

R16

IV B.TECH II SEM

ADVANCED SUPPLEMENTARY EXAMINATIONS

JULY 2023



Subject Code: R16CE4201

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**  
**BUSINESS MANAGEMENT CONCEPTS FOR ENGINEERS**  
**(CE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) Define Managerial economics.
- (b) Define Market. Mention the features of monopoly market.
- (c) List out various GAAP principles
- (d) Mention the functions of management
- (e) Define HRM
- (f) Write the functions of financial management

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Discuss the functions of managerial economics
- (b) Explain Law of demand
3. (a) Explain economies of scale
- (b) Differentiate monopoly and oligopoly
4. (a) Explain different types of accounts with examples
- (b) Discuss double entry book keeping system with its significance.
5. (a) List out Henry Fayal's principles in detail.
- (b) Explain theory X and theory Y with examples
6. (a) Describe various production methods.
- (b) Explain EOQ with graphical representation
7. (a) Explain the differences between PERT and CPM
- (b) Discuss capital budgeting techniques.

\*\*\*



Subject Code: R16CE4202

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**  
**PRE-STRESSED CONCRETE STRUCTURES**  
**(CE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

**[2+2+2+2+2+2]**

1. a) What is the need for the use of high strength concrete and high tensile steel in prestressed concrete?
- b) Compare Pretensioning and Post tensioning methods.
- c) Write down the permissible limit for shrinkage of concrete in pretensioned and post tensioned members as per IS code.
- d) Compare the flexure failure of conventional RC beam with PSC beam.
- e) Mention the factors influencing the ultimate shear resistance of PSC members.
- f) List any two functions of end block.

**PART-B**

**4 X 12 = 48**

- 2) a) Discuss the general principles of pretensioning and post tensioning in PSC. **[6M]**  
b) Write the merits and demerits of prestressed concrete. **[6M]**
- 3) Describe the different systems of prestressing. **[12M]**
- 4) A post- tensioned concrete beam with a cable of 4 wires (total area = 600 mm<sup>2</sup>) is tensioned with 1 wire at a time. The cable with zero eccentricity at the ends and 100 mm at the center and is on a parabolic curve. The span of the beam is 10 m. The cross section is 200 mm wide and 550 mm deep. The wires are to be stressed from one end so that immediately after anchoring, the initial prestress of 940 N/mm<sup>2</sup> would be obtained. Compute the final design stress in steel after all the loss as: Coefficient of friction is 0.6, Coefficient for wave effect is 0.003, deformation and slip of anchorage is 1.25 mm,  $E_s = 210 \text{ kN/mm}^2$ ,  $E_c = 28 \text{ kN/mm}^2$ , Shrinkage of concrete is 0.0002 and relaxation of stress in steel is 3% of initial stress. **[12M]**
- 5) A rectangular concrete beam 100 mm wide and 250 mm deep spanning over 8 m is prestressed by a straight cable carrying an effective prestressing force of 250 kN located at an eccentricity of 40 mm. The beam supports a live load of 1.2 kN/m. (i) Calculate the resultant stress distribution for the centre of the span cross section of the beam assuming the density of concrete as 24kN/m<sup>3</sup>. (ii) Find the magnitude of prestressing force with an eccentricity of 40 mm which can balance the stresses due to dead load & live load at the soffit of the centre span section. **[12M]**

6) A pretensioned T section has a flange width of 1200 mm and 150 mm thick. The width and depth of the rib are 300 mm and 1500 mm respectively. The high tension steel has an area of 4700 mm<sup>2</sup> and is located at an effective depth of 1600 mm. If the characteristic cube strength of the concrete and the tensile strength of steel are 40 Mpa and 1600 Mpa respectively. Calculate the flexural strength of the section. **[12M]**

7) The end block of a post tensioned bridge girder is 500 mm wide by 1000 mm deep. Two cables, each comprising 90 high tensile wires of 7 mm diameter are anchored using square plates of side length 400 mm with their centres located at 500 mm from the top and bottom of the edges of the beam. The jacking force in each cable is 4000 kN. Design a suitable anchorage reinforcement using Fe415 grade HYSD bars conforming to IS: 1343 provision. **[12M]**

\*\*\*



# Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16ME4201

IV B.Tech II Semester Adv. Supple Examinations, July-2023

MECHATRONICS

(ME)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

## PART-A

1	a)	Define a mechatronic product.
	b)	What is the working principle of transducer?
	c)	List the different types of Actuator.
	d)	Explain the Boolean algebra?
	e)	Mentioned the fuzzy logic applications in mechatronics.
	f)	Classify the different types of Process Controllers?

[2+2+2+2+2+2]

## PART-B

4 X 12 = 48

2	a)	Explain social and economical impacts of mechatronics products.	(6M)
	b)	Explain the working principle of the fluid systems.	(6M)
3	a)	Sketch and explain the capacitive transducers	(6M)
	b)	Explain the working principle of Hall effect transducer	(6M)
4	a)	What are the important applications of piezoelectric actuators?	(6M)
	b)	What is meant by mechanical actuation system? Explain the devices used in such systems.	(6M)
5	a)	Explain the following logic gates i) AND ii) OR iii) NAND iv) NO	(8M)
	b)	Enlist applications of logic gates.	(4M)
6	a)	Explain the different micro sensors used in mechatronics.	(6M)
	b)	What is significance role of mechatronic control in automated manufacturing?	(6M)
7	a)	Explain the basic structure of programmable logic controller?	(6M)
	b)	Classify the different types of Digital Controllers? Distinguish them in detail.	(6M)

\*\*\*

Subject Code: R16ME4202

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**  
**REFRIGERATION & AIR CONDITIONING**  
**(ME)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) What is refrigeration? Write short note on air refrigeration system.
- (b) What is the need for a Compressor and Expansion devices in a VCR system?
- (c) What is the Refrigerant? Mention the need to avoid CFCs as a refrigerant.
- (d) What is Vortex Tube? Explain the principle of working of Vortex Tube?
- (e) What is the difference between Air Conditioning and Refrigeration?
- (f) Define Humidification and Dehumidification.

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Explain the working principle of Simple air evaporative cooling system with a neat sketch and mention the various processes of the system on the T-S diagram.
- (b) A Dense air machine operates on reversed Brayton cycle and is required for a capacity of 10 TR. The cooler pressure is 4.2 bar and the refrigerator pressure is 1.4 bar. The air is cooled in the cooler at a temperature of 50° C and the temperature of air at inlet to compressor is -20° C. Determine for the Ideal Cycle i) COP ii) Mass of air circulated per minute iii) Theoretical piston displacement of compressor iv) Theoretical piston displacement of expander v) Net power per tonne of Refrigeration. Show the cycle on p-v and T-s planes.
3. (a) Explain the working principle of VCR system with the help of configuration diagram and temperature-entropy diagram
- (b) A vapor compression refrigeration machine, with Freon-12 as refrigerant, has a capacity of 12 tonne of refrigeration operation between -28°C and 26°C. The refrigerant is subcooled by 4°C before entering the expansion valve and the vapor is superheated by 6°C before leaving the evaporator. The machine has a six-cylinder single-acting compressor with stroke equal to 1.5 times the bore. It has a clearance of 3.5% of the stroke volume. Find: i) Theoretical power required; ii) COP, iii) Volumetric Efficiency; iv) Bore and stroke of cylinder. The speed of compressor is 1200 rpm. The following are the properties of Freon-12.

Pressure (Bar)	Satu. Temp. (°C)	Enthalpy (kJ/kg)		Entropy (kJ/kg K)		Sp. Volume of Vapor m <sup>3</sup> /kg
		Liquid	Vapour	Liquid	Vapor	
1.093	-28	10.64	175.11	0.0444	0.7153	0.1475
6.697	26	60.67	198.11	0.2271	0.6865	0.0262

Specific heat of liquid refrigerant = 0.963 kJ/Kg K and specific heat of super-heated vapor = 0.615 kJ/kg K.

4. (a) Explain the working of any two types of refrigerant compressors with the help of a neat sketch  
(b) Explain the working of thermostatic expansion valve with the help of a neat sketch
5. (a) Briefly explain with a neat sketch constructional features and working of Practical Vapour Absorption Refrigeration System.  
(b) Explain the working of a Steam jet refrigeration system with the help of a neat sketch.
6. (a) Explain in brief as to how the human body reacts to changes in temperature of environment.  
Also explain the effect of activities on the heat load calculation for comfort applications.  
(b) Explain the characteristics of the processes on a psychrometric chart : i) Sensible cooling  
ii) Sensible heating iii) Cooling and Humidification  
iv) Cooling with Dehumidification v) Bypass factor
7. (a) Atmospheric air at  $30^{\circ}\text{C}$  dry bulb temperature and 75% relative humidity enters a cooling coil at the rate of  $200\text{ m}^3/\text{min}$ . The coil dew point temperature is  $14^{\circ}\text{C}$  and the by-pass factor of the coil is 0.1. Determine i) The Temperature of air leaving the cooling coil; ii) The capacity of the cooling coil in tonnes of refrigeration and in kilowatt; iii) the amount of water vapour removed per minute; iv) The sensible heat factor for the process and v) Latent Heat factor. [12 M]

\*\*\*



**Subject Code: R16ME4206**

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**

**ALTERNATE SOURCES OF ENERGY**

**(ME)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) What is meant by solar radiation?
- (b) What are the applications of solar collectors?
- (c) Define latent heat
- (d) What is solar pond explain in brief?
- (e) What is biological conversion process?
- (f) What is the purpose of a well? List out the types of wells.

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Explain the working of pyranometer with the help of neat sketch.
- (b) What are the layers of sun and Discuss about the Environmental impact of solar power?
3. Classify concentrating collectors and Explain the working of compound and cylindrical concentrator collectors with the help of a neat sketch.
4. (a) Elaborate in detail the components of solar water heater? Explain with schematic.
- (b) Discuss about solar distillation and drying.
5. (a) Discuss about the measurement anemometer working principle and its applications.
- (b) Distinguish between horizontal and vertical axis windmills.
6. (a) Briefly discuss about any two types of Bio-gas digesters.
- (b) What is the difference between biogas and biofuel? Mention the characteristics of bio gas.
7. (a) Explain the methods for harnessing energy. And what are the ways to Harness Natural energy in home.
- (b) Explain about liquid dominated flashed steam geothermal system.

\*\*\*





Subject Code: R16EC4201

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**

**CELLULAR AND MOBILE COMMUNICATIONS**

**(ECE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) Discuss the importance of frequency reuse scheme
- (b) Distinguish Frequency diversity vs Time diversity
- (c) With neat sketch draw and explain the equivalent circuit of an antenna
- (d) Explain the importance of channel borrowing
- (e) Why handoff is necessary
- (f) Differences between TDMA & CDMA schemes

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Discuss the physical factors that influence short-term fading in the radio propagation channel [6]
- (b) Explain the various trends in Cellular radio and personal communications [6]
3. (a) How real time co-channel interference measured at mobile radio transceiver [8]
- (b) Explain the effect of crosstalk in cellular radio and how to reduce the effect of it. [4]
4. (a) Explain the design procedure of Roof-Mounted Antenna in detail. [8]
- (b) How the antenna pattern ripple effects can be reduced ? [4]
5. (a) Explain the procedure of numbering various radio channels [8]
- (b) Compare the various channel assignment algorithms [4]
6. (a) Describe the various types of handoff in detail with examples [6]
- (b) Explain the procedure of intersystem handoffs with simple diagram [6]
7. (a) Explain the architecture of GSM and what are the services offered by GSM channels? [8]
- (b) Explain the methods for improving the capacity in cellular systems [4]

\*\*\*



**Subject Code: R16EC4211**

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**

**EMBEDDED SYSTEM DESIGN**

**(ECE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) Explain the concept of Performance design metric in detail
- (b) List out different RT-Level Sequential Components
- (c) Define Pipelining and explain its importance
- (d) Define Cache memory
- (e) Explain the Models vs Languages
- (f) Explain the concept of PLD IC technology

**[2+2+2+2+2]**

**PART-B**

**4 X 12 = 48**

2. (a) Explain the classification of embedded systems based on different criteria in detail and give an example for each
- (b) Explain the following terms
  - (i) Full-Custom VLSI
  - (ii) Semicustom ASIC
3. (a) Explain the concept of Combinational design along with example
- (b) Write short notes on RT-level Custom single-purpose processor Design
4. (a) Draw the VLIW architecture and explain its operation
- (b) Explain the terms Testing and Debugging in detail
5. (a) Explain the following terms of serial Protocols
  - (i) I<sup>2</sup>C
  - (ii) CAN
  - (iii) FireWire
- (b) Write short notes on Flash Memory in detail
6. (a) Draw and explain the Basic state machine model in detail
- (b) Explain the concept of concurrent process model in detail
7. (a) explain the concept of Full custom IC technology along with diagram
- (b) Explain the following terms in detail
  - (i) Behavioural synthesis
  - (ii) System Synthesis

\*\*\*



Subject Code: R16CS4203

**IV B.Tech II Semester Adv. Supple Examinations, July-2023**  
**SOFTWARE QUALITY ASSURANCE AND TESTING**  
**(CSE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) What is the Managements role in SQA.
- (b) How to minimizing risks of Software Testing.
- (c) Explain Regression Testing
- (d) Write importance of Cactus.
- (e) List the steps in Testing Process.
- (f) List the Testing Responsibilities in Software Development Methodologies.

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) List and Explain the components of Software Quality Assurance system.
- (b) Explain the criteria's of Malcon Baldrige.
3. (a) Explain economics of software testing
- (b) Explain management support for software testing
4. (a) List and Explain Software Testing Guidelines and Process preparation checklist.
- (b) Explain Boundary Value Analysis with examples.
5. (a) Explain different Tools available for Testing Software.
- (b) Explain Features of Silk Test Product Tools
6. (a) What is the use of Software Testing Process? Write about the causes and Problems associated with defects.
- (b) Explain the Workbench for verification testing.
7. (a) What are the suggested metrics for evaluating application system testing
- (b) Explain any two Software Development Methodologies

\*\*\*