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Eighth Semester B.E. Degree Examination, Jan./Feb. 2021
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. Define operation management. Explain the classification of production system. (10 Marks)
- b. Define productivity. Discuss the factors affecting productivity. (10 Marks)
- 2 a. Explain the Decision making process. (10 Marks)
- b. Discuss the characteristics of operations decision with examples. (10 Marks)
- 3 a. Shipments (in tons) of welded tube by an aluminum producer are shown in Table Q3(a)

Year	1	2	3	4	5	6	7	8	9	10	11
Tons	2	3	6	10	8	7	12	14	14	18	19

Table Q3(a)

- i) Graph the data, and comment on the relationship
- ii) Compute a 3-years moving average, plot it as a dotted line, and use it to forecast shipments in year 12.
- iii) Using a weight of 3 for the most recent data, 2 for the next, and 1 for the oldest, forecast shipment in year 12. (10 Marks)
- b. Explain the steps in forecasting process. (10 Marks)
- 4 a. Distinguish between design capacity and system capacity. (06 Marks)
- b. A metal processing firm wishes to install enough automatic molders to produce 2,50,000 good casting per years. The molding operation takes 1.5 minutes per casting, but its output is typically about 3 percent defective. How many molders will be required if each one is available for 2,000 hours (of capacity) per year? (06 Marks)
- c. Explain the generalized procedure for making a location decision. (08 Marks)

PART – B

- 5 a. What do you mean by aggregate planning? List and explain various pure strategies. (10 Marks)
- b. What do you mean by Master Production Schedule? What are the steps involved in master scheduling process? Explain. (10 Marks)
- 6 a. What are the reasons for holding inventory? Explain. (08 Marks)
- b. What are the assumptions underlying the basic EOQ model? Mention them. (04 Marks)
- c. A company requires 16,000 units of raw material costing Rs 2 per unit. The cost of placing an order is Rs 45 and the carrying costs are 10% per year per unit of the average inventory. Determine :
 - i) the economic order quantity
 - ii) cycle time
 - iii) total variable cost of managing the inventory. (08 Marks)
- 7 a. Explain MRP system Inputs and outputs. (10 Marks)
- b. What are the potential benefits from MRP? Explain (10 Marks)
- 8 a. Explain the supply chain activities in brief. (10 Marks)
- b. Discuss the various reasons for the make – or – buy decisions. (10 Marks)

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Eighth Semester B.E. Degree Examination, Jan./Feb. 2021
Control 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, if any, may be suitably assumed.

PART – A

- 1 a. Differentiate open loop control system and closed loop control system with an example. (07 Marks)
- b. What is control action? Explain any one of its type with an example. (07 Marks)
- c. What are the requirements of an ideal control system? Explain. (06 Marks)

- 2 a. Obtain the transfer function model of an AC motors in control system. (07 Marks)
- b. Find the transfer function of a mechanical system shown in Fig.Q2(b) constructing free body diagram. (07 Marks)

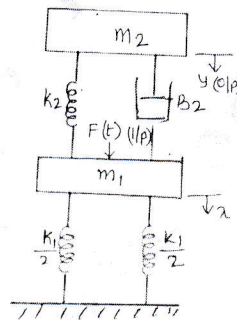


Fig.Q2(b)

- 3 a. Obtain the mathematical modeling of a first order pneumatic system. (06 Marks)

- b. Find the transfer function of a block diagram shown in the Fig.Q3(a). (08 Marks)

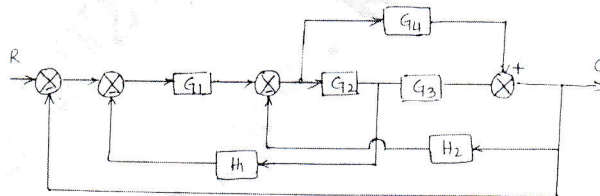


Fig.Q3(a)

- b. Using Mason's gain formula find the overall transfer function of a signal flow graph shown in Fig.Q3(b). (12 Marks)

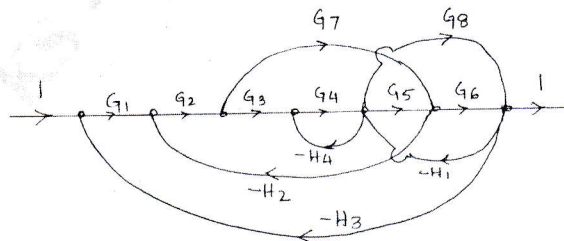


Fig.Q3(b)
1 of 2

(12 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.

- 4 a. Explain the different types of inputs. (05 Marks)
 b. Determine the stability of the system for the following equation using R-H criteria.
 $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$. (07 Marks)
 c. The measurement conducted on a servosystem, which shows the system response as $C(t) = 1 + 0.25e^{-50t} - 1.25e^{-10t}$ when subjected to a unit step input. Obtain the closed loop transfer function also find ω_d and ξ . (08 Marks)

PART - B

- 5 a. Draw the polar plot for $G(s) = \frac{5(s+1)}{s(s+2)}$. (06 Marks)
 b. Draw the Nyquist plot and analyse the stability of $G(s) = \frac{4}{s(1+0.1s)(1+0.2s)}$. (14 Marks)
- 6 a. What is Bode attenuation diagram? Explain. (05 Marks)
 b. Draw the Bode magnitude and phase angle plot for $G(s) = \frac{(s+0.2)}{s(s+0.01)(s+2)(s+10)}$.
 Find PM, GM and K values. (15 Marks)
- 7 a. List the general rules for constructing root loci. (05 Marks)
 b. Sketch the root locus for the following OLTF $G(s) = \frac{k(s+1)(s+2)}{(s+0.1)(s-1)}$. (15 Marks)
- 8 a. With a neat sketch explain series and feedback system with an examples. (10 Marks)
 b. For the system shown in Fig.Q8(b), write the differential equations for the mass m and obtain the matrix representation of state equations. (10 Marks)

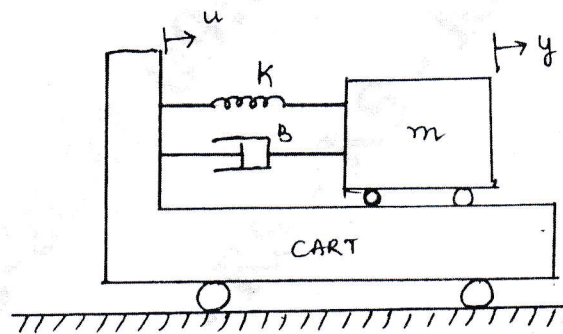


Fig.Q8(b)

(10 Marks)

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10ME831

Eighth Semester B.E. Degree Examination, Jan./Feb. 2021

Tribology

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Use of Data hand book is permitted.

PART - A

- 1 a. List out the Properties of Lubricating Oil? Explain any two. (10 Marks)
b. Derive an Expression for Hagen Poiseuille Law with assumptions? (10 Marks)
- 2 Derive an expression for Reynold's 2D equation with assumptions? (20 Marks)
- 3 a. Derive an expression for Load carrying capacity of a Idealized Journal bearing. (12 Marks)
b. Explain the mechanism of Formation of continuous oil film in a full Journal bearing. (08 Marks)
- 4 a. Derive an Expression for Pressure distribution of a plane slider bearing with a fixed shoe. (15 Marks)
b. Derive an Expression for the oil film thickness of a plane slides bearing with a fixed shoe. (05 Marks)

PART - B

- 5 An oil ring of a full Journal bearing is to operate in still air. The bearing diameter is 75mm and the length is 75mm. Bearing is subjected to a load of 5KN and is rotating at 500 rpm. Radial clearance is 0.0625mm. The oil is SAE 30. The ambient air temp is 20⁰Centigrade. Determine the equilibrium temperature and viscosity of oil. (20 Marks)
- 6 a. Derive an expression for pressure distribution of an Hydro Static step bearing. (10 Marks)
b. A hydrostatic step bearing has the following specifications
Diameter of the shaft = 152mm
Diameter of the pocket = 102mm
Vertical thrust on the bearing = 45000N.
External Pressure = Zero
Shaft Speed = 900rpm
Viscosity = 24.15cp
Oil film thickness is = 0.127mm. Find
i) inlet pressure ii) supply pressure iii) Quantity of oil flow
iv) power loss v) frictional force
Torque and Co-efficient as friction on the shaft? (10 Marks)
- 7 a. List out the properties of a typical bearing material? Explain any two. (10 Marks)
b. What are the advantages and disadvantages of bearing materials? (10 Marks)
- 8 a. List out the characteristics taken into account for bearing selection. Explain any two. (10 Marks)
b. Explain different ways to reduce friction in addition to Lubricants to improve tribological behavior of components? (10 Marks)

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Eighth Semester B.E. Degree Examination, Jan./Feb. 2021
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. What are the functions of compression and oil control rings in piston? (04 Marks)
 - b. Explain with neat diagram any two types of combustion chambers used in C.I. Engines. (08 Marks)
 - c. Explain with diagram the working of
 - i) Wax type thermostat valve and
 - ii) Bellow type thermostat valve used cooling system. (08 Marks)
- 2
 - a. Explain the fuel mixture requirements for S.I Engines in various transient conditions. (06 Marks)
 - b. List various alternate fuels used in I.C Engines and brief about any one. (06 Marks)
 - c. Explain with neat diagram working of electrical fuel feed pump used in petrol engines. (08 Marks)
- 3
 - a. What are the advantages and disadvantages of super charging? (06 Marks)
 - b. Write any four differences between mechanical supercharging and turbo charging. (04 Marks)
 - c. Explain with schematic diagram the working of any two types of super charging methods. (10 Marks)
- 4
 - a. Differentiate between battery and magneto coil ignition system. (04 Marks)
 - b. With neat sketch, explain the working of battery coil ignition system. (08 Marks)
 - c. With neat sketch, explain the working of centrifugal advance. (08 Marks)

PART – B

- 5
 - a. What are the requirements of a clutch? (03 Marks)
 - b. With neat sketch explain the working principle of fluid coupling. (08 Marks)
 - c. Determine the dimensions of a clutch plate transmitting a 40kW at 4000rpm. The inner diameter of the clutch plate is 0.6 times its outer diameter. The pressure intensity on the plate should not exceed 75KPa Co-efficient of friction of clutch plate material is $\mu = 0.3$. The design torque is 30% more than the engine torque to accommodate clutch face wear for avoiding the slip. (09 Marks)
- 6
 - a. What are the forces and torque coming rear axle? (04 Marks)
 - b. Define the following with sketch and explain their effect on steering
 - i) Camber
 - ii) King pin angle
 - iii) Included angle and scrub radius
 - iv) Castor. (16 Marks)
- 7
 - a. Explain the air suspension system with neat layout diagram. (08 Marks)
 - b. Draw the layout of hydraulic braking system and explain various components. (12 Marks)
- 8
 - a. Explain with diagram positive crank case ventilation system. (07 Marks)
 - b. Explain with diagram the exhaust gas recirculation system. (07 Marks)
 - c. Explain in brief about catalytic convertor. (06 Marks)

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