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S. Y. B. TECH. (MECHANICAL ENGINEERING) (SEMESTER - I)

COURSE NAME: MANUFACTURING PROCESSES

COURSE CODE: MEUA21173

(PATTERN 2017)

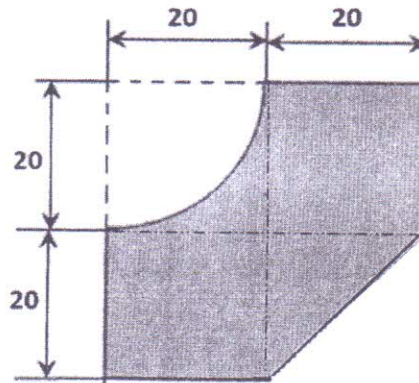
Time: [1 Hour]

[Max. Marks: 30]

(\*) Instructions to candidates:

- 1) Answer Q.1 OR Q.2 and Q.3 OR Q.4.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Use suitable data where ever required

Q.1) a) Design a strip layout for manufacturing a mild steel component as shown in figure. The thickness of the component is 1.2 mm. Take ultimate shear stress value as 220 N/mm<sup>2</sup>. Also find the percentage utilization and centre of pressure. [6 marks]



b) For the above stated problem, find the amount of shear on the punch to be provided if the punching force is to be reduced to half of the force required when operation is carried using a punch without shear. Take percentage penetration of 45%. Also, suggest one alternative strip layout design to improve the % utilization of the sheet and obtain its value. [6 marks]

c) Explain with sketches types of pilots used in sheet metal working. [4 marks]

OR

Q.2) a) A cup of internal diameter 50 mm and height to diameter ratio of 1.4 is to be drawn from 1.2 mm cold rolled steel. The corner radius for cylindrical cup is 1.6 mm. Find size of the blank, number of draws required, punch and dies dimensions for each draw.

Consider value of punch and die clearance as 1.15 times thickness of sheet. Consider percentage reduction permitted in the first draw is 50% and in the second, third and fourth draw is 30%, 20% and 15% respectively. Consider trimming allowance of 3.2 mm for each 25 mm of cup diameter. [6 marks]

b) Draw schematic of a progressive, a compound and a combination die. [6 marks]

c) State the importance of reducing cutting force in sheet metal works and only sketch methods of reducing cutting forces in sheet metal works. [4 marks]

Q.3) a) With a schematic explain the working of blow moulding process. [6 marks]

b) Write two points of comparison between vacuum thermoforming process and pressure thermoforming process. [4 marks]

c) Suggest most appropriate process for manufacturing of following plastic components:

i) Chairs, ii) Car dash board, iii) Plumbing fittings, iv) Cosmetic packaging, v) Food and water bottles, vi) Automobile fuel tanks, vii) Luggage bags, viii) Refrigerator inner panels.

[4 marks]

OR

Q.4) a) Describe with neat sketch transfer moulding. [6 marks]

b) Compare injection moulding with compression moulding in terms of tooling cost, rate of production, quality of surface and type of plastic processed. [4 marks]

c) Categorize the following applications into thermoplastic and thermosetting plastics:

i) Electric plugs, ii) Gears, iii) Dishes, iv) Container taps and fittings, v) Electronic components with moulded terminals, vi) Telephone receivers, vii) Washing machine agitators and viii) Toilet goods. [4 marks]

