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10ME/PM81

Eighth Semester B.E. Degree Examination, June/July 2019

Operations Management

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the concept of production and briefly discuss the classification of production systems with their advantages and limitations. **(14 Marks)**

b. Define productivity. Explain the factors affecting productivity. **(06 Marks)**

2 a. List and explain the steps in a decision making process. **(08 Marks)**

b. A produce of digital watches sells his product at Rs.30 each. The production costs at volumes of 10000 and 25000 units are as follows. Using the data, prepare a break-even chart and determine BEP.

Item	10000 units	25000 units
Labour	Rs. 60,000	Rs. 1,00,000
Materials	1,20,000	2,00,000
Overheads	90,000	1,10,000
Selling and Administration	50,000	60,000
Depreciation	80,000	80,000
Total	4,00,000	5,50,000

(12 Marks)

3 a. Explain the following forecasting methods:
i) Exponential smoothing
ii) Linear regression **(08 Marks)**

b. The sales for the domestic water pumps manufactured by a company is given in the table. Forecast the demand for the pumps for the next 3 years using least square method.

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Sales $(000)^x$	30	33	37	39	42	46	48	50	55	58

(12 Marks)

4 a. Briefly explain a systematic approach to long term capacity decisions. **(08 Marks)**

b. Discuss the reasons for plant location study. **(06 Marks)**

c. Explain the factors influencing plant location. **(06 Marks)**

PART – B

5 a. What do you mean by aggregate planning? What are its objectives? **(06 Marks)**

b. What are the strategies of aggregate planning? Briefly explain. **(06 Marks)**

c. The supply, demand, cost and inventory data for a company which has a constant work force is given below:

Demand Forecast	
Period	Demand
1	100
2	50
3	70
4	80

Initial inventory = 20
Final inventory = 25

Supply Capacity (units)			
Period	Regular time	Overtime	Subcontract
1	60	18	1000
2	50	15	1000
3	60	18	1000
4	65	20	1000

RT cost/unit = Rs.100
OT cost/unit = Rs.125
SC cost/unit = Rs.130
Unused RT cost = Rs.50/unit
Carry cost/unit/period = Rs.2
Using transportation model, allocate production capacity to satisfy demand at minimum cost. **(08 Marks)**

6 a. Define inventory. Explain the different types of inventories. **(06 Marks)**
b. Explain the important reasons for keeping inventories. **(06 Marks)**
c. The demand for a particular item is 18000 units per year. The holding cost/unit is Rs.1.20 per year and the cost of procurement is Rs.400. Determine:
i) Economic ordering quantity
ii) Number of orders/year
iii) Time between orders **(08 Marks)**

7 a. What are the three major inputs for an MRP system? Briefly explain. **(08 Marks)**
b. Briefly explain the following:
i) MRP-II
ii) ERP
iii) CRP **(12 Marks)**

8 a. What is supply chain? What are its objectives? **(06 Marks)**
b. Explain the different approaches to SCM. **(06 Marks)**
c. Briefly explain the following:
i) Vendor development
ii) Make or buy decision
iii) E-procurement **(08 Marks)**

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10ME82

Eighth Semester B.E. Degree Examination, June/July 2019

Control Engineering

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What are requirements of an ideal control system? Explain them. **(04 Marks)**

b. Explain with suitable examples regulator system and follow-up system. **(06 Marks)**

c. Discuss, giving equations, the effect of following controller on the system:
i) Proportional plus derivative controller
ii) Proportional plus integral controller **(10 Marks)**

2 a. Obtain the transfer function of an armature controlled d.c. motor. **(10 Marks)**

b. Obtain step response of a first order thermal system. **(05 Marks)**

c. Writing Equivalent Analogous System for Force-voltage and Force-Current Analogy. **(05 Marks)**

3 a. Use block diagram reduction to obtain the overall transfer function of the system shown in Fig.Q3(a).

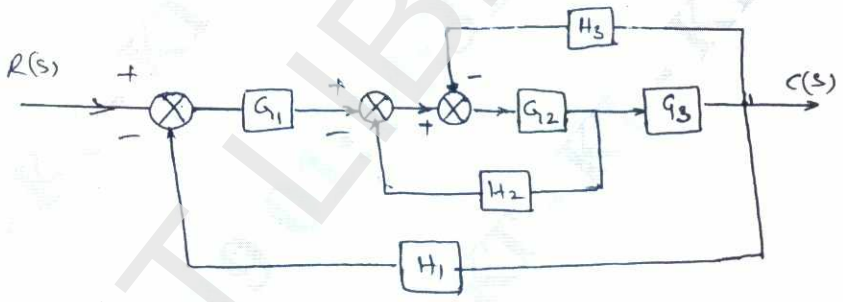

Fig.Q3(a) **(10 Marks)**

b. Obtain the closed loop transfer function $\frac{C(s)}{R(s)}$ for the signal flow graph of a system shown in Fig.Q3(b) by use of Mason's gain formula.

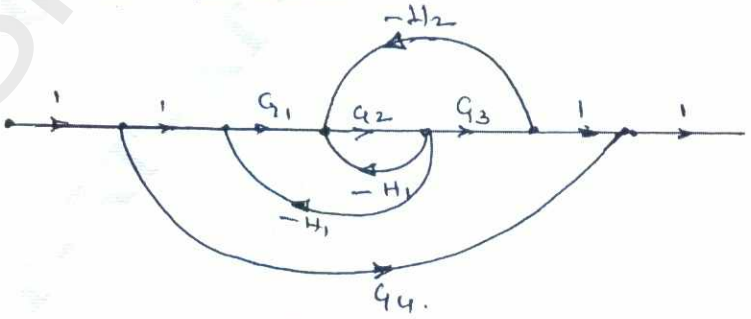

Fig.Q3(b) **(10 Marks)**

4 a. By applying Routh criterion, discuss the stability of the closed loop system whose characteristic equation is $s^6 + 3s^5 + 4s^4 + 6s^3 + 5s^2 + 3s + 2 = 0$. **(06 Marks)**

b. Determine the rise time, peak time, peak overshoot, and setting time for the given transfer function $G(s) = \frac{16}{s(s+2)}$ subjected to unit step function. **(08 Marks)**

c. Derive the response of a first order system, subjected to unit step function input. Explain the importance of time constant on speed of response. **(06 Marks)**

PART – B

5 a. Sketch the polar plot for $GH(s) = \frac{12}{s(s+2)(s+4)}$. **(06 Marks)**

b. Sketch the Nyquist plot for $GH(s) = \frac{10}{s(s+6)(s+8)}$. **(14 Marks)**

6 Sketch the Bode plot of a unity feedback system whose open loop transfer function is given by $G(s) = \frac{20}{s(1+0.1s)(1+0.05s)(1+0.5s)}$ and ascertain its stability. Write gain margin and phase margin. **(20 Marks)**

7 Sketch the root locus plot of a unity feedback with an open loop transfer function $G(s) = \frac{K}{s(s+3)(s+5)}$, find the value of K for stable. **(20 Marks)**

8 a. Write brief note on :
i) Lag compensator
ii) Lead compensator **(10 Marks)**

b. Define state variable and state transition matrix. List the properties of the state transition matrix. **(10 Marks)**

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10ME833

Eighth Semester B.E. Degree Examination, June/July 2019

Power Plant Engineering

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions, selecting at least TWO questions from each part.***
2. ***Missing data may suitably be assumed.***

PART – A

1 a. Explain in detail about overfeed and underfeed mechanism of coal feeding with necessary sketches. **(08 Marks)**

b. Explain the working of pulverized fuel feeding mechanism with necessary sketches. What are the types of pulverized fuel feeding mechanism? **(08 Marks)**

c. Differentiate between Grate fired furnace and Chamber Type Furnace. **(04 Marks)**

2 a. With a neat sketch, explain the working of an Ash handling system. What are the various types of Ash handling system? Explain any one of them in detail. **(08 Marks)**

b. Differentiate Bailer mountings and Bailer accessories. Give example for them. **(04 Marks)**

c. Classify Bailers. With a neat sketch, explain the working of a Velox Boiler. **(08 Marks)**

3 a. A chimney is 30 m high and is filled with hot gases at a temperature of 288°C. The temperature of the outside air is 21°C. If the actual draught is 80% of the theoretical draught, determine the available draught. The bailer uses 18 kg of air per kg of fuel burnt. **(04 Marks)**

b. Write short notes on:
i) Economisers
ii) Air-Preheaters
iii) Superheaters **(06 Marks)**

c. Classify costing towers. Explain the working of single deck and double spray ponds with necessary sketches. **(10 Marks)**

4 a. Draw the schematic layout of diesel power plant and explain the function of each components. **(08 Marks)**

b. Explain with sketch the working of a simple closed cycle gas turbine power plant with PV and TS diagram. Derive the expression for overall efficiency. **(08 Marks)**

c. Name few methods of starting a diesel engine power plant. **(02 Marks)**

d. State the merits and demerits if gas turbine plant. **(02 Marks)**

PART – B

5 a. Classify Hydro-electric power plant. With a neat sketch, explain the general layout layout of a hydro electric power plant. **(12 Marks)**

b. Name some of the important Hydel installations in India. **(02 Marks)**

c. Explain with neat sketches, any three different types of surge tanks. **(06 Marks)**

6 a. What is meant by a Nuclear Fusion and Nuclear Fission reaction? Explain them briefly with necessary reactions involved. **(04 Marks)**

b. With a neat sketch, explain the working of a pressurized water reactor. **(07 Marks)**

c. Explain briefly about the disposal of solid, liquid and gaseous wastes produced by a Nuclear power plant. **(09 Marks)**

7 a. Explain the factors which influence the selection of site for power station. **(06 Marks)**

b. Define the following:

i) Load factor
ii) Demand factor
iii) Diversity factor
iv) Capacity factor
v) Use factor **(10 Marks)**

c. What do you mean by base load plant and peak load plant? Give examples for them. **(04 Marks)**

8 a. What is meant by power plant economics? **(04 Marks)**

b. Explain the basis for load estimation. **(04 Marks)**

c. The maximum load on a thermal power plant of 60 MW capacity is 50 MW at an annual load factor of 50%. The loads having maximum demands of 25 MW, 20 MW, 8 MW and 5 MW are connected to the power station. Determine:

i) Average load on power station
ii) Energy generated per year
iii) Demand factor
iv) Diversity factor **(08 Marks)**

d. Name the types of tariffs. What are the requirements of it? **(04 Marks)**

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10ME844

Eighth Semester B.E. Degree Examination, June/July 2019

Automotive Engineering

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the various methods of cylinder arrangements used in multicylinder engines. **(08 Marks)**

b. What are the various methods of engine cooling? Explain with sketches. **(12 Marks)**

2 a. Explain Octane number and Cetane number. **(08 Marks)**

b. Sketch and explain Zenith Carburetors. **(12 Marks)**

3 a. Explain with neat sketches, types of superchargers. **(10 Marks)**

b. Compare Turbochargers with mechanical superchargers. **(10 Marks)**

4 a. Explain "Battery coil ignition system" for four cylinder engine. **(10 Marks)**

b. Explain with sketch vacuum advance mechanism. **(10 Marks)**

PART – B

5 a. With neat sketch, explain single plate clutch. **(10 Marks)**

b. With neat sketch, explain working of "synchromesh gear box". **(10 Marks)**

6 a. Define following and explain their effects on steering:
i) Camber
ii) King pin inclination
iii) Castor
iv) Toe in and Toe out **(08 Marks)**

b. With a neat sketch explain Hotch-Kiss drive. **(12 Marks)**

7 a. Explain with neat sketch, "laminated springs". **(08 Marks)**

b. State advantages and disadvantages of hydraulic brake over mechanical brake. **(06 Marks)**

c. Draw the neat sketch of "Master Cylinder". **(06 Marks)**

8 a. Explain with neat sketch "Exhaust Gas Recirculation" system. **(10 Marks)**

b. Explain the sources of automotive exhaust gas emission. **(05 Marks)**

c. Draw neat sketch of "Positive Cranck Ventilation System". **(05 Marks)**

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