

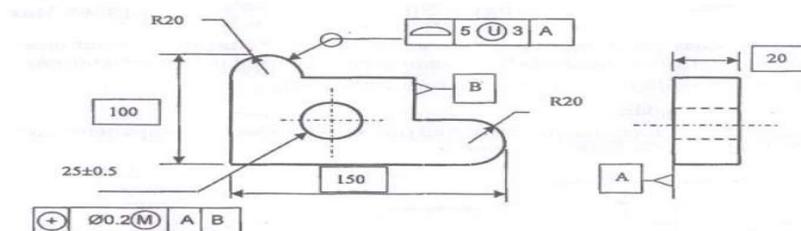
B.E./B.TECH Degree Examination, December 2020  
 Seventh Semester  
**ME16006 Process Planning and Cost Estimation**  
 (Regulation 2016)

Time: Three hours

Maximum: 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

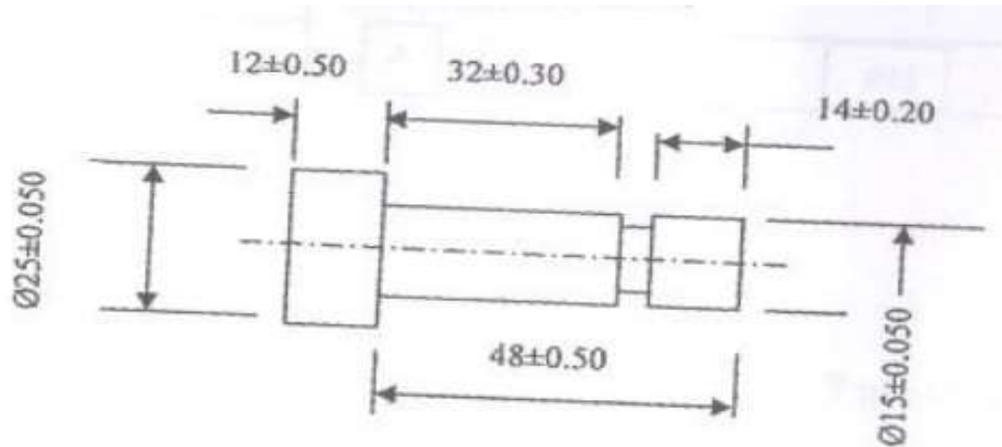
- Which type of production is being used in car manufacturing plant:
  - Job shop production
  - Batch production
  - Mass production
  - Continuous production
- Which *one* of the following indicates an increase in productivity?
  - Increased output as a result of waste reduction.
  - Increased output as a result of working for an additional shift.
  - Increased production owing to addition of machines and equipment.
  - Increased production with respect to increase in raw material consumption
- Prime cost of a product, manufactured in a factory, is determined by the sum of
  - Direct Material, direct expenses and indirect labour
  - Indirect material, indirect expenses and indirect labour
  - Direct material, direct expenses and direct labour
  - Indirect material, direct expenses and direct labour
- Shear loss, tonghold loss scale loss, flash loss and sprue loss will be considered in
  - Cost estimation of forging
  - Cost estimation of casting
  - Cost estimation of welding
  - Cost estimation of fabrication
- Study the drawing and interpret any one geometric tolerance symbol



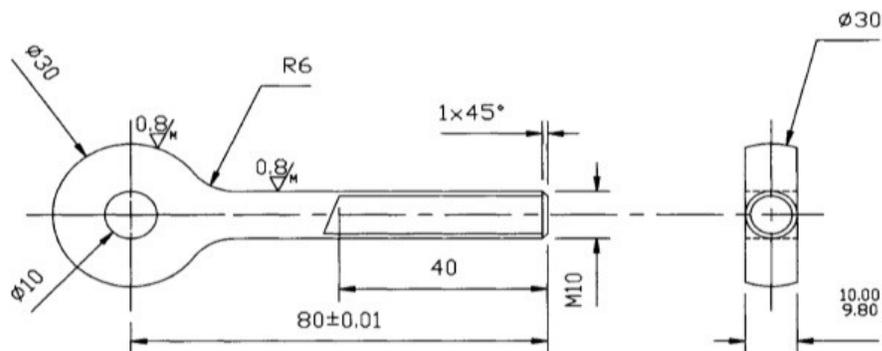
- Classify three basic functions of Jigs and Fixtures.
- What do you mean by Break Even Point? What is the use of calculating it?
- Differentiate interchangeability and standardization.

**PART B - (4 X16 = 64 marks)**

09. (a) (i) Discuss the production equipment and tool selection for the component shown. (8)  
Undercut diameter is 12mm



- (ii) Analyse and interpret the drawing below and list the critical processing factors for the part. (8)



MATERIAL: Mild Steel  $\text{Ø}30\text{mm}$

**(OR)**

- (b) For the component shown below, identify a suitable type of jig to manufacture the dia 20mm holes and produce a general arrangement drawing for a suitable design solution. Assume the holes are the last feature to be manufactured. (16)

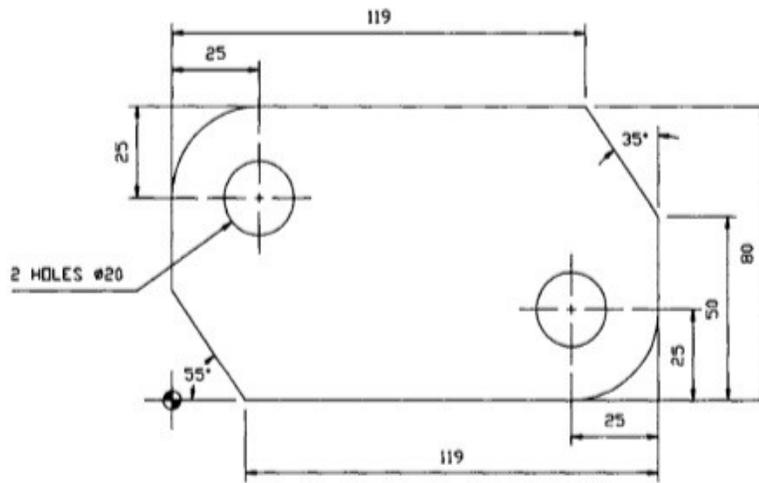
Material: aluminium alloy

Workpiece: 25 mm thick, surface finish N8 (general) and N3 (top)

Holes: 15 mm deep, surface finish N5

Fillets: R25 mm unless indicated otherwise

Tolerance:  $\pm 0.5$ , in general, unless stated



10. (a) For the component drawing below (Fig. Q5.7), identify: (16)

- i. suitable processes for its manufacture;
- ii. a suitable sequence of operations using the datum provided and using the points designated P1-P10;
- iii. suitable types of equipment for its manufacture;
- iv. suitable tooling for its manufacture.

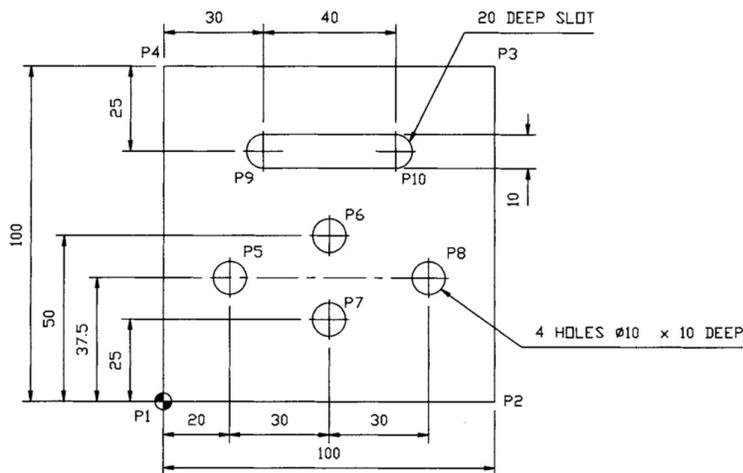


Figure Q5.7 Mild steel component

*Drg. notes:*

- Workpiece: 20mm thick
- Material: Mild steel
- General tolerance:  $\pm 0.5$
- Surface finish: N9 (general), N7 (slot/holes)

(OR)

(b) Interpret the meaning of followings: (16)

- (i) dimensional tolerance symbols
- (ii) form tolerance feature control frames
- (iii) surface finish symbols

11. (a) Calculate the machining time required to produce one piece of the component shown in (16)

Fig. starting from  $\text{Ø}25$  mm bar. The following data is available.

For turning :

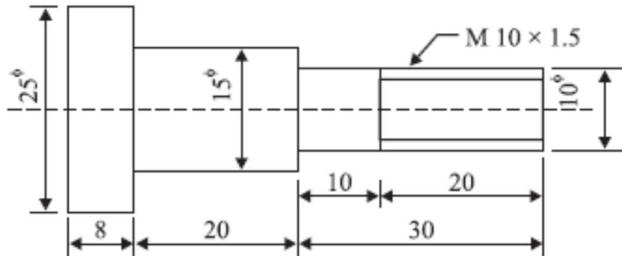
For thread cutting :

Cutting speed = 40 m/min.

Cutting speed = 8 m/min.

Feed = 0.4 mm/rev.

Depth of cut = 2.5 mm/per pass



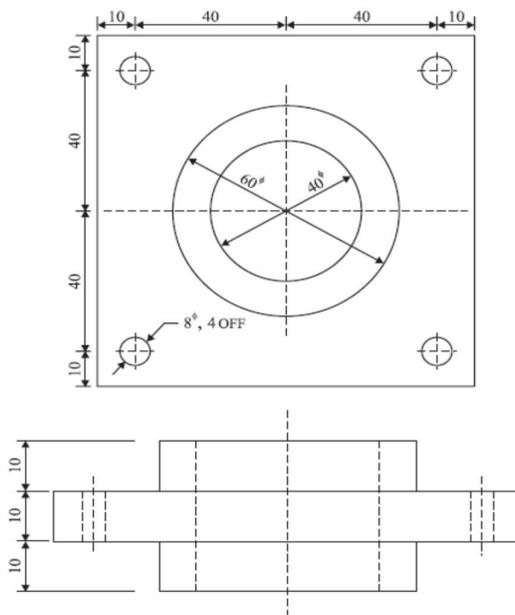
(OR)

- (b) Calculate the machining time (1) to drill four 8 mm dia (2) to drill one 40 mm dia (16)

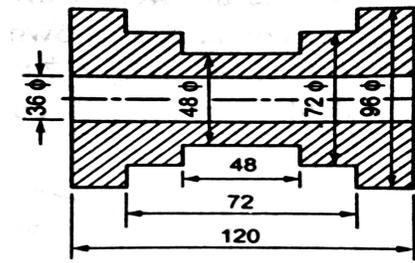
central hole (3) to tap the 8mm dia a hole to a length of 10 mm having 3 threads per cm. 20 mm dia hole is drilled first and then enlarged to 40 mm dia hole.

The cutting speed for drilling is 10 m/min. Feed for 8 mm drill is 0.1 mm/rev, for 20 mm drill feed is 0.2 mm/rev and for 40 mm dia drill feed is 0.4 mm/rev.

The cutting speed for tapping is 10 m/min. For return stroke the speed is 2 times the cutting speed



12. (a) (i) Calculate the material cost of 25 gun metal bushes, as shown in Fig. Take the density of material as 8.25 gm/cc and its cost as Rs.75/kg. Assume 12% material loss during process. (8)



All dimensions are in mm

- (ii) Calculate the cost of welding two plates 200mm x 100mm x 8mm thick to obtain a piece 200mm x 200mm x 8mm approximately using rightward welding technique. (8)

The following data is available:

Cost of filler material = Rs. 60 per kg

Cost of oxygen = Rs. 700 per 100 cu meters

Cost of acetylene = Rs. 700 per 100 cu meters

Consumption of oxygen = 0.70 cu m/hr

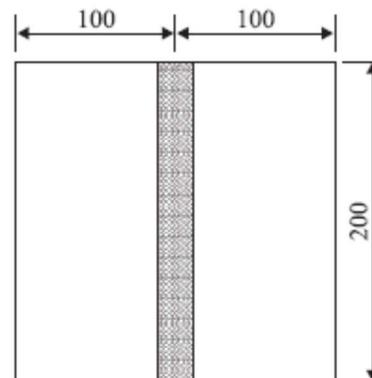
Consumption of acetylene = 0.70 cu m/hr

Diameter of filler rod = 4 mm

Density of filler material = 7.2 gms/cc

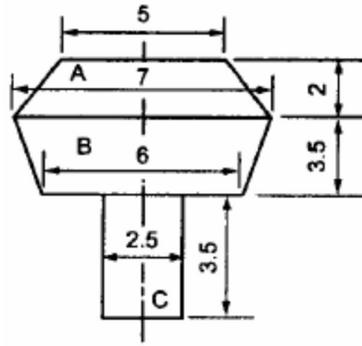
Filler rod used per meter of weld = 340 cms

Speed of welding = 2.4 meter/hr



(OR)

- (b) (i) 20 numbers of gun metal bevel gear blank shown in figure are to be cast in the factory from the planner supplied by the customer Estimate the selling price of each piece from the following data. (8)



- (ii) Two machines are purchased, each for Rs. 12,000. The estimated useful life of the machines is 5 years. The estimated scrap value is Rs. 2,000. For machine A, the straight line, the straight line method and for B, the reducing balance method with 30% is used to calculate the depreciation every year. Compare the depreciation charged in each case. (8)