequences on arc stability, penetration, and weld quality if an inappropriate power source is selected for either product.	10	CO4	BL4
