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G.R. No.	
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paper code: U239-152 (T1)

OCTOBER 2019 INSEM (T1)

S. Y. B.TECH. (MECHANICAL ENGINEERING) (SEMESTER – III)

COURSE NAME: MANUFACTURING PROCESSES

COURSE CODE: MEUA21182

(PATTERN 2018)

Time: [1 Hour]

[Max. Marks: 20]

(*) Instructions to candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed.
- 4) Assume suitable data where ever required.

Q 1) Attempt any one

- a) Calculate the ratio of solidification times of two steel cylindrical side risers of sizes 36 cm in diameter by 72 cm in height and 72 cm in diameter by 36 cm in height subjected to identical conditions of cooling. [8]
- b) A sprue is used to deliver liquid iron at a rate of 30 kg/sec. The density of iron is 7800 kg/m^3 . The height of pouring basin is 'h1' cm and that of sprue is three times of height of the pouring basin. Calculate the diameter of the sprue base for avoiding aspiration. [8]

Q 2) Attempt any one

- a) A 30-mm-thick plate made of low carbon steel is to be reduced to 25 mm in one pass in a rolling operation. As the thickness is reduced, the plate widens by 4%. Average yield strength of the steel is 174 MPa, and tensile strength is 290 MPa. The entrance speed of the plate is 77 m/min. Roll radius is 300 mm, and rotational speed is 45 rev/min. Determine (i) the minimum required coefficient of friction that would make this rolling operation possible, (ii) exit velocity of the plate, (iii) forward slip and (iv) Power for unit width of strip [8]
- b) Distinguish between: [8]
 - Hot working and cold working processes (minimum eight points)
 - Direct and indirect extrusion (minimum four points with process schematic)

Q 3) Attempt any one.

- a) State eight points of differences between A.C. welding and D.C. welding. [4]
- b) It is required to weld a low carbon steel plate by the manual metal arc welding process using a linear V.I. characteristic D.C. Power source. The following data are available: Open circuit voltage of power source: 62 V, Short circuit current: 130 A, Arc length: 4 mm. Voltage is considered to be 34.43% of current. Efficiency of heat input to the workpiece: 84 %. Calculate the heat input to the workpiece. [4]