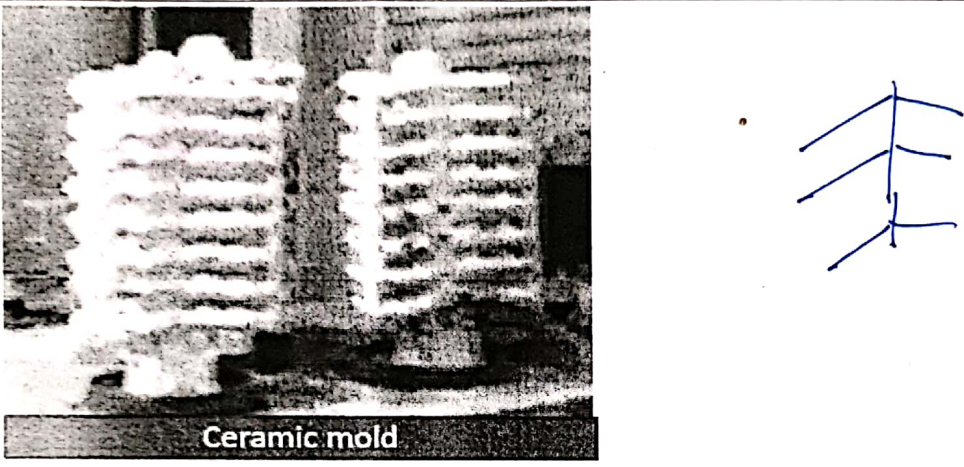
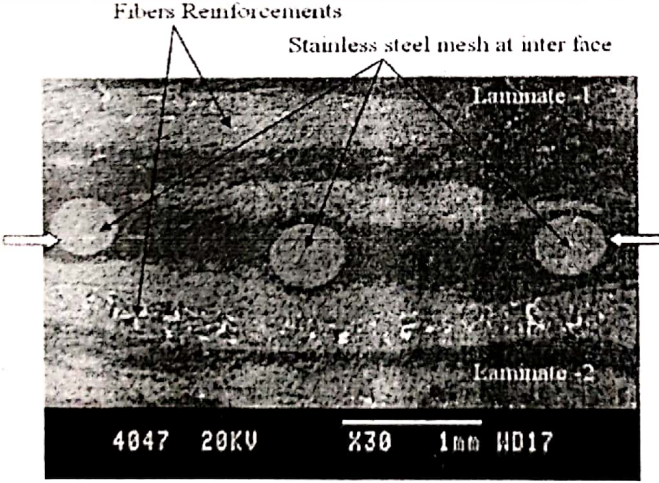


Neat sketches and drawings are necessary (wherever applicable). Be brief and specific in your answers. Make suitable assumptions wherever required and state the assumptions made. Part A and Part B should be answered in SEPARATE answer books

PART A (21 marks)

1.	Define Transition current in GMAW process.	1
2.	Specify the advantages and limitations of cellulosic coated electrodes.	3
3.	Calculate the cylindrical riser diameter by modulus method for feeding a rectangular slab casting having dimensions as 50 mm x 20 mm x 10 mm.	3
4.	 <p style="text-align: center;">Ceramic mold</p> <p>Observe the figure of pattern assembly (tree). Explain the step by step procedure involved in this process to get the product.</p>	7
5.	 <p style="text-align: center;">Fibers Reinforcements Stainless steel mesh at inter face Laminate -1 Laminate -2</p> <p style="text-align: center;">4047 20KV X30 1mm WD17</p> <p>Observe the figure. Thermoplastic laminates are joined. At interface stainless steel mesh is seen. Explain the joining process.</p>	7

PART B (30 MARKS)

1. a) If an alloy, obeying power law of strain hardening $\sigma = 400 \varepsilon^{0.3}$ MPa, is tested in uniaxial tension, what will be the uniform elongation? (2)
- b) State the von Mises yield criterion. Show that, for plane strain condition, the von Mises yield criterion reduces to the form (3)

$$\sigma_1 - \sigma_2 = (2/\sqrt{3}) \sigma_0$$

2. A rectangular plate of Al alloy is compressed between two flat dies at room temperature to a height h with no change in length. Derive an equation for mean forging pressure and show the pressure distribution over the width ($2a$). σ_0 is uniaxial flow stress of the alloy and μ is the coefficient of friction at the die-workpiece interface. (6)

3. a) What is the importance of neutral point in cold rolling of sheets/strips? (1.5)
- b) Show the effect of die angle on extrusion force in extrusion of solid rods with circular cross section in a figure and explain the variation. (1.5)
- c) What is springback in sheet bending? What are the methods of springback compensation? (2)

4. The diameter of a wire is to be reduced from 5mm to 3.7mm in a single pass by a wire drawing operation at room temperature. Which of the following options (dies) can be used? Justify your answer with calculations. (6)

Die 1: Die angle = 12° ; $\mu = 0.10$

Die 2: Die angle = 10° ; $\mu = 0.16$

5. Tensile properties of a 1.5mm thick isotropic sheet are: YS = 120 MPa, UTS = 240 MPa.
- a) Neglecting thickness changes, determine the initial blank diameter required to draw a flat bottom cylindrical cup of outer diameter 50 mm and height 40 mm using the above material. Determine the force required for shearing this blank from a large sheet. (4)
- b) Determine if the above cup can be deep drawn in a single stage assuming the efficiency of the drawing process to be 85%. (2)
- c) Estimate the optimum blank holding force for the above deep drawing process. What defect would occur if the applied blank holding force is less than the optimum? (2)