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[5252]-512

S.E. (Mechanical/Auto.) (First Semester) EXAMINATION, 2017

MANUFACTURING PROCESSES-I

(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) All questions are compulsory i.e. solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.

(ii) Figures to the right indicate full marks.

(iii) Assume suitable data, if necessary.

(iv) Neat diagrams must be drawn wherever necessary.

1. (a) Compare hot chamber die casting process with cold chamber die casting process with schematic sketches. [6]
- (b) A high carbon steel solid cylindrical piece having diameter 45 mm and height 88 mm is reduced in height by 25% at room temperature using open die forging. Calculate the forging force at the end of stroke assuming the coefficient of friction as 0.15 and the work metal strength coefficient 'K' as 425 MPa and strain hardening exponent 'n' as 0.15. [6]

Or

2. (a) Explain the principle of roll forging process with a neat sketch. [6]
- (b) A cylindrical riser for which diameter of the riser is equal to the height of the riser is to be designed for a sand casting mould for the size of steel casting as 35 mm × 60 mm × 25 mm. The previous observations indicated the total solidification time for the said casting is 72 second. However, find the size of the riser to obtain total solidification time of 112 seconds. [6]

P.T.O.

3. (a) With a schematic explain the principle and working of injection moulding process. [6]
- (b) State various arc welding and gas welding processes. Explain the principle and working of any *one* type of gas welding process. [6]

Or

4. (a) Explain with neat sketch the principle of film extrusion process. [6]
- (b) State various resistance welding processes. Explain the principle and working of any one type of resistance welding process. [6]
5. (a) Discuss with neat sketches various methods that are used to reduce the cutting forces in sheet metal working. [6]
- (b) What is centre of pressure ? Explain method of calculating centre of pressure for a 'Tee' section having flange dimensions 80×20 mm and web dimensions 20×80 mm. Overall height of the 'Tee' section is 100 mm. [7]

Or

6. (a) With neat sketches explain the various drive mechanisms that are used for sheet metal presses. [6]
- (b) A cup of internal diameter 40 mm, height 65 mm is to be drawn from a 1.6 mm cold rolled steel with ultimate tensile strength of 360 MPa. The corner radius for cylindrical cup is 1.2 mm. Percentage reduction permitted in the first draw is 50% and in the second, third and fourth draw is 35%, 20% and 15% respectively. Consider trimming allowance of 3.2 mm for each 25 mm of cup diameter. Find size of the blank, number of draws required, punch and die dimensions and drawing pressure for each draw. Consider value of die constant 'c' as 0.7 and value of punch and die clearance as 1.15 times thickness of sheet. [7]

7. (a) State the different accessories used on lathe and state the purpose of each one. [6]
- (b) Calculate the change gears for cutting two start left hand threads of 2.4 mm pitch on a lathe having 6 mm pitch lead screw. Available gears are 20 to 120 teeth in steps of 5. Sketch the gear train and suggest what modification is required for cutting right hand threads ? [7]

Or

8. (a) Explain with a neat sketch taper turning operation to be carried on lathe out using a taper turning attachment. [6]
- (b) A workpiece of 90 mm diameter is to be turned down to 82 mm diameter. The length of the workpiece is 124 mm. The maximum allowable depth of cut is 0.8 mm. Assume feed as 0.22 mm/rev and cutting speed as 250 m/min. If the approach length is 25 mm and over travel is 15 mm then calculate the spindle revolution (RPM) and machining time for each pass if feed as 0.22 mm/rev and cutting speed as 250 m/min is kept constant for all the passes. Also, find the total machining time for all the passes. [7]