R16

II B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2025

Subject Code: R16CE2202

II B.Tech II Semester Supple Examinations, April-2025
HYDRAULICS AND HYDRAULIC MACHINERY
(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) What is the specific energy curve?
   (b) Name some dimensionless numbers.
   (c) List out the applications of the impact of free jets.
   (d) What is the example of Impulse Turbine?
   (e) What is the specific speed of a pump? Give the equation for it.
   (f) Distinguish between load factor and plant factor.

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

PART-B

                                                                    4 X 12 = 48

2. (a) Find the bed slope of a trapezoidal channel with bed width of 3 m, depth of water 2.5 m and side slope of 2 horizontal to 3 vertical when the discharge through the channel is 10 m3/s. Taking the value of N = 0.03 in the Manning formula.   **[7]**
   (b) Find, in terms of specific energy E, an expression for the critical depth in a trapezoidal channel with bottom width B and side slope of 1 vertical to n horizontal.   **[5]**

3. (a) What is meant by dimensional analysis? What are the uses?   **[6]**
   (a) A 1.0 m long model of a ship is towed in a towing tank at a speed of 81 cm/s. To what speed of the ship of 64 m long does this correspond?   **[6]**

4. A jet of water having a velocity of 30m/s strikes a series of radial curved vanes mounted on a wheel that is rotating at 200 r.p.m. The jet makes an angle of 20 degrees with the tangent to the wheel at the inlet and leaves the wheel with a velocity of 5m/s at an angle of 130 degrees to the tangent to the wheel at the outlet. Water is flowing from outward in a radial direction. The outer and inner radii of the wheel are 0.5m and 0.25m, respectively. Find vane angles at the inlet and outlet. Work is done per unit weight of water and wheel efficiency.   **[12]**

5. (a) Draw the velocity triangles, work done and maximum hydraulic efficiency of a pelton wheel turbine.   **[6]**
   (b) Define the term unit power, unit speed and unit discharge with reference to a hydraulic turbine. And also derive the expression for these terms.   **[6]**

6. A centrifugal pump discharges 0.15 m3/sec of water against a head of 12.5 m, the speed of impeller being 600 r.p.m. The outer and inner diameter of impeller are 500 mm and 250 mm respectively and the vanes are bent back at 350 to the tangent at exist. If the area of flow remains 0.07 m^2 from inlet to outlet, calculate (i) Manometric efficiency of pump (ii) Vane angle at inlet (iii) Loss of head at inlet to impeller when the discharge is reduced by 40% without changing the speed.   **[12]**

7. (a) What is load duration curve? Explain with sketch. Discuss its uses.   **[8]**
   (b) Describe the basic features of hydropower plants.   **[4]**

NEC

Subject Code: R16CE2204

II B.Tech II Semester Supple Examinations, April-2025
SURVEYING-II
(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 the term "Stadia constant" and explain its significance in tacheometry.
   (b) How is a closing error in a traverse identified and corrected?
   (c) Explain the difference between compound and reverse curves.
   (d) Explain the basic features of a total station.
   (e) Briefly discuss the typical methods for setting out a vertical curve?
   (f) Discuss the principle behind Jeffcott's Direct Reading Tacheometer?

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

PART-B

4 X 12 = 48

2. (a) Discuss the principles of tangential and stadia tacheometry and explain how heights and distances are measured using these methods.
   (b) Elaborate on the types of theodolites used in surveying and explain how stadia constants are determined and applied in field measurements.

3. (a) Describe the process of theodolite traversing by bearings and discuss the advantages of plotting a traverse by coordinates.
   (b) Discuss trigonometrical leveling to determine the elevations and distances of inaccessible objects. Explain the problems on single and reciprocal observations.

4. (a) Discuss the theory of simple curves in surveying and explain in detail the linear and instrumental methods used for setting out these curves.
   (b) Explain reverse curve geometry and field application in road construction projects.

5. (a) Discuss the types of vertical curves used in surveying and explain how they are set out on-site with appropriate examples.
   (b) Explain the concept of transition curves and describe the methods for computing and setting out transition curves in the field.

6. (a) Describe the principles of tacheometry and explain how fixed and movable hair tacheometers are used to measure distances and elevations in surveying.
   (b) Explain the principle of the substance bar and Beaman's stadia arc in measuring horizontal distances. Discuss their field applications.

7. (a) Explain the features and working principles of total stations in detail. How have they revolutionized modern surveying techniques?
   (b) Provide a brief introduction to hydrographic surveying. Discuss its methods and applications, especially in coastal engineering projects.

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Subject Code: R16EE2202

II B.Tech II Semester Supple Examinations, April-2025
DIGITAL ELECTRONICS
(EEE)

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) Determine the 2's complement of a signed binary number 10111
   (b) List the two types of standard form to express Boolean functions
   (c) Write some of the applications of multiplexer and demultiplexers
   (d) What are the basic configurations of PLDs?
   (e) What is the difference between latch and Flip-flop?
   (f) What is a universal shift register?

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

PART-B

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2. (a) A 12-bit Hamming code word containing 8 bits of data and 4 parity bits is read from memory. What was the original 8-bit data word that was written into memory if the 12-bit word read out is as 000011101010　　　　　　　　　　　　(6)
   (b) Convert to decimal (i) 4057.06_8 (ii) $5C7_{16}$ (iii) 1001011_2　　　(6)

3. (a) Table the Postulates and Theorems of Boolean Algebra　　　　　(6)
   (b) Simplify the Boolean function $F = A'B'C' + B'CD' + A'BCD' + AB'C'$　　(6)

4. (a) Draw the block diagram of 4-bit BCD adder and explain its operation.　(6)
   (b) Implement the following Boolean function with a multiplexer
   　$F(A,B,C,D) = \sum(1,3,4,11,12,13,14,15)$

5. (a) Implement the combinational logic circuit defined by the function $F(A,B,C) = \sum(3,5,6,7)$ using PLA　　　　　　　　　　　　　　　　　　　　　　(6)
   (b) Compare of PROM, PLA, and PAL　　　　　　　　　　　　　　(6)

6. (a) Explain the operation of positive and negative edge triggered S-R flip-flop with symbol and truth table　　　　　　　　　　　　　　　　　　　　　　　　(6)
   (b) Summarize the excitation table of R-S, J-K and D flip-flops　　　(6)

7. (a) Explain the principle of operation of a 4-bit universal shift register　(6)
   (b) Draw logic diagram of a 4-bit synchronous up-counter and explain its sequence of operation.　　　　　　　　　　　　　　　　　　　　　　　　(6)

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Subject Code: R16EE2205

II B.Tech II Semester Supple Examinations, April-2025
ELECTRICAL MACHINES-II
(EEE)

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) Why are three-phase induction motors are called asynchronous and list their advantages. ·
   (b) On what factors does the speed of an induction motor depends? Explain.
   (c) What is crawling and how it can be minimized?
   (d) Deduce an expression for the pitch factor of an alternator armature winding short chorded by some angle.
   (e) What is synchronous condenser? and write down its applications.
   (f) State the advantages of capacitor-run motor over capacitor-start motor.

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

PART-B

                                                                 4 X 12 = 48

2. (a) Draw and explain the torque-speed characteristics of a three-phase induction motor and clearly indicate the effect of change in rotor resistance.
   (b) Estimate the stator current, equivalent rotor current, efficiency, output, and the power factor at a slip of 5% for a three-phase induction motor having the following data: *stator impedance (1+j3) Ω, rotor standstill impedance (1+j2) Ω, no load shunt impedance, (10+j50) Ω and volts per phase is 250 V.*

3. (a) Explain the working of rotor rheostat starter for a three-phase induction motor with the help of neat diagram.
   (b) The open circuit voltage across the slip-rings of a 100 hp, 3-phase induction motor is 273 V at standstill. What resistance in the rotor circuit will reduce its full load speed by 25%. The full load slip is 2% with no additional rotor resistance. Assume rotor to be star connected.

4. (a) Compare salient pole and non-salient pole synchronous generators in any six aspects.
   (b) Calculate the speed and open-circuit line and phase voltages of a 4-pole, 3-phase, 50 Hz star connected alternator with 36 slots and 30 conductors per slot. The flux per pole is 0.05 Wb sinusoidally distributed.

5. (a) Explain the Potier method of finding the voltage regulation of synchronous generator.
   (b) A 2000 KVA, 3-phase, 8 pole alternator runs at 750 rpm in parallel with other machine on 6000 V bus-bars. Calculate synchronising power on full load 0.8 pf lagging per mechanical degree of displacement and corresponding synchronising torque. The synchronous reactance is 6 Ω/phase.

6. (a) A 2000 V, 3-phase, 4-pole, Y-connected synchronous motor runs at 1500 rpm. The excitation is constant and corresponds to an open-circuit voltage of 2000 V. The resistance is negligible as compared to synchronous reactance of 3 Ω/phase. Determine the power input, power factor and torque developed for an armature current of 200 A.

(b) Explain an experimental method of determining V curves and inverted V curves for a synchronous motor.

7. (a) Using double revolving field theory explain the torque-slip characteristics of a single-phase induction motor and prove that it cannot produce any starting torque.

(b) Explain the working principle and applications of single-phase shaded pole motors.

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NEC

Subject Code: R16EE2206

II B.Tech II Semester Supple Examinations, April-2025
ANALOG ELECTRONICS
(EEE)

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) Write the advantages of negative feedback amplifier.
   (b) Define %tilt of RC circuit.
   (c) Write the ideal characteristics of an operational amplifier.
   (d) What is a multivibrator?
   (e) Draw the circuit diagram of ap-amp all pass filter
   (f) Define accuracy and resolution of D/A converter.

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

PART-B

4 X 12 = 48

2. (a) Draw the circuit diagram of current shunt feedback and derive expressions for input and output resistances.
   (b) Explain the concept of feedback with block diagram.

3. (a) Draw the RC Low pass circuit. With necessary waveforms and expressions explain its working for step input.
   (b) Explain negative peak clipper with and without reference voltage.

4. (a) Draw the block diagram of op-amp and explain it in detail.
   (b) With a neat diagram explain about the voltage to current converter in details

5. (a) How 555 timer acts as mono stable multi vibrator? Explain with a neat circuit diagram.
   (b) Explain RC phase shift oscillator using Op-amp.

6. (a) With a neat diagram, explain the band reject filter. Derive the expression for output voltage
   (b) Define active filter. List out different filters and sketch the frequency response of them.

7. (a) With a neat diagram explain about the counter type D/A converter in detail.
   (b) Consider a 10 bit D/A converter having a reference voltage of 10 V. What is the binary digital input needed to get 4.5 V output? What outputs are obtained from the converter for the inputs of (i) binary 0010110101 and (ii) decimal 520?

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Narasaraopeta Engineering College (Autonomous)

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

Subject Code: R16ME2205

II B.Tech II Semester Supple Examinations, April-2025
MANUFACTURING TECHNOLOGY
(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 the purpose of a sprue in a gating system?
   (b) What is the purpose of the oxy-acetylene torch in gas welding?

   (c) What materials are commonly welded using resistance welding?

   (d) Differentiate between bulk forming and sheet metal forming.

   (e) What is the difference between bloom and billet?
   (f) Name two types of extrusion processes.

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

PART-B

4 X 12 = 48

2. (a) Describe the different types of patterns used in foundry work (e.g., solid, split, shell). Discuss the advantages and disadvantages of each type.   [6]
   (b) What is the core and explain any 3 types of cores with sketches   [6]
3. (a) Explain the components of a gating system in casting. Discuss the function of each component and how they influence the quality of the final casting.   [6]
   (b) What is centrifugal casting? Describe the process and its advantages. In which applications is centrifugal casting most commonly used?   [6]
4. (a) Describe the components of an arc welding system and their functions. Include power supply, electrodes, and flux.   [6]
   (b) Explain the principle of gas welding. Describe the oxy-acetylene welding process, including the equipment used, flame types, and applications.   [6]
5. (a) Discuss the factors affecting the quality of welds in resistance welding. How do parameters like pressure, current, and time influence the weld?   [6]
   (b) Compare TIG welding with MIG welding in terms of process characteristics, advantages, disadvantages, and applications.   [6]
6. (a) Differentiate between hot rolling and cold rolling processes. Discuss their advantages, disadvantages, and applications.   [6]
   (b) Explain the defects that occur in forged products, such as laps, underfills, and scale formation. How can these defects be minimized?   [6]
7. (a) Explain the extrusion process and differentiate between direct (forward) extrusion and indirect (backward) extrusion. Provide examples of products manufactured using each method. [6]
   (b) Explain the wire drawing process. How does it differ from bar drawing, and what are the main factors affecting the quality of the drawn product?   [6]

Subject Code: R16CS2204

II B.Tech II Semester Supple Examinations, April-2025
DATABASE MANAGEMENT SYSTEMS
(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) Explain the concept of data independence.
   (b) What is an entity in an ER model?
   (c) What are integrity constraints in SQL?
   (d) Explain the significance of null values in a relational database.
   (e) What is timestamp ordering?
   (f) Explain the concept of sorted files.

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

PART-B

                                                            4 X 12 = 48

2. (a) Compare the hierarchical, network, and relational data models. What are the strengths and Weaknesses of each model?
   (b) Describe the client-server architecture for a database system. How does it differ from a Centralized architecture?

3. (a) Describe the process of converting an ER diagram into a relational schema. What are the key steps involved?
   (b) What is the basic form of an SQL query? Provide an example of a simple SQL query that retrieves data from a single table.

4. (a) What are the main differences between SQL and PL/SQL?
   (b) What are packages in PL/SQL? Discuss the advantages of using packages in database applications.

5. (a) Define functional dependency in the context of a relational database.
   (b) Define the following terms in the context of the relational model: domain, attribute, tuple, and relation with an examples.

6. (a) Explain why recovery mechanisms are important in database systems.
   (b) Discuss the ACID properties of transactions.

7. (a) What is a heap file? How are records stored and retrieved in a heap file?
   (b) What is a multilevel index? How does it improve the efficiency of data retrieval compared to a single-level index?

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