MBA-02

Roll No. 2 0 1 9 0 1 1 1 0 5

B.Tech
(SEM V) ODD SEMESTER
MINOR EXAMINATION: 2021-2022
Subject Name: ENGINEERING AND MANAGERIAL ECONOMICS
Time: 2 Hrs. Max. Marks: 30

Note: Attempt all questions.

1. **Attempt any Three parts of the following. Q. 1(a) is compulsory.**
   (a) Define Managerial Economics. Describe its nature, scope and practical significance. (4)
   (b) Differentiate between Micro and Macro Economics. (3)
   (c) Application of Concept of Elasticity is very essential in managerial decisions-making process. Comment. (3)
   (d) Explain Law of Demand with the help of example. Also discuss the exceptions to the law of demand. (3)

2. **Attempt any Three parts of the following. Q. 2 (a) is compulsory.** (4)
   (a) Economics is science as well as an art. Explain
   (b) What are the applications of managerial economics in the field of engineering? (3)
   (c) Explain managerial decision-making process. (3)
   (d) What are the three basic conditions a problem must have to be an economic problem? (3)

3. **Attempt any Three parts of the following. Q. 3(a) is compulsory.**
   (a) What are the determinants of Supply? (4)
   (b) What is the meaning of Supply? Also discuss the law of Supply. (3)
   (c) Explain Demand Forecasting. Also discuss qualitative methods of demand forecasting. (3)
   (d) What are the types of price elasticity of demand? Explain with the help of curves. (3)

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BCS- 15

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B. TECH
ODD Semester
Minor Test 2021-2022

BCS- 15 DATABASE MANAGEMENT SYSTEMS

Time: 02 Hrs

Max. Marks: 20

Note: Answer all questions

1. **Attempt any Three parts of the following. Q.1 (a) is compulsory.**

(a) Briefly describe the four basic SQL DML statements and explain their use. Also describe main SQL DDL statements. 4

(b) Mention the issues with traditional file-based systems that make DBMS a better choice. 2

(c) Define the five basic Relational algebra operations with an example of each. 2

(d) Explain different languages present in DBMS 2

2. **Attempt any Two parts of the following.Q.2 (a) is compulsory.**

(a) Name three record-based Data models. Discuss the main differences among these data models. 4

(b) Explain different types of keys in a database 2

(c) Explain different types of relationships amongst tables in a DBMS. 2

3. **Attempt any Two parts of the following.Q.3 (a) is compulsory.**

(a) Consider the following Employee table 4

Employee_Name	Salary
Jennifer	3390
Michael	8004
Den	9001
Pat	2300

Write SQL queries for the following:

i. Get the names of all employees.

ii. Get length of name of all employees.

iii. Find the names of all employees whose salary is greater than 9000.

iv. Get the names of all employees in uppercase.

(b) Explain the concept of Database Schema and discuss the types of schemas in a database. 2

(c) Describe Join. List its different types. 2

ODD SEMESTER
MINOR TEST 2021 - 2022

Machine Design-I

Time: 2 Hrs. Max. Marks: 20

Note: *(i) Attempt all questions. Marks are indicated against each question.*
(ii) Use of design data book is permitted.
(ii) Assume missing ***data suitably****, if any.*

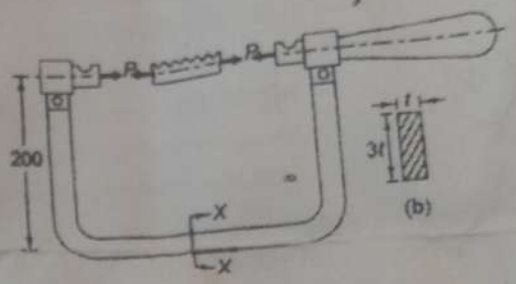
Q.1 Attempt any Three parts of the following. Q. 1(a) is compulsory.

(a). Define machine design and explain the design procedure for the design of a machine. 4

(b). Differentiate between following: 2

(i) Strength and Stress
(ii) Resilience and Toughness

(c). The frame of a hacksaw is shown in the adjacent figure. The initial tension P in the blade should be 300 N. The frame is made of plane carbon steel 30C8 with tensile yield strength of 400 MPa and the factor for safety is 2.5. The cross-section of the frame is rectangular with a ratio of depth to width as 3. Determine the dimensions of the cross-section. 2



(d) Define stress concentration factor and describe the methods to reduce the effect of stress concentration. 2

Q.2 Attempt any Two parts of the following. Q. 2(a) is compulsory.

(a). A manufacturer is interested in starting a business with five different models of tractors ranging from 7.5 kW to 75 kW capacities. Specify power capacities of models. There is an expansion plan to further increase the number of models from five to nine to fulfill the requirement of farmers. Specify the power capacities of additional models. 4

(b). Determine the BIS designation of materials from the following chemical compositions: 2

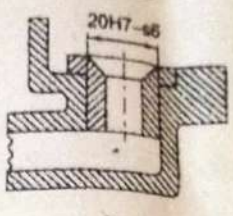
(i) carbon= 0.12–0.18%; silicon = 0.15–0.35%; manganese = 0.40–0.60%; chromium = 0.50–0.80%.

(ii) carbon = 0.35-0.45%; manganese = 0.7-0.9%

(iii) carbon = 0.12–0.20%; silicon = 0.15–0.35%; manganese = 0.60–1.00%; nickel = 0.60–1.00%; chromium = 0.40–0.80%

(iv) carbon = 0.15–0.25%; silicon = 0.10–0.50%; manganese = 0.30–0.50%; nickel = 1.5–2.5%; chromium = 16–20%.

(c). The valve seat fitted inside the housing of a pump is shown in the adjacent figure. Determine the type of fit between the housing and valve seat.



Q.3 Attempt any Two parts of the following. Q. 3(a) is compulsory.

(a). The stresses developed at a point in a machine component are as follows: σ_x=-120 MPa, σ_y= 180 MPa and τ_{xy}= -80 MPa. Draw

(i) Initial stress element and complete Mohr's circle.

(ii) Principal stress element and Maximum shear stress element.

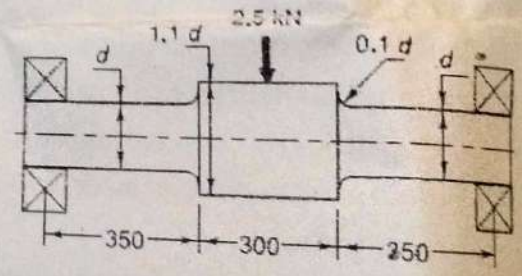
(b). The stress developed at a critical point in a machine component made of steel 45C8 (*Syt = 380 MPa*) are as follows: σ_x=100 MPa, σ_y=40 MPa and τ_{xy}=80 MPa. Calculate the factor of safety by:

i) Maximum principal stress theory

ii) Maximum shear stress theory

iii) Distortion energy theory

(c). A non-rotating shaft supporting a load of 2.5 kN is shown in the adjacent figure. The shaft is made of brittle material, with an ultimate tensile strength of 300 N/mm². The factor of safety is 3. Determine the dimensions of the shaft



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B. Tech
Odd Semester
Minor Test 2021-22

Dynamics of Machines

Time: 2 Hrs **Max. Marks: 20**

Note: Answer all questions.

Q.1 Attempt any three parts of the following.Q.1 (a) is compulsory

(a) A link AB of a four-bar linkage ABCD revolves uniformly at 120 rpm in clockwise direction. Find the angular acceleration of links BC and CD and acceleration of point E on link BC by graphical method. Given: AB=7.5 cm, BC=17.5 cm, EC= 5 cm, CD= 15 cm, DA=10 cm [4]

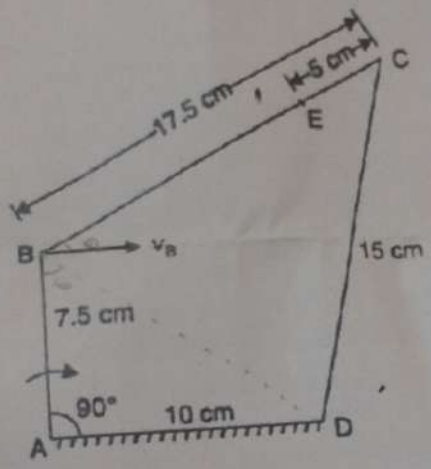

Fig 1

(b) In a certain slider crank mechanism, lengths of crank and connecting rod are equal. If the crank rotates with a uniform angular speed of 14 rad/s and the crank length is 300 mm, find the maximum acceleration of the slider in m/s^2. [2]

(c) Explain the controlling force diagram for spring-controlled governor. [2]

(d) A uniform disc of radius of gyration 15 cm and weight 5 kg is mounted on one end of an arm of length 60 cm, the other end of the arm is free to rotate in a universal bearing. If the disc rotates about the arm with a speed of 300 rpm clockwise looking from front, with what speed will it precess about the vertical axis. [2]

Q.2 Attempt any two parts of the following.Q.2 (a) is compulsory

a) A single cylinder double acting steam engine develops 150 kW at a mean speed of 80 r.p.m. The coefficient of fluctuation of energy is 0.1 and the fluctuation of speed is ± 2% of mean speed. If the mean diameter of the flywheel rim is 2 metre and the hub and spokes provide 5% of the rotational inertia of the flywheel, find the mass and cross-

sectional area of the flywheel rim. Assume the density of the flywheel material (as 7200 kg/m³. [4]

b) The torque (N-m) on the crank shaft of a two-stroke engine can be described as $T=10000+1000\sin 2\theta-1200\cos 2\theta$, where θ is the crank angle measured from inner dead centre. Assuming the resisting torque to be constant, find the power in kW developed by the engine at 100 rpm. [2]

c) Write in brief (a) static equilibrium of three force member (b) Dr.Alembert's Principle [2]

Q.3 Attempt any two parts of the following.Q.3 (a) is compulsory

a) Each arm of porter governor is 200 mm long and is hinged at a distance of 40 mm from the axis of rotation. The mass of each ball is 1.5 kg and the sleeve is 25 kg. When the links are at 30 deg. to the vertical, the sleeve begins to rise at 260 rpm. Assuming that the friction force is constant, find the maximum and minimum speeds of rotation when the inclination of the arms to the vertical is 45 deg. [4]

b) In a spring-controlled governor, the curve of controlling force is a straight line. When balls are 400 mm apart, the controlling force is 1200 N and when 200 mm apart, the controlling force is 450 N. At what speed will the governor run when the balls are 250 mm apart? What initial tension on the spring would be required for isochronism and what would then be the speed? The mass of each ball is 9 kg.[2]

c) Explain applied torque and reaction torque in Gyroscope? Explain in what way the gyroscopic couple affects the motion of an aircraft while taking a turn? [2]

MINOR TEST (EXAMINATION) 2021-22

MANUFACTURING SCIENCE

Time: 2 Hour Max. Marks:30

NOTE: Answer all questions. Assume missing data suitably.

1. **Attempt any Three parts of the following. Q.1(a) is compulsory.**
   (a) Explain the concept of plastic deformation for forming processes. What are the two important yielding criteria used for ductile materials and derive the basic governing equations of these yielding criteria. 4
   (b) Describe the selection of a manufacturing process to produce a component on the basis of technical and economical aspects. 3
   (c) Discuss the role of manufacturing in economical development of India. 3
   (d) What do you mean by open die and closed die forging? Explain the various forging operations. 3

2. **Attempt any Three parts of the following. Q.2(a) is compulsory.**
   (a) Explain the different zone in forging process. Derive an expression for Forging force of strip in open die forging for sliding zone and write the assumptions required for its derivation. 4
   (b) What is the significance of recrystallization temperature in metal working? Distinguish Hot working and Cold working process. 3
   (c) A strip of lead with initial dimensions 28 mm x 28 mm x 160 mm is forged between two flat dies to a final size of 8 mm x 98 mm x 160 mm. if coefficient of friction is 0.25, determine the maximum forging force. The average yield stress of lead in tension is 7 N/mm^2. 3
   (d) A 6 mm thick sheet is rolled with 250 mm diameter rolls to reduce thickness without any change in its width. The friction coefficient at the work roll interface is 0.2. what is the minimum possible thickness of the sheet that can be produced in a single pass? 3

3. **Attempt any Three parts of the following. Q.3 (a) is compulsory.**
   (a) Describe true strain for wire drawing and also derive expression for true strain. A circular rod of copper is being drawn from a diameter of 10mm to 8mm at a speed of 0.5m/s. calculate the value of true strain. 4
   (b) What do you mean by wire drawing? Also differentiate between wire drawing and tube drawing. 3
   (c) Why is lubrication needed in metal forming processes? Explain different types of defect in extrusion process with the help of neat sketches. 3
   (d) Explain different extrusion process with help of neat sketches. 3

B. Tech.

(SEM V) ODD SEMESTER

MINOR TEST (EXAMINATION) 2021-2022

HEAT & MASS TRANSFER

Time: 2 Hrs

Maximum Marks: 20

Note: Answer all questions. Assume suitably if any data is missing.

Q.1 Attempt any **Three** parts of the following. **Q. 1(a)** is compulsory.

(a) Derive the general heat conduction equation in polar coordinate system for homogeneous and isotropic material. Further, deduce the Poisson's and Fourier's equation of heat conduction. [4]

(b) A wall of a furnace is made up of inside layer of silica brick 120 mm thick covered with a layer of magnesite brick 240 mm thick. The temperatures at inside and outside layers of wall are 725 °C and 120 °C respectively. The contact thermal resistance between the two walls at the interface is 0.0035 °C/W per unit wall area. If thermal conductivities of silica and magnesite bricks are 1.7 W/m °C and 5.8 W/m °C respectively. Calculate (i) the rate of heat loss per unit wall area (ii) the temperature drops at interface. [2]

(c) Deduce the expression for temperature distribution and rate of heat transfer for infinitely long fin of uniform cross-sectional area. [2]

(d) Define fin efficiency and fin effectiveness. Deduce mathematical expression of fin effectiveness for finitely long fin with tip dissipation. [2]

Q.2 Attempt any Two parts of the following. **Q. 2(a)** is compulsory.

(a) Determine the rate of heat flow through a spherical boiler wall which is 2 m in diameter and 2 cm thick steel thermal conductivity of 58 W/m K. The outside surface of boiler wall is covered with asbestos (k = 0.116 W/m K) 5 mm thick. The temperature of outer surface and that of fluid inside are 50 °C and 300 °C respectively. Take inner film resistance as 0.0023 K/W. Comments on result. [4]

(b) Derive the expression for the steady state radial overall heat transfer coefficient based on inner and outer radius for a coaxial composite cylinder, whose inner surface is exposed to hot fluid and outer surface is exposed to a cold fluid. [2]

(c) Deduce expressions for temperature distribution and rate of heat transfer for 1D steady radial conduction in hollow cylindrical of constant thermal conductivity, without heat generation subjected to Dirichlet boundary conditions. [2]

Q.3 Attempt any **Two** parts of the following. **Q. 3(a)** is compulsory.

(a) A cylindrical body of 300 mm diameter and 1.6 m height is maintained at a constant temperature of 36.5 °C. The surrounding temperature is 13.5 °C. Find out the amount of heat to be generated by body per hour if $\rho = 1.025$ kg/m^3, cp = 0.96 kJ/kg

°C, k = 0.0892 kJ/m-h °C, $\nu = 15.06 \times 10^{-6}$ m²/s and $\beta = 1/298$ K^{-1}. Assume Nu = 0.12 (Gr. Pr)$^{1/3}$ (the symbols have their usual meaning). [4]

(b) Two rods of identical shapes and size are held fixed between two supporting plates each maintained at 100 °C and exposed to an ambient air at 25 °C. The midpoint temperature of rod 1 made of thermal conductivity 200 W/m K is measured to be 50 °C, while the temperature at corresponding location in rod 2 is found to be 60 °C. Calculate and comment on thermal conductivity of rod 2. [2]

(c) Explain Newton's law of cooling? Explain the physical significance of: (i) Grashoff number (ii) Prandtl number. [2]