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10ME81

Eighth Semester B.E. Degree Examination, June/July 2017

Operations Management

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Define operations management. Give a brief account of the historical evolution of operation management. (08 Marks)
- b. Differentiate between product and services. (06 Marks)
- c. State the factors affecting productivity. (06 Marks)
- 2 a. Briefly explain the various characteristics of decision making. (05 Marks)
- b. Explain the framework for decision making. (07 Marks)
- c. The following figures shows profit and sales of XYZ company:

Year	Sales (Rs)	Profit (Rs)
2014	25,000	3,000
2015	35,000	4,500

- Calculate: i) Fixed cost ii) P/V ratio, (08 Marks)
- iii) BEP iv) Sales to earn a profit of Rs.6000.
- 3 a. State and explain various factors affecting forecasting. (06 Marks)
 - b. State various time series methods of forecasting. Explain:
 - i) simple moving average
 - ii) weighted moving average. (08 Marks)
 - c. Demand for a TV sets in Mumbai showrooms was 400 in 1st quarter, 350 in 2nd quarter and 250 in 3rd quarter.
 - i) What is the forecast for the 4th quarter by simple average method?
 - ii) What is the forecast for 4th quarter by WMA, given weightage for the most recent part period double than the other previous two period? (06 Marks)
 - 4 a. Explain:
 - i) Design capacity
 - ii) System capacity. (06 Marks)
 - b. List the various factors influencing plant location. Explain. (06 Marks)
 - c. A firm developing agency must determine how many photo enlarger cubicles are required to maintain in output of 200 goods per hour. The set up and exposure time can theoretically be done on 2 minutes per print, but operators are on the average only 90 percent efficient and in addition 5 percent of print scrapped and redone. Also the cubicles can utilized for enlarging only 70 percent of the time.
 - i) What is the required system capacity in prints/hr?
 - ii) What average output/hr can be expected from each cubicles taking its use factor and efficiency into account?
 - iii) How many enlarger cubicles are required? (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – B

- 5 a. Explain various aggregate planning cost. (06 Marks)
 b. Distinguish between aggregate planning and master scheduling with an example. (04 Marks)
 c. Vertex Inc. produces machines that have a seasonal demand pattern, we are required to plan the optimum production rates and inventory levels for the next four quarter periods. The available production capacities during regular time (RT), over time (OT) as well as other cost data are as follows:

Supply capacities (units)			
Period	RT	OT	SC
1	1200	150	800
2	900	200	800
3	1000	350	800
4	700	350	800

Demand & Inventory	
Period	Units
1	1200
2	900
3	1000
4	700

- i) Initial inventory = 110 units
 ii) Final inventory = 140
 iii) Regular time cost/unit = Rs.100
 iv) Overtime cost/unit = Rs.125
 v) Sub contracting cost/unit = Rs.145
 vi) Cost of unused capacity = Rs.40/unit
 vii) Inventory cost per unit/period = Rs.15
 Determine optimum production and total cost. (10 Marks)

- 6 a. Discuss the need for inventory. (06 Marks)
 b. Explain the various cost associated with inventory. (06 Marks)
 c. A company estimates that it will sell 12000 units of its product for the next year. The ordering cost is Rs.100/order and the carrying cost per unit per year is 20% of the purchase price per unit. The purchase per unit is Rs.50. Find:
 i) Number of orders per year
 ii) EOQ
 iii) Time between successive orders. (08 Marks)

- 7 a. Discuss various MRP inputs and outputs. (10 Marks)
 b. With the given product structure tree and inventory, compute the net requirements for A, B, C, D and E to produce 50 units of X.

Components	A	B	C	D	E
Inventory on hand & on order	20	10	15	30	100

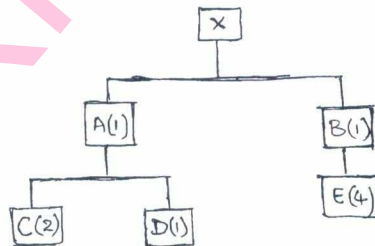


Fig.Q7(b)

- 8 a. State the importance of purchasing and supply management. (06 Marks)
 b. Explain the procurement process. (06 Marks)
 c. Explain stages of vendor development. (08 Marks)

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10ME/PM82

Eighth Semester B.E. Degree Examination, June/July 2017

Control Engineering

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Define control system. Compare open loop and closed loop control system with an example for each type. (08 Marks)
 b. What are the ideal requirements of control system? (06 Marks)
 c. Draw the block diagram of proportional plus integral plus derivative controller and state its characteristics. (06 Marks)
- 2 a. Write the differential equations governing the behaviour of the mechanical system shown in Fig.Q2(a). Also obtain the analogous electrical circuit based on force voltage analogy and loop equations.

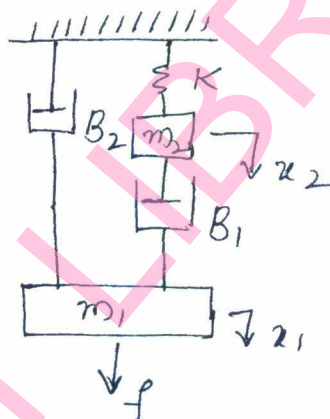


Fig.Q2(a)

- b. Obtain the transfer function of field controlled DC motor. (10 Marks)
- 3 a. Reduce the block diagram shown in Fig.Q3(a) and obtain the transfer function $\frac{C(s)}{R(s)}$. (10 Marks)

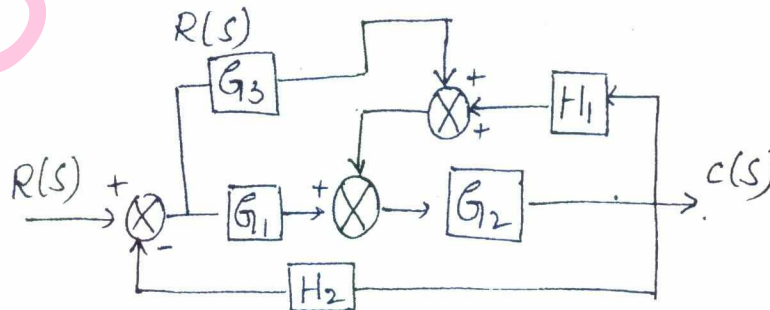


Fig.Q3(a)

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- b. Find the transfer function by using Mason's gain formula for the signal flow graph shown in Fig.Q3(b).

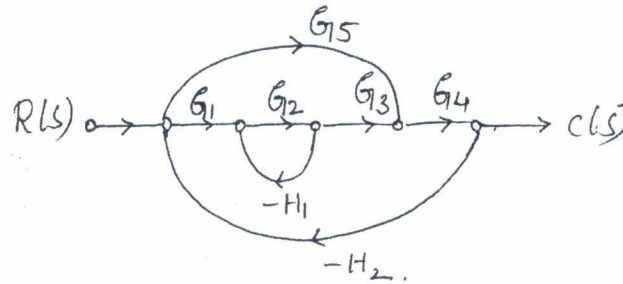


Fig.Q3(b)

(10 Marks)

- 4 a. A units feedback system characterized by an open loop transfer function

$$G(s) = \frac{10}{s^2 + 2s + 6}$$

Determine the following, when the system is subjected to a unit step input:

- Undamped natural frequency
 - Damping ratio
 - Peak overshoot
 - Peak time
 - Settling time
- (10 Marks)
- b. Explain Routh Hurwitz criterion for stability of a control system and examine the stability of $s^4 + 2s^3 + 3s^2 + 8s + 2 = 0$ using the same.

(10 Marks)

PART - B

- 5 a. Sketch the polar plot for the transfer function $G(s) = \frac{10}{s(s+1)(s+2)}$.

(10 Marks)

- b. Plot the Nyquist diagram for the open loop transfer function

$$G(s)H(s) = \frac{12}{s(s+1)(s+2)}$$

and determine the nature of stability.

(10 Marks)

- 6 Sketch the bode plot for a unity feed-back system, whose open loop transfer function is given by $G(s)H(s) = \frac{10}{s(1+s)(1+0.02s)}$, find:

- Gain and phase cross over frequencies.
- Gain and phase margin.
- Stability of the closed loop system.

(20 Marks)

- 7 Sketch the root locus plot for the system whose open loop transfer function is given by

$$G(s)H(s) = \frac{K}{s(s+2)(s^2 + 8s + 20)}$$

(20 Marks)

- 8 a. Explain the following:

- Lead compensator
- Lag compensator

(10 Marks)

- b. Explain the series and feedback compensated system, with block diagrams.

(10 Marks)

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10ME833

Eighth Semester B.E. Degree Examination, June/July 2017
Power Plant Engineering

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. With neat sketches and combustion equations explain overfeed and under feed mechanism of burning of coal. (10 Marks)
- b. With the help of a neat diagram, explain chain grate stoker. List a few advantages and disadvantages. (10 Marks)
- 2 a. Sketch and explain La Mont steam generator. (10 Marks)
- b. What is pulverized coal? Explain the BIN system with a neat diagram. List the advantages and disadvantages of using pulverized coal. (10 Marks)
- 3 a. What is DRAUGHT? Classify it. Explain with sketch the operation of balanced draught system. What are its advantages? (10 Marks)
- b. Explain with sketch : (i) Air preheater (ii) Superheater. (06 Marks)
- c. Explain the working principle of natural draught cooling tower with a neat sketch. (04 Marks)
- 4 a. Sketch and explain the layout of a diesel engine power plant. (06 Marks)
- b. Explain the importance of lubrication system in diesel power plant. (04 Marks)
- c. Explain the working principle of open cycle and closed cycle gas turbine with neat sketch. (10 Marks)

PART – B

- 5 a. Explain the following:
(i) Water hammer (ii) Pumped storage plant (iii) Hydrographs. (12 Marks)
- b. What are the advantages and disadvantages of hydro-electric plants? (08 Marks)
- 6 a. Give the classification of nuclear reactors. (06 Marks)
- b. Sketch and explain gas cooled reactor and also list its advantages. (10 Marks)
- c. Write short notes on disposal of radioactive wastes. (04 Marks)
- 7 a. Define (i) Demand factor (ii) Load factor (iii) Diversity factor. (iv) Utilization factor (v) Capacity factor (vi) Use factor. (12 Marks)
- b. The peak load on a power station is 30 MW. The loads having maximum demands of 25 MW, 10 MW, 5 MW and 7 MW are connected to the power station. The capacity of the power station is 40 MW and annual load factor is 50% find
 - (i) Average load on the power station
 - (ii) Energy supplied per year
 - (iii) Demand factor
 - (iv) Diversity factor. (08 Marks)
- 8 a. Explain the performance and operating characteristics of power plant. (08 Marks)
- b. Enumerate various type of tariff and explain any two of them. (08 Marks)
- c. What are the objectives and requirements of tariff? (04 Marks)

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10ME844

Eighth Semester B.E. Degree Examination, June/July 2017
Automotive Engineering

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Explain wet and dry liners with the help of diagrams. (06 Marks)
b. With a neat sketch, explain pump circulation system of water cooling. (07 Marks)
c. Explain single row overhead valve mechanism with a neat sketch. (07 Marks)
- 2 a. Describe fuel mixture requirements of S.I.Engine. (06 Marks)
b. Draw a typical diesel engine fuel injector and explain its working. (08 Marks)
c. Define the terms cetane number and octane number. How they are related to knocking phenomenon in IC engines? (06 Marks)
- 3 a. Define super charging. Also explain centrifugal type supercharger. (08 Marks)
b. Enumerate the advantages of turbocharging in diesel engines. (06 Marks)
c. Write a brief note on intercooler. (06 Marks)
- 4 a. With a neat diagram, explain the battery ignition system. (07 Marks)
b. Draw and explain a typical electronic ignition system. (07 Marks)
c. Explain vacuum advance mechanism with a neat figure. (06 Marks)

PART – B

- 5 a. Explain torque converter with a neat sketch. (06 Marks)
b. With a neat diagram, explain synchromesh three speed gear box. (07 Marks)
c. The engine of a car employing a single plate friction clutch develops maximum torque of 150 Nm. External diameter of the clutch plate is 1.2 times its internal diameter. Determine the dimensions of the clutch plate and the axial force provided by the springs. The maximum allowable pressure intensity for the clutch facings is 100 KPa. Coefficient of friction = 0.3. Assume uniform wear. (07 Marks)
- 6 a. With a neat sketch, explain the working of Hotchkiss drive. (06 Marks)
b. Describe worm and wheel steering gear with a neat sketch. (06 Marks)
c. The wheel base of a car is 2.7 m and pivot centres are at 1 metre. The wheel track is 1.2 m. Calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels when the angle of inside lock is 40°. (08 Marks)
- 7 a. With a neat sketch, explain the working of torsion bar. (06 Marks)
b. Explain wheel cylinder of hydraulic braking system with a neat sketch. (08 Marks)
c. Draw and explain the layout of air braking system. (06 Marks)
- 8 a. Explain Exhaust Gas Recirculation (EGR) with a neat diagram. (08 Marks)
b. With a neat sketch, explain the catalytic converter. (06 Marks)
c. How the air injection system helps in reducing overall emission effect? (06 Marks)

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