1. Define method study.

2. Write down any two important applications of work measurement.

3. Brief about scope of process planning.

4. What are the documents used in process planning?

5. What is manufacturing logic?

6. Define costing.

7. List the types of estimates.

8. Brief about indirect material cost.

9. What is administrative overhead?

10. Find the weight of steel sphere of diameter 140mm taking steel density as 7150 Kg/m³.
PART B — (5 x 16 = 80 marks)

11. (a) State and explain major principles of motion economy. (16)

   Or

   (b) (i) Describe the procedure for stop watch time study. (8)
   (ii) Explain the applications of ergonomics. (8)

12. (a) List and explain process planning activities. (16)

   Or

   (b) (i) Describe material selection parameters. (6)
   (ii) Determine the time to face mill a C.I. casting 1.2 m long and
        266.7 mm wide, considering start and end allowances. Assume the
        following:
        No. of teeth in the cutter : 32
        Cutter diameter : 375 mm
        Spindle speed : 75 rpm
        Table feed : 287.5 mm per minute. (10)

13. (a) (i) State and explain objectives of cost estimation. (8)
   (ii) What are different classifications of cost? Explain. (8)

   (b) (i) Describe cost accounting with an example. (8)
   (ii) Explain major elements of cost. (8)

14. (a) Explain various methods of estimates. (16)

   Or

   (b) (i) Discuss data requirements and sources for cost estimation. (10)
   (ii) Write short notes on cost allowances in estimation. (6)

15. (a) (i) For manufacture of 1000 bolts and nuts per hour, a factory incurs
        following expenses:
        Direct Material cost : Rs.350
        Direct labour cost : Rs.200
        Direct expenses : Rs.75
        Factory over heads : 150% of labour cost
        Office overheads : 30% of factory cost
        Determine whether the factory is making profit or loss in selling
        one set of bolt and nut for Rs.1. (8)
(ii) A welded platform top is made by 20 mm steel plates requiring 10 joints of 1 metre length each. Welding is done on one side only by arc welding process. Labour charges are Rs.15 per hour. Electrode required per metre run in 2.5 m and costs Rs.6 per metre. Power consumption is 6 Kwhr per metre of the weld and cost Rs.3 per Kwhr. Time for welding 1 m length is 18 min. Assuming over heads as Rs.10 per hour, calculate welding expenses. (8)

Or

(b) (i) Determine selling price of a component made from steel bar 50 mm long and 20 mm in diameter machining time as \(1\frac{1}{2}\) hour.

Assume the following:

- **Steel Density**: 8000 Kg/m\(^3\)
- **Steel cost**: Rs.60/ Kg
- **Labour cost**: Rs.15/hour
- **Overheads**: 100\% of labour cost
- **Profit**: 20\% of total cost

(ii) 150 pieces of a stepped shaft are to be drop forged from raw stock of 20 mm diameter. Estimate the cost assuming the following:

1. **Shaft size**: Step on left: 10 mm diameter \(\times\) 75 mm long
   Step in the middle: 20 mm diameter \(\times\) 125 mm long
   Step on right: 10 mm diameter \(\times\) 75 mm long

2. **Material cost**: Rs.200 metre
3. **Cost of forging**: Rs.1200 per sq.metre of forged surface
4. **Overheads**: 100\% of forging cost.
   Consider scale loss, shear loss, flash loss, tong hold loss and sprue loss while making required assumptions. (10)
1. Define continuous production.

2. What is meant by Break even Analysis?

3. Define method study.

4. What is work measurement?

5. List the pre-requisite information needed for process planning.

6. How is the quality determined in batch production?

7. Define Kanban system.

8. What is manufacturing lead time?

9. Write the uses of two bin system.

10. What is ABC analysis?
PART B — (5 × 16 = 80 marks)

11. (a) Discuss the ten functions of production planning cycle. (16)

Or

(b) Write detailed notes on:
(i) Standardization 
(ii) Simplification
(iii) Specialization. (6 + 5 + 5)

12. (a) (i) Explain the various steps for time study. (8)
(ii) Discuss predetermined motion time standard. (8)

Or

(b) (i) Explain micro motion and memo motion study? (8)
(ii) Discuss the advantages and disadvantages of work sampling. (8)

13. (a) Discuss in detail the different phases of applying value analysis. (16)

Or

(b) Explain the steps involved in:
(i) Product planning
(ii) Process planning. (8 + 8)

14. (a) (i) Describe the information flow for master scheduling. (8 + 8)
(ii) With an example explain Gantt chart.

Or

(b) Write detailed notes on:
(i) Flow production scheduling
(ii) Batch production scheduling. (8 + 8)

15. (a) (i) Discuss the different costs associated with Inventory. (6)
(ii) Derive an expression for EOQ with uniform demand rate without shortages. (10)

Or

(b) Discuss in detail
(i) JIT
(ii) ERP. (8 + 8)

Seventh Semester

Mechanical Engineering

MF 441 — PROCESS PLANNING AND COST ESTIMATION

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 x 2 = 20 marks)

1. Define standardization.
2. What is Break Even Analysis?
3. What are the aims of costing?
5. List out the different components of Cost.
6. What are the factory expenses?
7. What are the losses in forging?
8. What are the different types of labour cost involved in welding?
10. What are the different types of milling operations?

PART B — (5 x 16 = 80 marks)

11. (a) (i) What is the scope of process planning? (6)

   (ii) Explain process planning for parts and process planning for assemblies. (10)

   Or
(b) (i) What are the benefits of computer aided process planning? (6)

(ii) List out the types of computer aided process planning. Explain. (10)

12. (a) (i) Describe the various cost involved in the estimating procedure. (8)

(ii) What are the functions of estimating? (4)

(iii) Differentiate costing and estimation. (4)

Or

(b) (i) What is the aims of estimating? (4)

(ii) What is the importance of costing? (2)

(iii) Describe the detail procedure of estimating. (10)

13. (a) A firm producing air circulator wants to place an improved design in the market. Suggest a selling price covering the on cost and keeping the previous profit proportions on sales. The materials in new model will cost Rs. 350 and the direct wages would be Rs. 200. The following figures relate to the previous year.

- Stock of material on 1st April 1975 = Rs. 25,000
- Stock of material on 31st March 1975 = Rs. 27,000
- Purchase of raw materials in this period = Rs. 50,000
- Manufacturing wages = Rs. 15,000
- Works on cost = Rs. 7,500
- Administrative and sales on cost = Rs. 7,500.
- Sales during the year = Rs. 95,000

Or

(b) In a production concern the variable overhead charges are Rs. 2.00 per article and the fixed overhead charges per month are Rs. 35,000. It is estimated that 65,000 articles are produced each month under normal conditions. Find:

(i) The normal overhead cost per article.

(ii) If the factory cost drops to 85% production. The overhead charges that are unrecovered.

(iii) If the production is increased to 130% by what amount these charges will be over recovered. (16)
14. (a) 1000 stepped bolts of size shown in Fig. are to be made by machine forging. Estimate net weight, gross weight and number of bars required. If m.s bars are available in 5 metre length and 20 mm diameter. Take the density of m.s bar 7.868 gm/cm³.

ALL DIM IN MM.

Or

(b) (i) What is the material cost of welding two plates of size 300 mm length and 150 mm with 8 mm thickness to make a piece 300 x 300 mm approximately? Use rightward technique with no edge, preparation costs. Take over all cost of oxygen as Rs. 0.70 per cu.meter, cost of acetylene at Rs. 7.00 per cu.metre, cost of filler metal Rs. 2.50 per kg. and 1 cu.cm of filler metal weighs 11.28 gms. Assume weld as rightward.

(ii) A lap joint is to be prepared in 9.5 mm. M.S. steel sheet using flat welding position and 6 mm electrode. Current used is 250 amps and 30 volts. Welding speed is 12 m/hr. and 0.3 kg of metal is deposited per metre length of joint.

Labour costs Rs. 1.50/hr, power Rs. 0.2/KWH and electrode Rs. 4/kg. Efficiency of machine is 50% and operating factor is 60%. Calculate the cost of labour, power and electrode per metre of weld.

15. (a) (i) Estimate the time taken to prepare a job as shown in fig. From mild steel stock bar 4.00 cm in diameter and 7.5 cm long. Assume the following data.

Cutting speed for turning and boring operations = 20 m/min
Cutting speed for drilling operations = 30 m/min.
Feed for turning and boring operation = 0.2 mm/rev.
Feed for 20 mm drill = 0.23 mm/rev.
Depth of cut not to exceed 3 mm in any operation.

(ii) Estimate the time required for tapping a hole with 2 cm diameter tap (3 mm pitch) to a depth of 5 cm in mild steel. The return speed of the tap is to be 3 times the cutting speed which is to be 10 metres per minute. (4)

(b) (i) A cast iron block of size 20 cm × 7.5 cm is required to be shaped to reduce the thickness from 2 cm to 1.8 cm in one cut. Determine the time required for shaping if cutting speed is 20 m/min. and feed is 0.2 mm per stroke and the cutting time ratio is 3/5. (8)

(ii) Calculate the time required to rough grind a steel shaft of 3.75 cm diameter to 3.7 cm diameter size using a grinding wheel of 5 cm face and assuming a cutting speed of 12 metre/minute and depth of cut 0.0025 cm. Length of shaft to be ground is 25 cm. (8)
Reg. No.: 

**Question Paper Code: 60346**

B.E./B.TECH.DEGREE EXAMINATION, MAY/ JUNE 2012.

Seventh Semester

Mechanical Engineering

ME 1007 — PROCESS PLANNING AND COST ESTIMATION

(Common to Production Engineering)

(Regulation 2004)

(Also common to B.E. (Part-Time) Sixth Semester Mechanical Engineering – Regulation 2005)

Time: Three hours                                      Maximum: 100 marks

Answer ALL questions.

**PART A — (10 × 2 = 20 marks)**

1. Define SIMO chart.

2. What is the difference between method study and work measurement?

3. What are the types of process planning?

4. What are the activities associated with process planning?

5. State the objectives of cost estimating.

6. What do you mean by a realistic estimate?

7. State the functions of an estimator.

8. What is meant by Standard data?

9. Define the term ‘Direct material cost’.

10. What do you mean by Overhead expenses?
PART B — (5 × 16 = 80 marks)

11. (a) Enumerate the principles of motion economy pertaining to work place layout.  

Or

(b) Discuss the objectives and various applications of ergonomics.

12. (a) Describe the various types of charts, diagrams and other documents used in process planning.

Or

(b) (i) Explain the process planning procedure.

(ii) What are the factors that influence process planning?

13. (a) Explain the various methods of costing.

Or

(b) From the records of an oil mill, the following data are available.

(i) Raw materials

Opening stock = Rs. 1,40,000
Closing stock = Rs. 1,00,000
Total purchases during the year = Rs. 2,00,000

(ii) Finished Goods

Opening stock = Rs. 20,000
Closing stock = Rs. 30,000
Sales = Rs. 6,00,000

(iii) Direct wages = Rs. 1,00,000

(iv) Factory expenses = Rs. 1,00,000

(v) Non-manufacturing expenses = Rs. 85,000

Find out what price should be quoted for a product involving an expenditure of Rs. 35,000 in material and Rs. 45,000 wages. Factory expenses to labour cost is 100/-

(16)
14. (a) (i) Differentiate between cost estimating and cost accounting. (8)
(ii) Discuss the various allowances in estimation. (8)

Or

(b) (i) What are the data requirements and sources available to develop an estimate? (8)
(ii) Briefly discuss the estimating procedure. (8)

15. (a) Briefly explain the estimation of machining time for various lathe operations with sketches. (16)

Or

(b) Two 1 m long M.S plates of 10 mm thickness are to be welded by a lap joint with a 8 mm electrode. Calculate the cost of welding. (16)

Assume the following data.

(i) Current used = 30 amperes
(ii) Voltage = 300 v
(iii) Welding speed = 10 m/hr
(iv) Electrode used = 0.1 kg/m of welding
(v) Labour charges = Rs 4.00 / hr
(vi) Power charges = Rs 0.2/ kwh
(vii) Cost of electrode = Rs 40.00 / kg
(viii) Efficiency of machine = 70%