

**V.S.B ENGINEERING COLLEGE**  
**DEPARTMENT OF MECHANICAL ENGINEERING**  
**ASSIGNMENT QUESTIONS**

**Class: IV Mechanical Engineering A Section**

**Subject: ME6005 Process Planning and Cost Estimation**

S.No	Assignment question
1.	Explain what do you mean by work measurement and the various methods used for work Measurement.
2.	What is the equipment used in time study? Explain the working of a decimal stop watch.
3.	What do you understand by Analytical Estimating? Give the procedure for conducting work measurement study by analytical estimating.
4.	What do you understand by work sampling? List the procedural steps in work sampling and give its areas of use.
5.	Explain briefly the various methods used for rating the performance of an operator A worker takes 0.5 minute to do a job and his performance rating is 80 percent. What is normal time? If the fatigue allowance is 10 percent of normal time and the worker spends one hour in one day (8 hour shift) on machine setting and personal work etc., what is standard time?
6.	What do you understand by the term work study? What are the objectives of work study?
7.	Explain what do you understand by method study? Give the procedural steps employed in Conducting method study.
8.	What are the various symbols used in work study for making charts. Give two examples of use of each symbol.
9.	What are the various recording techniques used in methods study ? Explain briefly.
10.	Explain how you will proceed to rate : (a) The pace of a man walking on a level ground. (b) The pace of a man dealing a pack of playing cards.
11.	Write short notes on : (a) PMTS (b) Westinghouse System of Rating (c) Standard time (d) Advantages and disadvantages of work sampling compared to time study
12.	The time study data for drilling three holes in a connecting link rod is given in T Calculate the standard time for drilling of one connecting

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	<p>rod.  The job description is :  (a) Drilling machine pillar type, and drilling machine capacity 25 mm diameter.  (b) Drill Jig is used for holding the hob on machine.  (c) Pieces to be drilled are lying in a bin near the machine.  (d) After drilling, the job is put in another bin lying near the machine.  Use the following information in calculating standard time. 10 connecting rods have been Machined. Rating factor 110 per cent.</p>
13.	<p>What is Ergonomics? Who is an Ergonomist? What special skills does he require and how do you think these skills can be acquired ?</p>
14.	<p>Define a (i) Qualitative display (ii) Quantitative display (iii) A representational instrument display Give one example of the application of each type.</p>
15.	<p>Sketch the outline of a suggested dash board instrument display for a family car which should include the means of indicating (a) Road speed in km/hr. (b) Quantity of petrol contained in the tank. (c) Engine running temperature. (d) Oil pressure. (e) Ignition working. (f) Total distance covered. (g) Battery discharge in Amps.</p>
16.	<p>Examine the controls of a machine tool in your College workshop. Constructively criticize the layout of the controls from the point of view of accessibility for the students, safety, force required to operate them, colour, pictorial representation which indicates on a panel close to the control how it should be operated (if any), and the direction of operation of the control (check if the accepted conventions are observed). Suggest any alterations you think would improve the layout.</p>
17.	<p>Assume you have to design a table and a chair on which a simple assembly operation is to be carried out by every student of your class. Obtain the appropriate limb dimensions for all the class, and hence arrive at the most suitable bench height, seat height and working areas for the table.</p>
18.	<p>Calculate the net machine-hours available in a factory from the following data for month of June :  (1) Number of milling machines = 8  (2) Number of working days = 25</p>

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	(3) Number of shifts per day = 2 (4) Time lost due to maintenance and repairs, etc. = 3 hrs. per day (5) Number of hours/shift = 8																											
19.	<p>A component can be produced with equal ease on either a capstan lathe or on a single spindle cam operated automatic lathe. Find the break-even quantity Q if the following information is known.</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="text-align: center; width: 30%;"><i>Capstan Lathe</i></th> <th style="text-align: center; width: 30%;"><i>Automatic Lathe</i></th> </tr> </thead> <tbody> <tr> <td>(a) Tooling cost</td> <td style="text-align: center;">Rs. 30.00</td> <td style="text-align: center;">Rs. 30.00</td> </tr> <tr> <td>(b) Cost of cams</td> <td style="text-align: center;">—</td> <td style="text-align: center;">Rs. 150.00</td> </tr> <tr> <td>(c) Material cost/Component</td> <td style="text-align: center;">Rs. 0.25</td> <td style="text-align: center;">Rs. 0.25</td> </tr> <tr> <td>(d) Operating labour cost</td> <td style="text-align: center;">Rs. 2.50/hour</td> <td style="text-align: center;">Rs. 1.00/hour</td> </tr> <tr> <td>(e) Cycle time/Component</td> <td style="text-align: center;">5 minutes</td> <td style="text-align: center;">1 minute</td> </tr> <tr> <td>(f) Setting up labour cost</td> <td style="text-align: center;">Rs. 4.00/hour</td> <td style="text-align: center;">Rs. 4.00/hour</td> </tr> <tr> <td>(g) Setting up time</td> <td style="text-align: center;">1 hour</td> <td style="text-align: center;">8 hours</td> </tr> <tr> <td>(h) Machine overheads (setting and operating)</td> <td style="text-align: center;">300 % of (d)</td> <td style="text-align: center;">1000 % of (d)</td> </tr> </tbody> </table>		<i>Capstan Lathe</i>	<i>Automatic Lathe</i>	(a) Tooling cost	Rs. 30.00	Rs. 30.00	(b) Cost of cams	—	Rs. 150.00	(c) Material cost/Component	Rs. 0.25	Rs. 0.25	(d) Operating labour cost	Rs. 2.50/hour	Rs. 1.00/hour	(e) Cycle time/Component	5 minutes	1 minute	(f) Setting up labour cost	Rs. 4.00/hour	Rs. 4.00/hour	(g) Setting up time	1 hour	8 hours	(h) Machine overheads (setting and operating)	300 % of (d)	1000 % of (d)
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20.	<p>In a small factory making toys, the fixed overhead costs are Rs. 5,000 per month and the variable cost is Rs. 4 per piece. The selling price is Rs. 6 per piece. Estimate the minimum monthly production so that the factory may not suffer any loss.</p>																											
21.	<p>In a factory fixed overhead charges are Rs. 45,000 and the variable overhead charges are Rs. 2.50 per article. The factory is producing 45,000 articles per month under normal conditions. Find : (i) Overhead cost per article under normal conditions. (ii) If the production drops to 80 percent, calculate the charges that remain uncovered. (iii) If the production increases to 125 percent, by what amount these charges will be over recovered. Take the overhead rate per article the same as during normal production, in both the cases.</p>																											
22.	<p>Give the main characteristics of job, batch and mass production.</p>																											
23.	<p>Give a procedure for process planning for the manufacture of a component in machine shop.</p>																											
24.	<p>Write short notes on : (a) Batch production (b) Calculation of material quantity required (c) Uses of a process sheet.</p>																											
25.	<p>Explain the steps involved in calculation of man-hours and machine-hours availability.</p>																											

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26.	The following data is available for a machine shop : (a) No. of machines 6 (b) No. of working days/month 25 (c) Working hours per day 8 (one shift only) (d) Overtime allowed per day 1.5 hours (e) Absenteeism 10% (f) Repair and maintenance allowance 5% Calculate the net available machine-hours in one month.
27.	What factors are taken into consideration in product design?
28.	What are the steps involved in process design?
29.	What is process design and what are the factors affecting process design?
30.	Draw a graph connecting “product variety” and “production quantity” for different types of production.
31.	What are the different factors considered in developing a manufacturing logic?
32.	What are the various cost elements considered in calculating the hourly cost of running a machine ?
33.	What do you understand by hourly cost of running a machine? Explain
34.	A component can be made either on an ordinary lathe or on an automatic lathe. The time taken in first case is hours per piece and overheads are 30 percent of labour cost. In the second case, the time taken is 30 minutes per item and overheads are 200 per cent of labour cost. If the material cost is Rs. 20 per piece and labour charges are Rs. 5 per hour, compare the total cost in both the cases.
35.	What are the different types of allowances that are considered in the estimation of standard time?
36.	The catalogue price of a motor driven sewing machine is Rs. 1,200 and allowable discount to distributor is 15 percent. Manufacturer’s data at a certain time, shows that sum of administrative and selling expenses, and factory cost are in the ratio 1 : 1 and the materiel cost, labour cost and factory overheads are in the ratio 1 : 3 : 2. If the cost of labour on the manufacture of the machine is Rs. 240, determine the profit realised on each sewing machine.
37.	A factory has 15 lathes of same make and 15 shapers of same make and capacity. Lathes occupy 30 m <sup>2</sup> floor area while shapers occupy 15 m <sup>2</sup> floor area. During one calendar year,

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	factory expenses are as follows :Rs. (i) Building rent and depreciation - 5,000 (ii) Indirect labour and material costs 15,000 (iii) Insurance charges 2,000 (iv) Depreciation charges of lathes 5,000 (v) Depreciation charges of shapers 3,000 (vi) Power consumption for the lathes 2,000 (vii) Power consumption for the shapers 1,000 Find out the machine-hour rate of on-cost allocation for lathes and shapers, if all the lathes and shapers work for 2,500 hours and 8,000 hours respectively.
38.	What are the three levels of design considered in new product development?
39.	What is meant by “Parametric Cost Estimating”? Explain
40.	What are “Global Cost Estimation” methods? Explain
41.	What is meant by “Cost-size Relationships” in conceptual cost estimating? Give an example and explain.
42.	What are the various data requirements and sources of information for cost estimation?
43.	A cast iron foundry employs 30 persons. It consumes material worth Rs. 25,000, pays workers @ Rs. 10 per hour and total overheads are Rs. 10,000. In a particular month (25 days) workers had overtime of 150 hrs and were paid at double their normal rate. Find (i) Total cost (ii) Man hour rate of overheads. Assume an 8 hours working day.
44.	Explain the following : (a) Distribution of die cost on individual components. (b) Material cost in costing of cast products. (c) Process scarp in a casting process.
45.	What do you understand by distribution of overhead expenses? Discuss various methods of allocation of overhead expenses.
46.	Explain the following terms w.r.t. machining operations giving examples : (a) Set-up time. (b) Handling time. (c) Unit operation time. (d) Total time.
47.	What are the various allowances to be considered while calculating the total time for Manufacturing a component?
48.	A face milling cutter of 150 mm diameter is used to give a cut on a m.s. block 500 mm × 250 mm. The cutting speed is 16 m/min and feed 0.2 mm/revolution. Calculate the time required to complete one cut.
49.	A slot 25 mm deep is to be cut through a work piece 200 mm long with the help of milling cutter with 10 teeth and diameter 150 mm. The cutting speed is 50 m/min, feed is 0.25 mm per tooth. Calculate (i) Table feed in mm/min. (ii) Total cutter travel (iii) Time required to machine the slot.
50.	How do simplification, standardization and specialization help in increasing the efficiency in the utilization of manpower, materials, equipment and capital.

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51.	Explain the routing function with the help of a typical route sheet.
52.	Define economics. Also discuss the flow of goods, services, resources and money payments in a simple economy with the help of a suitable diagram.
53.	An operator at an ABC company is expected to take 2 minutes to load and 1 minute to unload a moulding machine. There are several machines of this type, all doing the same thing, and the automatic run time on each is 4 minutes. Respective costs are Rs. 8 per hour for the operator and Rs. 20 per hour for each machine. (a) Construct a worker-machine chart for the most efficient one-worker and two machine situation. (b) What is the cycle time? (c) What is the total cost per cycle?
54.	Differentiate between process planning and production planning. Explain the procedure of Process planning listing the advantages of process planning.
55.	Draw the break-even chart and explain how break-even analysis is helpful in the selection of equipment.

**Name of the Faculty**

**HoD**

# V.S.B. ENGINEERING COLLEGE, KARUR

Department of Mechanical Engineering

Academic Year: 2018-2019 (ODD Semester)

## Assignment Details

Class: IV Year/ VII Semester Mechanical Engineering "B" Section

Subject Name/Code: Robotics/ME6010

Faculty name: Mr.V.Ragavan

Sl.No.	Register No.	Name of the Student	Topic Details
1.	922515114006	ARUNADEVI M	What is your understanding about Robot Anatomy and its Co ordinate Systems? Explain with a suitable sketch of a robot.
2.	922515114052	KAVIN C	How to Know When a SCARA Robot is the Right Choice for Your Application.
3.	922515114053	KISHORE THANGAM M	Illustrate Robots Improve Safety, Productivity in OBG's Heat Treating and Quenching System
4.	922515114054	KODIYARASU K	Identify the five major parts of a robot. Give suggestions for replacing them with modern tools
5.	922515114055	KOKULA SANDHIYA P	Explain degrees of freedom as applied to robots with suitable example
6.	922515114056	KRISHNAN R	List the types of robot Sensors along with an example for each.
7.	922515114057	LEZLIN S K	Industrial robots improve productivity – Illustrate with an Example.
8.	922515114058	LINKESH KUMAR L	How to improve the use of industrial robots in lean manufacturing

			systems. Narrate with an application
9.	922515114059	LOGESHWARAN R	Design and Construct a Polar configuration robot and state its importance in Automobile assembly.
10.	922515114060	MAC MILEN T J	Discuss with the suitable example the roles of Robot in Modern manufacturing.
11.	922515114061	MAKESHWARAN T	Write in detail about latest innovations in medical robots.
12.	922515114063	MANIKANDAN R	Compare Pneumatic and Hydraulic Actuators and furnish their advantages and disadvantages over manufacturing.
13.	922515114064	MANIMARAN N	To detect non-conducting metallic objects which sensor would be useful for robot actuator.
14.	922515114065	MANOJ T	Explain the principle of working of Hall effect sensor and its application in Robotics
15.	922515114066	MANOJ KUMAR.G	Suggest a suitable specification of Robot and sensor type to measure the level of sulphuric acid in a storage tank. The sensor must give an electric signal as output.
16.	922515114067	MANOJKUMAR N	List important factors and desirable characteristics to be considered in the design of end effectors.
17.	922515114068	MANOJKUMAR R	Develop a conceptual design of a Robot with Light sensors based control system for counting a number of milk packets being packed for dispatch. Assume suitable data if necessary.
18.	922515114069	MANOKANNAN K	State Work Envelope and its Types. Draw a neat work envelope for a polar configuration robot.
19.	922515114070	MITHUN M	Classify robots according to type of control systems and type of actuator drives.
20.	922515114071	MOHAMEDZAKIR HUSSAIN M	Compare and discuss the four basic configurations of robots.
21.	922515114072	MOHAMMED BAGRUDEEN M	List the applications of potentiometer sensor in/around your home and office/university.

22.	922515114073	MOHAN KUMAR R	To detect non-conducting metallic objects which sensor would be useful for robot actuator.
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26.	922515114078	MUTHUSAMY R	Explain degrees of freedom as applied to robots with suitable example
27.	922515114079	NANTHAKUMAR V	List the types of robot Sensors along with an example for each.
28.	922515114080	NARESH S	Classify robots according to type of control systems and type of actuator drives.
29.	922515114081	NAVEEN D	Compare and discuss the four basic configurations of robots.
30.	922515114082	NAVEEN M	Compare Pneumatic and Hydraulic Actuators and furnish their advantages and disadvantages over manufacturing.
31.	922515114083	NAVEEN R	Explain the principle of working of Hall effect sensor and its application in Robotics
32.	922515114084	NAVEEN S	Suggest a suitable specification of Robot and sensor type to measure the level of sulphuric acid in a storage tank. The sensor must give an electric signal as output.
33.	922515114085	NAVEEN S	List important factors and desirable characteristics to be considered in the design of end effectors.
34.	922515114086	NAVEENA R	Develop a conceptual design of a Robot with Light sensors based control system for counting a number of milk packets being packed for dispatch. Assume suitable data if necessary.
35.	922515114087	NAVEENKUMAR S	State Work Envelope and its Types. Draw a neat work envelope for a polar configuration robot.

36.	922515114088	NAVEENPRASANTH S	What is your understanding about Robot Anatomy and its Co ordinate Systems? Explain with a suitable sketch of a robot.
37.	922515114089	NIRANJAN M	How to Know When a SCARA Robot is the Right Choice for Your Application.
38.	922515114090	NITESH M	Illustrate Robots Improve Safety, Productivity in OBG's Heat Treating and Quenching System
39.	922515114091	NORUL HASAN M	Identify the five major parts of a robot. Give suggestions for replacing them with modern tools
40.	922515114092	PARIVARTHINI S	Explain degrees of freedom as applied to robots with suitable example
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42.	922515114094	PERIYASAMY R	Classify robots according to type of control systems and type of actuator drives.
43.	922515114095	PRABHU RAM P	Compare and discuss the four basic configurations of robots.
44.	922515114096	PRAKASH C	Compare Pneumatic and Hydraulic Actuators and furnish their advantages and disadvantages over manufacturing.
45.	922515114098	PRAVEENKUMAR M	Cite important developments in the evolution of robots.
46.	922515114099	PRAVEENKUMAR R	List the types of robot end effectors along with their tasks for each type
47.	922515114100	PRAVEENKUMAR S	Define two types of automation and the contribution of robots in them.
48.	922515114309	INBARAJ K	Discuss the role of robots in the workforce and its impact in employment
49.	922515114310	JAYACHANDRAN M	Cite important developments in the evolution of robots.
50.	922515114311	LALITH KUMAR S	List the types of robot end effectors along with their tasks for each type

51.	922515114312	MAHENDRAN R	Define two types of automation and the contribution of robots in them.
52.	922515114313	MANIKANDAN C	List the types of robot Sensors along with an example for each.
53.	922515114314	MANOJ KUMAR R	Classify robots according to type of control systems and type of actuator drives.
54.	922515114315	NELSON PHILIP S	Compare and discuss the four basic configurations of robots.
55.	922515114316	P PRABHAKARAN C	List the applications of potentiometer sensor in/around your home and office/university.
56.	922515114317	PURUSOTHAMAN C	To detect non-conducting metallic objects which sensor would be useful for robot actuator.

**Signature of faculty**

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