PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Sem & AY: Odd Sem. 2019-20

Course Code: MEC 304

Course Name: PRODUCTION PLANNING AND CONTROL

Program & Sem: B.Tech. (MEC) & VII DE

Date: 27.09.2019

Time: 9.30AM to 10.30AM

Max Marks: 40

Weightage: 20%

Instructions:
(i) All questions are compulsory
(ii) Scientific calculators are allowed.

Part A (Memory Recall Questions)

Answer all the Questions. Each question carries four marks. (4Qx4M=16M)

1. Briefly explain any four objectives of production, planning and control.

(C.O.NO.1) [Knowledge]

2. Describe the characteristics of a job production environment and its merits

(C.O.NO.1) [Knowledge]

3. What do you mean by TPS and JIT? (C.O.NO.2) [Knowledge]

4. Compare between push system and pull system. (C.O.NO.2) [Knowledge]

Part B (Thought Provoking Questions)

Answer both the Questions. Each question carries seven marks. (2Qx7M=14M)

5. A company is thinking of launching a new product to the market. Explain any 4 different aspects of new product development process for the new product by considering an example (C.O.NO.1) [Comprehension]

6. A company wants to introduce standardization principles in its working place. Explain in which all area they can introduce this concept as a company. Also mention about some challenges that they may face in standardization.

(C.O.NO.1) [Comprehension]

Part C (Problem Solving Questions)

Answer the Questions. The Question carries ten marks.   (1Qx10M=10M)

7) a) How does finding BEP for a product helps a company and briefly discuss about algebraic method and graphical method to calculate BEP   [4 M]

(C.O.NO.1) [Comprehension]

b) A manufacturer produces 1500 units of products annually. The marginal cost of each product is Rs.960 and the product is sold for Rs.1200. Fixed cost incurred by the company is Rs.48, 000 annually. Calculate P/V Ratio and what would be the break -even point in terms of output and in terms of sales value?   [6 M]

(C.O.NO.1) [Comprehension]

Semester: 7

Course Code: MEC 304

Course Name: **Production planning and control**

Date: 27/09/19

Time: 11.00 – 12.00pm

Max Marks 40 Marks

Weightage. 20%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels	Thought provoking type [Marks allotted] Bloom's Levels	Problem Solving type [Marks allotted]	Total Marks
			K	C	A	
1	1	Unit 1	4			4
2	1	Unit 1	4			4
3	2	Unit 2	4			4
4	2	Unit 2	4			4
5	1	Unit 1		7		7
6	1	Unit 1		7		7
7	1	Unit 1	4	6		10
	Total Marks		8 12	20		40

K =Knowledge Level   C = Comprehension Level. A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

[I hereby certify that All the questions are set as per the above guide lines. Mr. Vishnu D]

24.09.11

Reviewers' Comments

Annexure- II: Format of Answer Scheme

SCHOOL OF ENGINEERING

SOLUTION

Semester 7

Course Code: MEC 304

Course Name: Production planning and control

Date: 27/09/19

Time: 11.00-12.00pm

Max Marks: 40 Marks

Weightage: 20 %

Part A   (Q x M = Marks)

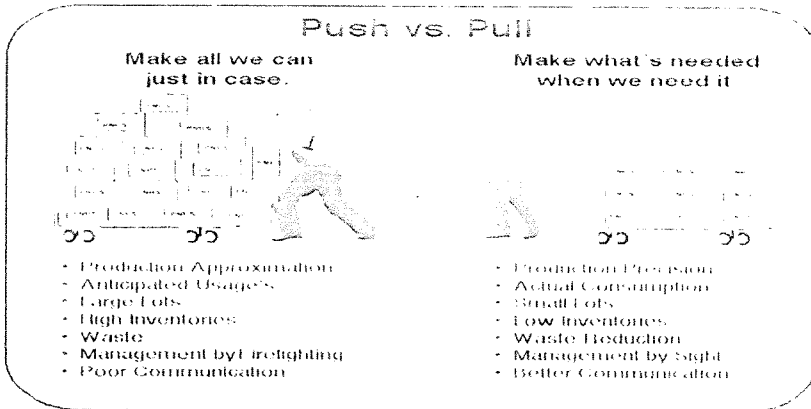| Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	➤ To systematically plan the production activities to achieve the high production efficiency. ➤ To ensure maximum utilization of all resources ➤ To ensure production of quality products ➤ To maintain optimum inventory level ➤ To coordinate production activities of various department ➤ To plan for plant capacities for future requirement /expansion ➤ To establish the targets and check them against performance ➤ To ensure effective cost reduction and cost control ➤ To maintain flexibility in manufacturing production ➤ To coordinate plant activities with various department effectively	1 mark for each objective $1 \times 4M = 4M$	4 mins
2	• Manufacturing of a single complete unit as per the customers order. • This is a special order type of production • Each job or product is different from others and no repetition is involved ▪ Characteristics: High variety and low volume		4mins

* High Skilled operators and supervisors are required
* Variable path handling equipment's are used

Flow of materials is not continuous i.e it id intermittent

Merits:

* **It involves comparatively small investment in machinery and equipment**
* **It is flexible and can be adapted easily to change in product design**

3 marks for characteristics and 1 mark for merits

Q No	Solution	Scheme of Marking	Max. Time
3	TPS: Toyota Production system JIT: Just in Time	2 marks each	4mins
4	 Push vs. Pull Make all we can just in case. / Make what's needed when we need it • Production Approximation / • Production Precision • Anticipated Usages / • Actual Consumption • Large Lots / • Small Lots • High Inventories / • Low Inventories • Waste / • Waste Reduction • Management by Firefighting / • Management by Sight • Poor Communication / • Better Communication	1 mark for each difference	4min

Part B

(2Q x 7M = 14Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5	1. Market aspects 2. Functional aspects 3. Operational aspects 4.Durability and Dependability 5. Aesthetic	1.5 marks for each for any 4 aspect and 1 mark for neat explanation	6mins
6	• Standardisation means setting up standards or measuring sticks by which quality,quantity,value,performance or service may be gauged or determined • Basic Standardization: it Includes standardization of basic elements such as Scales and weights,voltage,prefered sizes.	5 marks for different standerdisation and 2 marks for limitation	6mins

- Dimensional Standardisation: It includes standardization of various engineering components such as nuts,bolts,screws,gears,keys,rivets and bearings.
- Material standardisatiom: The material that are used in production are standardized in quality,size,shape and physical aspects.It includes standardization of lubricants,coolants...etc
- Equipment standardization: Includes Specification relating to machine and equipment required for production.
- Process Standardisation
- Quality standardization:
- Safety measure standardization
- Personnel standardization: Wage rates,operation times,training and selection...etc

LIMITATIONS:

➢ Reduced choice for customers because of reduced variety
➢ Change in product design or new product design may take a very long time
➢ Excess standardization of operations and procedure will reduce the initiative and interest of workers.

limits and fits,surface texture,drawing paper size and testing procedure....etc.

Part C   (1Q x10 M = 10Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
7	a) BEP analysis Two methods: 1)Algebraic 2) Graphical	1 mark for BEP and 3 Marks for	4mins

b)

A. Contribution per unit = Sales – Variable cost = Rs. 1200 – Rs. 960 – Rs. 240

B. P/V Ratio = Contribution / Sales x 100 = 240/1200 x 100 – 20%

C. Break-even point (in units) = Fixed cost / Contribution per unit =

                    =48, 000 /240 – 200 units

D. Break-even point (in Rs.)   = Break-even point x selling price per unit

                    – 200 x 1200 – 2 40, 000

                           OR

D. Break-even point (in Rs.)   = Fixed cost / P/V Ratio

                    – 48, 000 / 20% – 2, 40. 000

methods

2 marks 4 mins
each

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST – 2

Sem & AY: Odd Sem. 2019-20

Date: 16.11.2019

Course Code: MEC 304

Time: 11:00 AM to 12:00 PM

Course Name: PRODUCTION PLANNING AND CONTROL

Max Marks: 40

Program & Sem: B.Tech (MEC) & V DE

Weightage: 20%

Instructions:
   I.   Scientific calculators are allowed

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries five marks.   (4Qx5M=20M)

1. Describe different dimensions of quality.   (C.O.NO.2) [Knowledge]

2. Explain the various steps involved in product planning process.

(C.O.NO.2) [Knowledge]

3. Briefly explain the ten commandants of value analysis.   (C.O.NO.2) [Knowledge]

4. What is process planning? List the importance of it.   (C.O.NO.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question carries five marks.   (2Qx5M=10M)

5. What are the quality control tools that you know? Explain how these tools are used
   to improve a process or product quality.   (C.O.NO.2) [Comprehension]

6. Assuming that you are a process planning engineer of a manufacturing firm, list the
   responsibilities that you supposed to deal with.   (C.O.NO.2) [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The Question carry ten marks. (1Qx10M=10M)

7. A product is sold at a rate of 500 nos. per day and the same is manufactured at the rate of 3000 nos. a day. The set up cost of machines is Rs.7000 and the storage cost is estimated as Rs.0.05 per unit per day. Labour cost, material cost and over-head cost are Rs.200, Rs.120 and Rs.190 respectively. If the interest rate is 12%, find the batch size so that total cost is minimum. Also find the total cost of a production run. Assume that the production facility is in operation for 320 days in a year.

(C.O.NO.2) [Application]

GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

Semester: 5

Course Code: MEC304

Course Name: Production Planning and Control

Date: 16.11.2019

Time: 11 AM – 12 Noon

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1.	2	II/Toyota Production System	5									5
2.	2	III/Product Planning and Process Planning	5									5
3.	2	III/Product Planning and Process Planning	5									5
4.	2	III/Product Planning and Process Planning	5									5
5.	2	II/Toyota Production System				5						5
6.	2	III/Product Planning and Process Planning				5						5

7.	2	III/Product Planning and Process Planning								10			10
	Total Marks		20			10			10				40

K =Knowledge Level   C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

SCHOOL OF ENGINEERING

SOLUTION

Semester: 5

Course Code: MEC304

Course Name: Production Planning and Control

Date: 16.11.2019

Time: 11 AM – 12 Noon

Max Marks: 40

Weightage: 20%

Part A (4Q x 5M = 20 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Dimensions of quality include (a) Performance (b) Aesthetics (c) Special features (d) Conformance (e) Reliability (f) Duality (g) Perceived quality **(h)** Serviceability	Listing of 8 dimensions– 2 Marks Brief note on each dimension – 3 Marks	7 Min.
2	Steps in product planning process: (a) Marketing and Marketing analysis. (b) The performance of feasibility studies, and (c) Advanced planning	Flow chart of product planning – 3 Marks Explanation – 2 Marks	7 Min
3	Ten commandants of value analysis (a) Do not use a components that does not contribute to the value (b) Do not use a component whose cost is not proportionate to its usefulness (c) Do not provide any features to the component that are not necessary (d) Accept the change of quality material where the overall cost is less	Each commandant - ½ marks and for 10 Commandants Total – 5 Marks	7 Min.

	(e) Use a method or process costing less. (f) Replace the non-standard parts with the standard part. (g) Use proper tooling and manufacturing methods (h) Cost of components shall be proportional to the material used (i) Use the material better suited for the purpose (j) If a supplier can provide a better part, then do not make it yourself.		
4	Process planning Definition: Act of preparing a detailed processing documentation for the manufacture of a piece part or assembly Importance i. Link between engineering design and shop floor manufacturing. ii. Determines the how the products will be manufactured iii. Process plans developed should be feasible, low cost and consistent. iv. Feedback from shop floor to design engineering regarding the manufacturability.	Definition – 2 Marks Importance – 3 Marks	7 Min.

Part B   (2Q x 5M = 10 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5	**7 QC tool** • Stratification • Histogram • Check Sheet (Tally Sheet) • Cause-and-effect diagram • Pareto chart • Scatter diagram • Control chart	Listing 7 QC tools - 2 Marks Explanation - 3 Marks	7 Min.

6	Responsibility of a process planning engineer i. Interpreting part print analysis ii. Gathering the fundamental details of product design iii. Selecting the machining process iv. Selecting proper machining with allied tooling v. Sequence of operation vi. Decide on inspection equipment vii. Determining appropriate production tolerance viii. Determine proper cutting tools and cutting conditions ix. Calculating the overall time	At least 8 responsibilities – 5 Marks	7 Min.

Part C

(1Q x 10M = 10 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
7	(a) Batch size Q_m= 2351 units (b) Cost of production run= Rs. 12,12,998	Identification of data given – 2 Mark Formulae – 2 Marks Finding Q_m – 4 Marks Calculation of cost of production run – 2 Marks	10 Min.

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester: Odd Semester: 2019 - 2020

Course Code: MEC 304

Course Name: PRODUCTION PLANNING AND PLANNING

Program & Sem: B.Tech (MEC) & VII (DE-III)

Date: 20 December 2019

Time: 9:30 AM to 12:30 PM

Max Marks: 80

Weightage: 40%

Instructions:
(i) Read the all questions carefully and answer accordingly.
(ii) All questions are compulsory.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 2 marks.   **(10Qx2M=20M)**

1. List the objectives of Production Planning and control.   (C.O.No.1) [Knowledge]
2. What is BEP? Write its significance.   (C.O.No.1) [Knowledge]
3. Define TPS and JIT.   (C.O.No.2) [Knowledge]
4. Mention the importance of Kanban.   (C.O.No.2) [Knowledge]
5. What is Value analysis.   (C.O.No.3) [Knowledge]
6. What do you mean by machine loading?   (C.O.No.3) [Knowledge]
7. What are Gantt chart?   (C.O.No.4) [Knowledge]
8. List any six priority rules used for scheduling   (C.O.No.4) [Knowledge]
9. What is ERP? List any two feature of it.   (C.O.No.5) [Knowledge]
10. Explain the Johnson's rule for scheduling n jobs on 2 machines. (C.O.No.5) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 6 marks.   **(5Qx6M=30M)**

11. With the neat flow diagram explain Process plan activity   (C.O.No.3) [Comprehension]

12. Differentiate between Value Engineering and Value Analysis

(C.O.No 3) [Comprehension]

13. Explain in detail any two quality control tools.   (C.O.No 2) [Comprehension]

14. Explain in detail the different types of Inventory costs.   (C.O.No.5) [Comprehension]

15. With a neat flow chart explain Scheduling Process.   (C.O.No.4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each Question carries 10 marks. (3Qx10M=30M)

16. A Manufacturing facility has five jobs to be scheduled on a machine. Their sequence of arrival, processing time, and due date are given in the table below. Schedule the jobs using (i) FCFS ii) SPT iii) Due Date iv) LCFS and v) STR rules. Also compare the results (using the performance measures of total completion time, average completion time, and average lateness) (C.O.No.4) [Application]

Job (in sequence arrival)	Processing Time (Days)	Due date (i.e.,days from now)
A	7	8
B	4	3
C	5	7
D	2	9
E	6	6

17. A scheduler has four jobs that can be done on any of four machines with respective times as shown in the table below. Determine the allocation of jobs to the machines that will result in minimum time (C.O.No.4) [Application]

JOBS	M1	M2	M3	M4
A	5	6	8	7
B	10	12	11	7
C	10	8	13	6
D	8	7	4	3

18. Machine components supplied to the assembly shop are produced in a plant at the rate of 150 pcs/day. A cost analysis showed that the constant production cost per piece including labour, material , overhead amount to Rs 250 per piece and the storage cost are Rs 0.025/pcs/day. If the preparation and machine setup costs for a production run amount to Rs 2500 and the assembly bay is using 60 pcs/day. Find the minimum cost batch size and the length of the production run. Also estimate the production cost per production run. Assume interest as 15% and 365 working days. (C.O.No.3) [Application]

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO (% age of CO)	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels	Thought provoking type [Marks allotted] Bloom's Levels	Problem Solving type [Marks allotted]	Total Marks
			K	C	A	
1	1	1	2			2
2	1	1	2			2
3	2	2	2			2
4	2	2	2			2
5	3	3	2			2
6	3	3	2			2
7	4	4	2			2
8	4	4	2			2
9	5	5	2			2
10	5	5	2			2
11	3	3		6		6
12	3	3		6		6
13	2	2		6		6
14	5	5		6		6
15	4	4		6		6
16	4	4			10	10
17	4	4			10	10

18	3	3			10	10
	Total Marks		20	30	30	80

K =Knowledge Level   C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:

Format of Answer Scheme

SCHOOL OF ENGINEERING

SOLUTION

Part A   (10Q x 2M = 20Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Objectives of PPC : ➢ To systematically plan the production activities to achieve the high production efficiency. ➢ To ensure maximum utilization of all resources ➢ To ensure production of quality products ➢ To maintain optimum inventory level ➢ To coordinate production activities of various department	Any four 0.5 marks each	5 mins
2	• It is also known as cost-volume-profit analysis	Definition 1 mark	5 mins

		• It reveals the effect of fixed costs, variable costs, prices, sales mix, etc • It is concerned with finding the point at which revenues and costs are exactly equal. This point is known as break even point.	**Significance 1 mark**	
3		TPS emphasizes continuous improvement, respect for people, and standard work practices in an assembly-line environment. JIT -- 'Produce only **what** is needed, only **how much** is needed, and only **when** it is needed.' Any deviation from '**true production needs' = Waste**	**TPS 1 mark JIT 1 mark**	**5 mins**
4		Kanban is a simple but effective control that helps JIT production work. The word KAN= card BAN=signals It is a Japanese word for card & the use of card is central to many Japanese control systems including one at Toyota.	**2 marks**	**5 mins**
5		Value analysis aims at a synthetic identification and elimination of unnecessary cost resulting in the increased use of alternatives, less expensive materials, cheaper designs, less costly methods of manufacturing, etc., to provide the same performance, quality and efficiency and in a decreased of overall costs and consequently greater profits. Value analysis is one of the major techniques of cost reduction and cost prevention. It is a disciplined approach that ensure the necessary function at minimum cost without compromising the quality, reliability, performance, and appearance	**2 marks**	**5 mins**
6		Machine loading : Is also known as machine loading card,is a display of the available capacity of a machine or workstation along with information whether it is overloaded or under loaded. Machine loading chart contains information about the basic capabilities and specification for the machine,data about its performance in the past (Breakdowns,maintainance, etc.,) and details about commitment already assigned to the machine.	**2 marks**	**5 mins**

7		Gantt Chart is a simple bar graph that can be used to schedule any type of operation.
		Gantt chart are usual aids used to depict the sequencing, load on facilities, or progress associated with work effort over a well defined time period.
		Two Basic types of Gantt Chart are:
		      1. Work load chart
		      2. Schedule Chart
			2 marks	**5 mins**

8		FCFS,SOT,DUE DATE,LSFC,START DTE,STR,STR/OR,CR,QR,RANDOM ORDER OR WHIM	**Any 6 ---2 marks**	**5 mins**
9		Enterprise resource planning (ERP) is a new system concept in which every enterprise function is integrated in a seamless flow of information. This system integrates all facts of business including sales and order entry, engineering, manufacturing, finance and accounting, distribution, order planning and execution. Features of ERP:	**Definition 1 mark 2 features – 1 mark**	**5 mins**

	➢ ERP is a software architecture that integrates all the functions of the eneterprises ➢ Flow of information are seamless flow ➢ Instant sharing of information simultaneously ➢ Updatiion of information will be fast ➢ It is supported by client server architecture for communication at different levels of the system.		
10	**Johnsons Rule Steps:** Step1: List the operation time, each job on both the machines Step2: Select the shortest operation time Step3: If the shortest time is for the first machine, do the job first Step 4: Repeat steps 2 and 3 for each remaining job until the schedule complete	**2 marks**	**5 mins**

Part B
(5Q x 6M = 30 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
11	 **Process Planning** Analyse part requirements Determine operation sequence Select equipment Calculate processing times Document process plan Communicate mfg. engr. ↔ shop *Fig. 3.6. Process planning activities* Explaination	Flow chart –3 marks Explaination ---3 marks	10 mins
12	• Value analysis is a application of a set of techniques to an existing product with a view to improve its value. Thus value analysis is the remedial process • Value engineering is the application of exactly same set of techniques to a new product at the design stage itself. Therefore value engineering is a preventive process	6 difference each 1 marks	10 mins
13	• Stratification • Histogram • Check Sheet (Tally Sheet) • Cause-and-effect diagram • Pareto chart	Skech 3 marks Explaination 3 marks	10 mins

	• Scatter diagram • Control chart		
14	• Ordering (purchasing) costs • Inventory carrying (holding) costs • Out of stock/shortage costs • Other cost	Any 2---each carry 3 marks	10 mins
15	 *Fig. 4.5. Master production schedule – flow chart* • Scheduling refer to the setting of operation start dates so that jobs will be completed by their due date. • Scheduling establishes the timing of productive activities that use the firm's human and equipment resources to serve its customers • Scheduling is used to allocate work loads to specific work centers and to determine the sequence in which operation are to be performed within the available capacity.	Flow chart 3 marks Explaination 3 marks	10 mins

Part C   (3Q x 10M = 30Marks)

Q No	Solution					Scheme of Marking	Max. Time required for each Question
16	SL NO	Rule	Total completion time(days)	Average completion time(days)	Average Lateness(days)	10 marks	20 mins
	1	FCFS	76	15.2	8.8		
	2	SPT	60	12	6.8		
	3	DD	75	15	8.4		
	4	LCFS	68	13.6	7.2		
	5	STR	77	15.4	8.8		
17	Total Flow time – 24 mins					10 marks	20 mins
18	**Qm=1244 units** **Tp= 8.293** **Ym = 254.02rs** **YmQm= 3,16,000rs**					10 marks	20 mins