

## AR23

CODE: 23BHT213

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

II B. Tech II Semester Regular Examinations, May, 2025

### MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (MECHANICAL ENGINEERING)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

- |  | <u>UNIT-I</u> | Marks | CO | BTL |
|--|---------------|-------|----|-----|
| 1. Define managerial economics? Explain the nature and scope of managerial economics.  |               | 14    | 1  | K3  |
| <b>(OR)</b>  |               |       |    |     |
| 2. a) Pose a hypothetical market situation where both demand and supply curves shift. Predict the outcome on equilibrium price and quantity. |               | 7     | 1  | K3  |
| b) Using the Law of Demand, construct a narrative explaining a significant plunge in demand for luxury cars during economic downturns.       |               | 7     | 1  | K2  |
| <b><u>UNIT-II</u></b>  |               |       |    |     |
| 3. a) Define the concept of elasticity of demand and explain how it is influenced by price changes in the market.                            |               | 7     | 2  | K2  |
| b) From the types of elasticity, distinguish between income elasticity and cross-price elasticity of demand, providing examples for each.    |               | 7     | 2  | K2  |
| <b>(OR)</b>  |               |       |    |     |
| 4. Define demand forecasting? Explain any four methods in demand forecasting.  |               | 14    | 2  | K3  |
| <b><u>UNIT-III</u></b>   |               |       |    |     |
| 5. a) Explain the Cobb-Douglas production function. What are its properties and limitations?   |               | 7     | 3  | K2  |
| b) Explain the concept of isoquants and iso costs. How can they be used to determine the least-cost combination of inputs?                   |               | 7     | 3  | K2  |
| <b>(OR)</b>  |               |       |    |     |
| 6. <b>From the following particulars, calculate:</b>   |               | 14    | 3  | K3  |
| (i) Break-even point in terms of sales value and in units.   |               |       |    |     |
| (ii) Number of units that must be sold to earn a profit of Rs. 90,000.   |               |       |    |     |
| Fixed Factory Over Heads Cost  | Rs 60,000     |       |    |     |
| Fixed Selling Over Heads Cost  | Rs 12,000     |       |    |     |
| Variable Manufacturing Cost per Unit   | Rs 12         |       |    |     |
| Variable Selling Cost per unit   | Rs 3          |       |    |     |
| Selling Price per Unit   | Rs 24         |       |    |     |

#### **UNIT-IV**

7. a) Define market? Differentiate between perfect and Imperfect competition. 7 4 K3  
b) Describe the process of price determination in case of monopoly market scenario. 7 4 K2

**(OR)**

8. Compare and contrast the Net Present Value (NPV) method and the Accounting Rate of Return (ARR) method in terms of time value of money and their general acceptance for project evaluation in corporate finance. 14 4 K2

#### **UNIT-V**

9. a) Explain the double-entry system of accounting and how it ensures the accuracy of financial records. 7 5 K2  
b) State the differences between Journal and Ledger 7 5 K2

**(OR)**

10. A Ltd. with its Head Office in Bangalore has a branch at Mysore. You are given the following particulars relating to Mysore branch for the year ended 31-3-2023. 14 5 K3

|  |           |
|--|-----------|
| Stock at Branch on 1-4-2022                  | Rs.32600  |
| Petty cash at branch on 1-4-2022             | Rs.110    |
| Goods sent to Branch                         | Rs. 45600 |
| Goods returns by the Branch                  | Rs.3900   |
| Cash Sales at Branch                         | Rs.71900  |
| Cash Sent to Branch for Expenses 1. Salaries | Rs12800   |
| 2. Rent                                      | Rs 3000   |
| 3. Petty Cash                                | Rs 2600   |
| Stock at Branch on 31-03-23                  | Rs 37100  |
| Petty Cash at Branch on 31-03-23             | Rs 90     |
| Prepare a Branch account at Head Office      |           |

**CODE: 23CET205** **SET-1**  
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**  
**(AUTONOMOUS)**  
**II B. Tech II Semester Regular Examinations, May, 2025**  
**SURVEYING**  
**(CIVIL ENGINEERING)**

**Time: 3 Hours****Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

|                 |   | Marks | CO | BTL |
|-----------------|---|-------|----|-----|
| <b>UNIT-I</b>   |   |       |    |     |
| 1.              | a) Define surveying. Explain the principles of surveying.   | 8     | 1  | 2   |
|                 | b) Explain the divisions of surveying with examples.  | 6     | 1  | 2   |
| <b>(OR)</b>     |   |       |    |     |
| 2.              | a) Explain the layout of a chain survey with neat sketch.   | 8     | 2  | 3   |
|                 | b) Define the following terms:  | 6     | 2  | 2   |
|                 | i) Triangulation    ii) Offset    iii) Baseline and Tie line  |       |    |     |
| <b>UNIT-II</b>  |   |       |    |     |
| 3.              | a) The following angles were observed in the clockwise direction in an open traverse.<br>angle ABC=124°15'<br>angle BCD=156°30'<br>angle CDE=102°00'<br>angle DEF=95°15'<br>angle EFG=215°45'<br>The magnetic bearing of the line AB was 241°30'. What would be the bearing of the line FG?   | 8     | 2  | 4   |
|                 | b) Explain the following terms in compass survey:   | 6     | 2  | 2   |
|                 | i) True Meridian    ii) Magnetic Meridian<br>iii) True North and Magnetic North   |       |    |     |
| <b>(OR)</b>     |   |       |    |     |
| 4.              | a) Draw a neat sketch of prismatic compass and explain its working procedure.   | 8     | 2  | 3   |
|                 | b) Define local attraction. Explain the procedure to find local attraction at a station along with its corrections.   | 6     | 2  | 3   |
| <b>UNIT-III</b> |   |       |    |     |
| 5.              | a) The following consecutive readings were taken with a dumpy level, the instrument having been moved after the 3 <sup>rd</sup> , 6 <sup>th</sup> , 8 <sup>th</sup> readings: 1.005, 1.315, 1.865, 0.965, 1.405, 1.555, 0.965, 1.175. The first reading was taken with the staff held upon a benchmark of elevation 302.540. Tabulate the page of field book and calculate the levels of the points using any method. | 8     | 3  | 4   |
|                 | b) Explain the temporary adjustments of a levelling.  | 6     | 3  | 3   |
| <b>(OR)</b>     |   |       |    |     |
| 6.              | a) Define the following terms:  | 6     | 3  | 2   |
|                 | (i) Contour interval and Horizontal equivalent<br>(ii) Temporary benchmark and GTS benchmark<br>(iii) Depression and Elevation contour  |       |    |     |
|                 | b) What are the methods of interpolation of contours? Explain any two methods.  | 8     | 3  | 3   |
| <b>UNIT-IV</b>  |   |       |    |     |
| 7.              | a) Explain the procedure to measure horizontal angles using repetition method in theodolite survey.   | 8     | 4  | 3   |
|                 | b) Write the advantages and applications of tacheometric survey.  | 6     | 4  | 3   |
| <b>(OR)</b>     |   |       |    |     |
| 8.              | a) Explain the elements of a simple circular curve with a neat sketch.  | 8     | 4  | 4   |
|                 | b) Describe the types of curves and explain any two types with a neat sketch.   | 6     | 4  | 3   |
| <b>UNIT-V</b>   |   |       |    |     |
| 9.              | a) Explain the advantages and limitations of using drones for land surveys compared to traditional survey methods   | 8     | 5  | 3   |
|                 | b) Describe the role of drones in agricultural surveys and how they contribute to precision farming   | 6     | 5  | 4   |
| <b>(OR)</b>     |   |       |    |     |
| 10.             | a) Explain the procedure of aerial photography and write its applications.  | 8     | 5  | 4   |
|                 | b) Explain the terrestrial photogrammetric surveying?   | 6     | 5  | 3   |

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**UNIT-I**Marks CO Blooms  
Level

1. a) List and explain different types of operating systems with examples. 7M CO1 L1
- b) Draw the Gantt chart and calculate the average Waiting Time for these processes using pre-emptive shortest job first scheduling algorithm. 7M CO1 L3

| Process No | Arrival Time<br>(ms) | Burst Time<br>(ms) |
|------------|----------------------|--------------------|
| 1          | 0                    | 9                  |
| 2          | 1                    | 4                  |
| 3          | 2                    | 9                  |

**(OR)**

2. a) Explain how system calls work in operating systems with suitable examples of their use. 7M CO1 L3
- b) With a neat sketch, explain the process state diagram and process control block. 7M CO1 L2

**UNIT-II**

3. a) Explain Peterson's solution for the critical section problem and how it prevents race conditions. 7M CO2 L2
- b) Demonstrate the use of semaphores to solve producer-consumer problem with pseudo-code. 7M CO2 L3

**(OR)**

4. a) Analyze the classic readers-writers problem and suggest a synchronization solution. 7M CO2 L4
- b) Evaluate different deadlock prevention techniques with suitable examples. 7M CO2 L5

**UNIT-III**

5. a) Define paging and explain its role in memory management. 7M CO3 L1
- b) Explain demand paging with an example, showing how a page fault occurs and is handled. 7M CO3 L3

**(OR)**

6. a) Consider the following page reference string: 2, 3, 4, 2, 1, 5, 6, 4, 1, 2, 3, 7, 6, 3, 2, 1. Calculate the number of page faults would occur for optimal page replacement algorithm with frame size of 5. 7M CO3 L2
- b) Illustrate page table structure and explain how logical addresses are translated into physical addresses. 7M CO3 L3

#### **UNIT-IV**

7. a) Describe different directory structures and how they organize files. 7M CO4 L2
- b) What is a file? What are the various file operations? What are the information associated with an open file? 7M CO4 L2

**(OR)**

8. a) Examine how an index file is used to speed up the access in direct-access files? 7M CO4 L2
- b) Analyze the advantages and disadvantages of different file allocation techniques. 7M CO4 L4

#### **UNIT-V**

9. a) Explain the structure of disks and how data is organized and accessed. 7M CO5 L2
- b) Explain briefly about the I/O device controllers with block diagram. 7M CO5 L3

**(OR)**

10. Given a moving-head disk with 200 tracks (numbered 0 to 199), the disk head is currently at track 120 after completing a request at track 125. The queue of requests is in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175, and 130. Calculate the total head movement required to satisfy these requests using the First-Come, First-Served (FCFS), Scan, and Shortest Seek Time First (SSTF), C-SCAN (Circular Scan), and Look disk scheduling algorithms. 14M CO5 L3

**Time: 3 Hours****Max Marks: 70**

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|        | <u><b>UNIT-I</b></u>  | Marks | CO | Blooms Level |
|--------|---|-------|----|--------------|
| 1. a)  | Define modulation and discuss the need for modulation and explain types of modulation   | 10M   | 1  | K2           |
| b)     | Briefly discuss about VSB   | 4M    | 1  | K2           |
|        | <b>(OR)</b>   |       |    |              |
| 2. a)  | Describe the power relations of AM wave   | 7M    | 1  | K2           |
| b)     | Write the working principle of envelope detector  | 7M    | 1  | K2           |
|        | <u><b>UNIT-II</b></u>   |       |    |              |
| 3. a)  | Describe the generation of FM using direct method.  | 7M    | 2  | K2           |
| b)     | A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the peak frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the frequency of the modulating signal is: (i) 1 kHz (ii) 15 kHz | 7M    | 2  | K3           |
|        | <b>(OR)</b>   |       |    |              |
| 4. a)  | Obtain the necessary expression for single tone NBFM.   | 7M    | 2  | K2           |
| b)     | Briefly explain the operation of slope detector   | 7M    | 2  | K2           |
|        | <u><b>UNIT-III</b></u>  |       |    |              |
| 5. a)  | Draw the block diagram of digital communication system and explain each block in detail.  | 7M    | 3  | K2           |
| b)     | Discuss about delta modulation.   | 7M    | 3  | K2           |
|        | <b>(OR)</b>   |       |    |              |
| 6. a)  | Discuss about pulse code modulation   | 7M    | 3  | K2           |
| b)     | Describe the operation of Time division multiplexing  | 7M    | 3  | K2           |
|        | <u><b>UNIT-IV</b></u>   |       |    |              |
| 7. a)  | Write the difference between ASK and FSK.   | 7M    | 4  | K2           |
| b)     | Analyse the coherent and detection of BFSK receiver.  | 7M    | 4  | K2           |
|        | <b>(OR)</b>   |       |    |              |
| 8. a)  | With neat diagrams illustrate the Amplitude Shift Keying.   | 7M    | 4  | K2           |
| b)     | Compute the peak frequency deviation, minimum bandwidth, and baud for a binary FSK signal with a mark frequency of 49kHz, a space frequency of 51kHz, and an input bit rate of 2kbps.   | 7M    | 4  | K3           |
|        | <u><b>UNIT-V</b></u>  |       |    |              |
| 9. a)  | Draw the block diagram of super heterodyne receiver and explain functions of each block.  | 10M   | 5  | K2           |
| b)     | Briefly explain pre-emphasis and de-emphasis.   | 4M    | 5  | K2           |
|        | <b>(OR)</b>   |       |    |              |
| 10. a) | In a broadcast super heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the IF frequency is 450 kHz, determine the image frequency and its rejection for tuning at 35MHz.  | 7M    | 5  | K3           |
| b)     | Discuss about different types of noises   | 7M    | 5  | K2           |

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| <b><u>UNIT-I</u></b>   |  | <b>Marks</b> | <b>CO</b> | <b>BTL</b> |
|------------------------|--|--------------|-----------|------------|
| 1.                     | a) Explain commutation in DC generator with necessary diagrams?  | 7            | 1         | Understand |
|                        | b) A short-shunt dc compound generator supplies 150 A at 100 V. The resistance of armature, series field and shunt field windings are 0.04, 0.02 and 65 $\Omega$ respectively. Determine the e.m.f generated. Also determine the e.m.f generated if same machine is connected as a long shunt machine.   | 7            | 1         | Apply      |
| <b>(OR)</b>            |  |              |           |            |
| 2.                     | a) Explain internal and external characteristics of a DC shunt generator   | 7            | 1         | Understand |
|                        | b) Differentiate between Lap and Wave winding in a DC machine  | 7            | 1         | Understand |
| <b><u>UNIT-II</u></b>  |  |              |           |            |
| 3.                     | a) Derive the armature torque equation of a DC motor.  | 7            | 2         | Understand |
|                        | b) Draw and explain the current – torque characteristics of a DC motor   | 7            | 2         | Remember   |
| <b>(OR)</b>            |  |              |           |            |
| 4.                     | a) Classify the DC motors based on the excitation methods with neat diagram  | 10           | 2         | Understand |
|                        | b) Mention the applications of each type of motor  | 4            | 2         | Remember   |
| <b><u>UNIT-III</u></b> |  |              |           |            |
| 5.                     | a) Derive the condition for achieving maximum efficiency of a DC Motor   | 7            | 3         | Understand |
|                        | b) A 240 V shunt motor has an armature resistance of 0.2 $\Omega$ and takes armature current of 20 A on full-load. The electromagnetic torque being constant, by how much must the flux be reduced to increase the speed by 40%?   | 7            | 3         | Apply      |
| <b>(OR)</b>            |  |              |           |            |
| 6.                     | a) Explain with the help of a neat sketch the principle of operation of a three-point starter?   | 7            | 3         | Understand |
|                        | b) Explain with neat circuit diagram how field's test is conducted on a two similar dc series motors?  | 7            | 3         | Understand |
| <b><u>UNIT-IV</u></b>  |  |              |           |            |
| 7.                     | a) Differentiate between efficiency and all day efficiency with an example   | 4            | 4         | Understand |
|                        | b) A 200 V/400V, 50 Hz transformer has peak flux density of 1.1 Wb/m <sup>2</sup> in the core and the net area of cross section of the core is 0.02 sqm. If the current density in the conductor is 3 A/mm <sup>2</sup> and conductor diameter of primary coil is 3 mm. Determine the kVA rating of the transformer and the number of primary and secondary turns. | 10           | 4         | Apply      |

**(OR)**

- |    |    |  |   |   |            |
|----|----|--|---|---|------------|
| 8. | a) | Explain the principle of operation of transformer and discuss the types of transformers.   | 7 | 4 | Understand |
|    | b) | Draw and explain the phasor diagram of a single-phase transformer with lagging p. f. load? | 7 | 4 | Understand |

**UNIT-V**

- |    |    |   |    |   |            |
|----|----|---|----|---|------------|
| 9. | a) | Explain with the help of connection and phasor diagrams how a Scott connection is used to obtain two-phase supply from three-phase supply | 14 | 5 | Understand |
|----|----|---|----|---|------------|

**(OR)**

- |     |  |  |    |   |          |
|-----|--|--|----|---|----------|
| 10. |  | <p>The open circuit and short circuit test on 10KVA, 125/250 V, 50Hz single phase transformer gave the following test results:</p> <p style="padding-left: 40px;">O.C TEST: 125V, 0.6 AMP, 50 WATTS (L.V Side)</p> <p style="padding-left: 40px;">S.C TEST: 15V,30 AMP, 100 WATTS (H.V Side)</p> <p>Calculate</p> <p>(i)copper losses at full load      (ii)full load efficiency at 0.8 p.f leading (iii)half load efficiency at 0.8 p.f leading (iv)regulation at full load 0.9 p.f leading (v) Equivalent circuit parameters and draw equivalent circuit referred to low voltage side.</p> | 14 | 5 | Remember |
|-----|--|--|----|---|----------|



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|        | <b><u>UNIT-I</u></b>  | <b>Marks</b> | <b>CO</b> | <b>BTL</b> |
|--------|---|--------------|-----------|------------|
| 1. a)  | Compare the advantages and disadvantages of open-source vs. proprietary operating systems.  | 7M           | CO1       | B1         |
| b)     | What are system calls? Explain different types of system calls with examples.   | 7M           | CO1       | B1         |
|        | <b>(OR)</b>   |              |           |            |
| 2. a)  | Explain different CPU scheduling algorithms in detail, Discuss their advantages and disadvantages.  | 7M           | CO1       | B1         |
| b)     | Describe different process operations such as process creation and termination. Explain how inter-process communication (IPC) works.        | 7M           | CO1       | B2         |
|        | <b><u>UNIT-II</u></b>   |              |           |            |
| 3. a)  | Describe the four conditions that a solution to the Critical-Section Problem must satisfy: Mutual Exclusion, Progress, and Bounded Waiting. | 7M           | CO2       | B2         |
| b)     | Discuss how race conditions affect process synchronization and give real-life examples where such problems can occur.                       | 7M           | CO2       | B2         |
|        | <b>(OR)</b>   |              |           |            |
| 4. a)  | Describe how Peterson's algorithm ensures mutual exclusion and progress.  | 7M           | CO2       | B2         |
| b)     | Provide examples of where hardware support for synchronization is used in modern operating systems.   | 7M           | CO2       | B3         |
|        | <b><u>UNIT-III</u></b>  |              |           |            |
| 5. a)  | Provide a real-world example where deadlock can occur.  | 7M           | CO3       | B3         |
| b)     | What is deadlock prevention, and how does it differ from deadlock avoidance?  | 7M           | CO3       | B1         |
|        | <b>(OR)</b>   |              |           |            |
| 6. a)  | Explain how a Resource Allocation Graph (RAG) is used for deadlock detection.   | 7M           | CO3       | B1         |
| b)     | Compare virtual memory with real memory (physical memory).  | 7M           | CO3       | B3         |
|        | <b><u>UNIT-IV</u></b>   |              |           |            |
| 7. a)  | Describe different file attributes and their roles in file management.  | 7M           | CO4       | B2         |
| b)     | What is sequential file access, and where is it commonly used?  | 7M           | CO4       | B1         |
|        | <b>(OR)</b>   |              |           |            |
| 8. a)  | What is indexed access, and how does it improve file retrieval?   | 7M           | CO4       | B1         |
| b)     | Discuss the advantages and disadvantages of each directory structure.   | 7M           | CO4       | B2         |
|        | <b><u>UNIT-V</u></b>  |              |           |            |
| 9. a)  | Explain the role of cache memory and buffering in mass-storage management.  | 7M           | CO5       | B2         |
| b)     | Differentiate between direct-attached storage (DAS), network-attached storage (NAS), and storage area networks (SAN).                       | 7M           | CO5       | B3         |
|        | <b>(OR)</b>   |              |           |            |
| 10. a) | Explain the First-Come, First-Served (FCFS) disk scheduling algorithm with an example.  | 7M           | CO5       | B1         |
| b)     | Explain how block devices handle data storage and retrieval. Give examples.   | 7M           | CO5       | B1         |