R16

IV B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2025

Narasaraopeta Engineering College (Autonomous)

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

Subject Code: R16CC42OE4

IV B.Tech II Semester Supple Examinations, April-2025

NON-CONVENTIONAL ENERGY RESOURCES (OPEN ELECTIVE-III)

(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) List any two applications of Solar ponds
   (b) Write the applications of solar energy
   (c) Define bio – energy
   (d) What is thermo electric generator
   (e) What is Hall effect?
   (f) Explain Thomson effects

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

PART-B

4 X 12 = 48

2. (a) Discuss the geometry of the solar radiation.
   (b) Explain any one instrument in detail for the measurement of Solar radiation

3. (a) What are the advantages of vertical axis wind turbine
   (b) Give a brief description on types of wind turbines.

4. (a) Explain (i) See beck (ii) Peltier effects
   (b) Describe various energy extraction technologies used with hydrothermal resources

5. (a) Differentiate wave and tidal energy.
   (b) Classify OTEC plants and explain open cycle plant with suitable diagram

6. What is the principle of MHD power generation and discuss about the main parts of an MHD generator?

7. Describe the following
   (a) Selection of Fuels and its operating condition
   (b) MHD accelerator and engine

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

Subject Code: R16ME4201

IV B.Tech II Semester Supple Examinations, April-2025

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. Differentiate traditional approach and mechatronic approach.
   b. Differentiate primary and secondary transducer.
   c. What is principle used in fluid power actuators.
   d. What is hexadecimal number system?
   e. Differentiate sensor and microsensor.
   f. What is a programmable logic controller?

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

PART-B

4 X 12 = 48

2. With neat sketches and necessary equations explain various modelling elements in mechanical, electrical, thermal and fluid systems.

3. a. Explain seeback effect, thomson effect and peltier effect.
   b. With suitable sketches explain piezoelectric transducers

4. Explain the difference between electric, Hydraulic and Pnuematic acutuators

5. a. By taking an example explain how to convert fractional decimal number to binary number.
   b. Convert $(257)_{10}$ to binary number.

6. a. What do you mean by rise-time, peak-time and settling-time in connection with transient response specification.
   b. Write short notes on digital controllers.

7. a. Explain briefly about PLC
   b. Explain different sensors in condition monitoring.

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

Subject Code: R16ME4202

IV B.Tech II Semester Supple Examinations, April-2025

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) Define Refrigeration
(b) Explain the components of VCR system
(c) Write few properties of refrigerant
(d) Define Relative humidity
(e) Discuss summer air conditioning system
(f) Write different types of fans used in Air Conditioning Systems

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

PART-B

4 X 12 = 48

2. a) Draw the refrigerator cycle on T-s diagram when the refrigerant is dry and saturated at the end of compression and find an expression for the COP in terms of temperature and entropies.
b) Boot-Strap and Boot-Strap Evaporative type Cooling System Used for Aircraft with Sketches

3. Vapour compression machine is used to maintain a temperature of -23^0 C in a refrigerated space. The ambient temperature is 37^0 C. The compressor takes in dry saturated vapour of F-12 refrigerant. A minimum 10^0C temperature difference is required at the evaporator as well as the condenser. There is no sub-cooling of the liquid. If the refrigerant flow rate is 1 kg/min, find (i) Tonnage of the refrigerant (ii) Power requirement and (iii) COP of the cycle.

4. a) List the different types of compressors? And explain each type usage in refrigeration systems giving proper reasons
b) Explain with neat sketch working of flooded type evaporator

5. a) State the advantages and disadvantages of Li-Br over conventional refrigerators.
b) Explain the working of Thermostatic Expansion valve with neat sketch. Write its advantages and disadvantages.

6. a) Explain in detail the factors affecting air refrigeration system.
b) The air at 35^0C DBT and 25^0C WBT is passed through a cooling coil at the rate of 280 m^3/min. The air leaves the cooling coil at 26.5^0C DBT and 50% relative humidity. Find: i) Capacity of the cooling coil in tonnes of refrigeration; ii) Wet bulb temperature of the leaving air; iii) Water vapour removed per minute; iv) Sensible heat factor.

7.a) Explain different heat pump circuits
b) Explain about Grills and Registers along with their performance effects

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

Subject Code: R16ME4206

IV B.Tech II Semester Supple Examinations, April-2025

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 do you understand by earth's albedo?
   (b) Define concentration ratio of a solar collector.
   (c) What is a solar chimney?
   (d) What range of wind speed is considered favourable for wind power generation?
   (e) What is the approximate efficiency of fuel wood when used for cooking by conventional methods?
   (f) What are the major applications of geothermal energy?

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

PART-B

4 X 12 = 48

2. (a) Calculate the angle of incidence of beam radiation on a plane surface, tilted by 45° from horizontal plane and pointing 30° west of south located at Mumbai at 1:30 PM (IST) on 15th November. The longitude and latitude of Mumbai are 72° 49' E and 18° 54' N respectively. The standard longitude for IST is 81° 44' E. 6M
   (b) Explain the construction and principle of operation of a sunshine recorder. 6M

3. (a) Describe the flat plate collector with the help of a suitable diagram. 6M
   (b) Explain the construction and working of central tower receiver collector. 6M

4. (a) Differentiate sensible and latent heat storage methods along with relative advantages and disadvantages. 6M
   (b) Explain the process of water desalination (solar distillation). 6M

5. (a) Following data were measured for a HAWT:
   Speed of wind = 20 m/s at 1 atm and 27 °C
   Diameter of rotor = 80 m
   Speed of rotor = 40 rpm
   Calculate the torque produced at the shaft for maximum output of the turbine 6M
   (b) Explain various designs of blades of VAWTs and their relative features. 6M

6. (a) What are the main advantages in use of biogas? What are its main constituents and heating value? 6M
   (b) What are the factors affecting the performance of biogas digester? 6M

7. (a) Describe various stages of exploration and development of geothermal resources. 6M
   (b) Describe the environmental considerations associated with geo thermal energy. 6M

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Subject Code: R16CS4203

IV B.Tech II Semester Supple Examinations, April-2025

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) List Software Quality Metrics.
   (b) What is Economics of Testing?
   (c) Differentiate Whitebox and Blackbox Testing.
   (d) What is Load Runner?
   (e) Define Validation Testing
   (f) Write about operational testing

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PART-B

4 X 12 = 48

2. (a) Define Software Quality? Explain different Software Quality Challenges.
   (b) Explain role of Software Quality Management.

3. (a) Testing is an Organizational issue? Explain it with an example.
   (b) Building the structured approach to Software testing of SDLC Phases.

4. (a) Explain need software Testing Guidelines and concepts of Workbench.
   (b) Explain Static Testing and Dynamic Testing with an example.

5. Explain Win runner and Rational Testing Tool with an example.

6. How do you develop a Test plan. Explain in detail with an example.

7. (a) Explain Post-Implementation Analysis
   (b) Describe Software Development Methodologies.

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