FACULTY OF ENGINEERING
B.E. 2/4 (Civil) I-Semester (Backlog) Examination, November 2021

Subject: Engineering Material and Construction

Time: 2 hours   Max. Marks: 75

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any seven questions.   **(7x3 = 21 Marks)**

1 What are the various uses of stones as building materials?
2 State any four requirement of good bricks.
3 What is meant by bulking of sand?
4 Mention at least three important clay minerals.
5 Differentiate between volume and weigh batching of concrete.
6 Define the terms lineation and foliation.
7 What are the advantages of recycled aggregated?
8 Explain any three methods of conserving energy in buildings.
9 Draw a neat sketch of segmental arch.
10 Define pointing.

PART – B

Answer any three questions.   **(3x18 = 54 Marks)**

11 (a Define quarrying of stone. Explain various methods of quarrying.
   (b) Differentiate between intermitted and continuous kiln.

12 (a) Classify different types of cement. And explain any two in detail.
   (b) List out different tests performed on coarse aggregates. And explain any
       two in detail.

13 (a) Why is curing necessary for concrete? Explain the curing of concrete by
       different methods.
   (b)Classify different types of mortars. And explain in detail the manufacturing
       method of mortar?

14 (a) What do you understand by the term decay of timber?
   (b) List out the common diseases in timber and what preventive measures can
       be adopted.

15 (a) Define water cement ratio. Discuss the importance of water cement ratio in
       reparing concrete.
   (b) List out the various characteristics of good flooring.

16 (a) Explain the method of making concrete and marble flooring.
   (b) What are scaffoldings? Explain the different types of scaffoldings.

17 Write short notes on:
   (a) Types of reinforcing steel
   (b) Fly ash bricks

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FACULTY OF ENGINEERING

B.E. 2/4 (EEE) I - Semester (Backlog) Examination, November 2021

Subject: Electrical Circuits - I

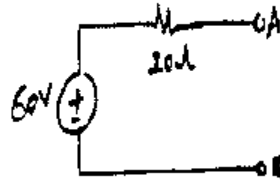**Time: 2 Hours**   **Max marks: 75**

Missing data, if any, may be suitably assumed

PART - A

**Note**: **Answer any Seven questions**.   **(7x3=21 Marks)**

1. Determine the equivalent current source for the voltage source shown in below.

2. Distinguish between KCL and KVL.

3. A Series connected RC circuit has a resistor of 50Ω and capacitive reactance of 25Ω
   What is its impedance and phase angle?

4. Define Bandwidth and quality factor.

5. State Compensation theorem.

6. What are limitations of super position theorem?

7. The readings of two watt meters of 3-phase power measurement are 50 W and 100W respectively. Calculate power factor.

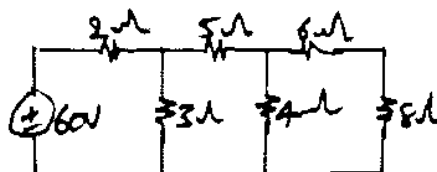8. Using dot convention, write voltage equations for the coils shown below.
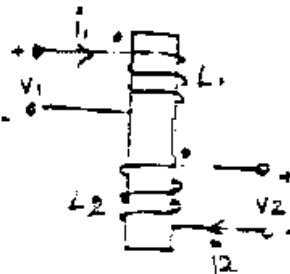
9. Define tree and chord?

10. Write the behavior of inductor and capacitor when they are suddenly connected to a DC supply.

PART – B

Note: **Answer any Three questions**.   **(3x18=54 Marks)**
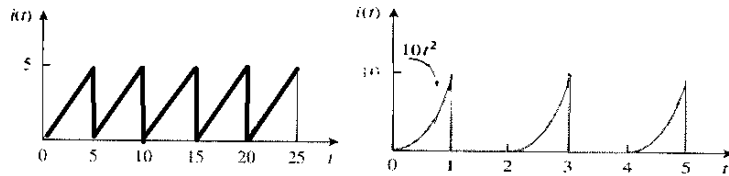
11 Determine the current flowing through the 4 ohm resistor in the below circuit by using
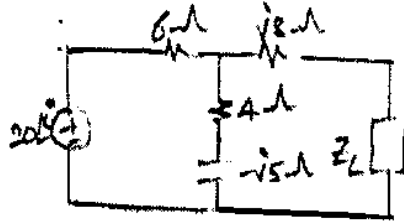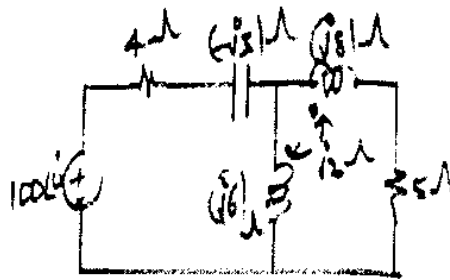Mesh Analysis.

12. Calculate the form factor and peak factor of the wave forms.

13. Find the load impedance Z_L that absorbs the maximum average power. Calculate that maximum average power.

14. Calculate the mesh currents in the circuit shown below.

15. Explain properties of incident matrix and tie set matrix. Prepare incident and tie set schedule and obtain the relation between tree-branch voltages and nodal currents.
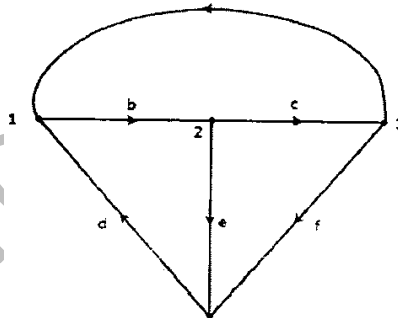
16. Use Nodal analysis to find the power dissipation in the 6 ohm resistor for the circuit shown below.
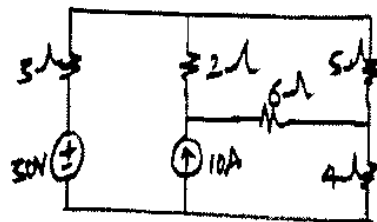
17. Explain relation between line and phase quantities in star and delta connections (balanced)?

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FACULTY OF ENGINEERING

BE 2/4 (Inst) I-Semester (Backlog) Examination, November   2021

Subject : Network Theory

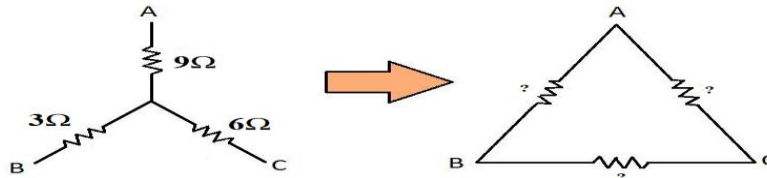**Time: 2 Hours**   **Max marks: 75**

Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Seven questions**.   **(7x3=21 Marks)**

1.   State Thevenin's Theorem and draw it's equivalent circuit?

2.   Convert Y-network to equivalent Δ-network?


3.   Define (i) Step function (ii) Exponentional function

4.   Define Transient Response?

5.   A series R-L circuit connected to a 1-ϕ supply $230 \angle 0^0 volts$, 50Hz which contains impedance of $46 \angle 30^0 \Omega$. Determine current passing through it and also find p.f.

6.   Define Form Factor and what is the value of form factor for sine wave?

7.   Derive Resonance frequency for series RLC circuit?

8.   Compare star connected system and delta connected system?

9.   Write the generalized equations of ABCD-parameters of a two port network?

10. Two 2-port networks connected in series and impedance parameters of each 2-port networks are Z_{11x} = 5Ω, Z_{12x} = Z_{21x} = 4Ω & Z_{22x} = 8Ω and Z_{11y} = 10Ω, Z_{12y} = Z_{21y} = 8Ω & Z_{22y} = 15Ω. What is the resultant 2-port network impedance parameters?

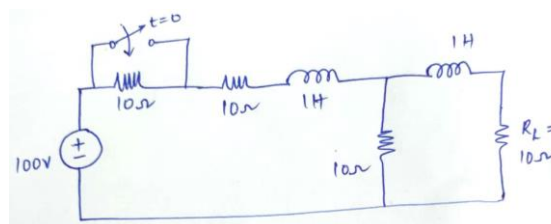**PART - B**

Note: Answer any Three questions.   **(3x18=54 Marks)**

11. (a) Classify Network Sources and explain?
    (b) Find the Norton's equivalent circuit across terminal a&b?
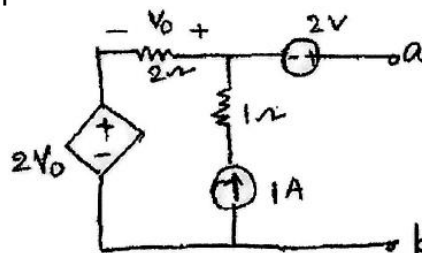
12. In the network shown below, the switch is closed at t = 0, find the expression for current   in R_L.

13. A circuit consists of three branches connected in parallel. One branch is having a pure resistance of 10Ω. The second branch consists of a resistance of 20Ω and an inductance of 0.1H. The third branch consists of a resistance of 15Ω and a capacitance of 150µF. if a 230V, 50Hz is connected across the circuit. Find the (i) current each branch (ii) total current (iii) Active power (iv) Reactive Power and (v) p.f. of the circuit?

14. Show that in a RLC resonant circuit, the resonant frequency is the geometric mean of the lower and upper half power frequencies respectively ($f_r = \sqrt{f_1 f_2}$)

15. Determine Z- parameters of a given two port network?
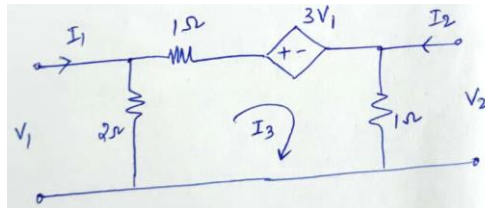
16. (a) A 3 – φ delta connected RYB system with an effective voltage of 400V, has a balanced load with impedances (3+j4) Ω. Calculate the
    (i) Phase currents
    (ii) Line currents
    (iii) Total power and power in each phase.

    (b) In figure, L1 = 4H, L2 = 9H, k = 0.5, i1 = 5cos(50t-30⁰)A, i2 = 2cos(50t-30⁰)A. Find the values of
    (i) V1 (ii) V2
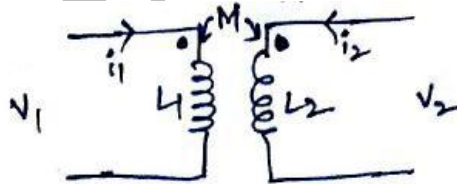
17. (a) Derive response of source free RL circuit
    (b) Find the voltage v(t) across inductor 20mH when the below current wave form passing through it?

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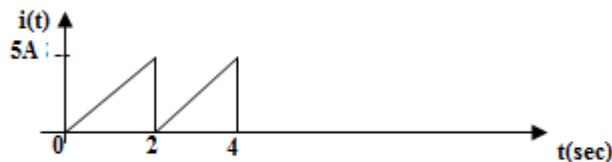
FACULTY OF ENGINEERING

BE 2/4(ECE) I-Semester (Backlog) Examination, November 2021

Subject: Basic Circuit Analysis

Time: 2 Hours   **Max marks: 75**

Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Seven questions**.   **(7x3=21 Marks)**

1. State maximum power transfer theorem

2. State and explain the time constant of RL and RC circuits.

3. Define self-inductance and mutual inductance

4. What is power factor

5. What are the conditions of symmetry and reciprocity in networks in terms of Z andY parameters?

6. What is a reciprocal network?

7. Define quality factor.

8. How the location of poles and zeros effect the system performance.

9. What are half power frequencies

10. Write the condition for underdamping and critical damping in RLC series circuit

PART-B

Note: **Answer any Three questions**.   **(3x18=54 Marks)**

11(a) In the circuit shown below determine the current through galvanometer of 500Ω resistance connected cross A & B using Thevenin's theorem.
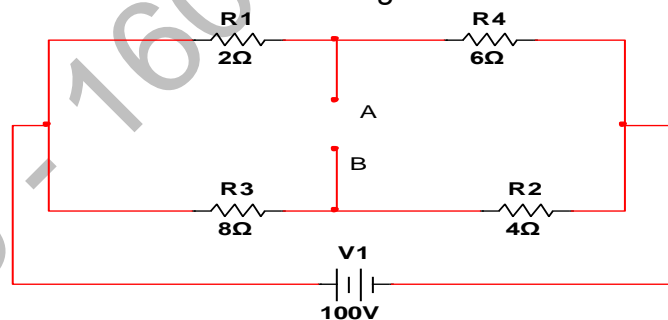
(b) Find the maximum power delivered to the load 12Ω of the following network.
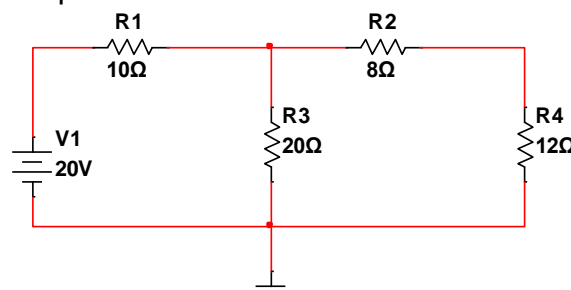
12. In the circuit shown below , the switch remains in position 1 for a long time. At t=0, the switch is changed to position 2. Determine the current response.
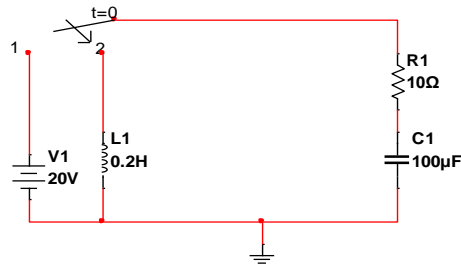
13(a) For the circuit shown below, find the load impedance Z which results in maximum power transfer across the terminals AB.
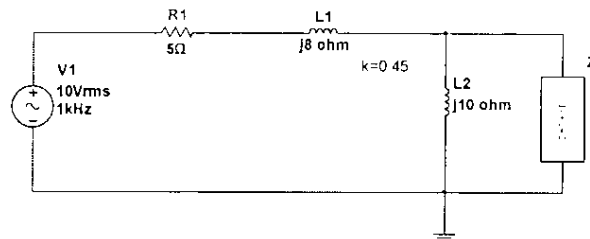
    (b) Explain maximum power transfer theorem for AC networks.

14 (a) The Z-parameters of a two port network are $Z_{11}=10\Omega$, $Z_{22}=15\ \Omega$, $Z_{12}=Z_{21}=5\ \Omega$. Find the equivalent T network.

    (b) Two identical sections of the network shown below are connected in parallel. Obtain the Y parameters of the combination.
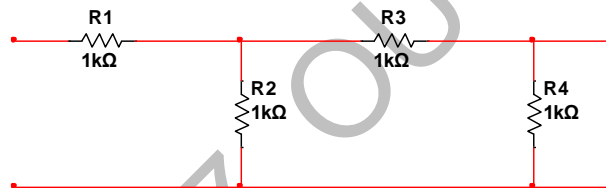
15 (a) Derive the expression for bandwidth of series RLC circuit

    (b) Explain the necessary conditions for driving point functions.

16 (a) Determine the effective inductance of the series connected coupled coils given below.
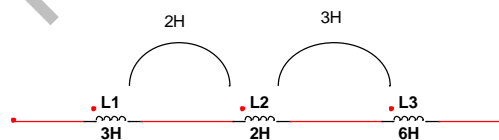
    (b) Determine the effective inductance of the series connected coupled coils given below.
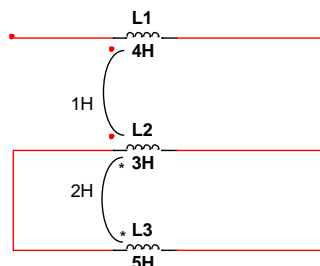
17 (a) Prove that when networks are connected in cascade, the overall ABCD parameters are the matrix multiplication of individual ABCD parameters.

    (b) Show that for a series resonant circuit the resonant frequency ω_o is the geometric mean of the two half power frequencies.

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FACULTY OF ENGINEERING
B.E. 2/4 (M/P/AE) I-Semester (Backlog) Examination, November 2021

Subject: Metallurgy and Material Science

Time: 2 Hours   **Max marks: 75**

Missing data, if any, may be suitably assumed

PART - A
**Note**: **Answer any Seven questions**.   **(7x3=21 Marks)**

1 What is Strain Hardening?
2 Differentiate ductile fracture with brittle fracture.
3 Draw the structure of the fatigue fracture specimen and show the various regions on it.
4 Mention the applications of diffusion theory in mechanical engineering.
5 What is Gibb's phase rule?
6 What are plain carbon steels and explain its classification?
7 What is Induction hardening?
8 Distinguishing between carburizing and Nitriding.
9 Draw a neat sketch of cupola furnace.
10 Mention the application of power metallurgy.

PART-B
Note: **Answer any Three questions**.   **(3x18=54 Marks)**

11 (a) Discuss slip and twining as mechanism of permanent deformation.
    (b) Explain the Griffith theory of brittle fracture.

12 (a) Explain the experimental determination of fatigue strength with the help of the neat sketch.
    (b) Differentiate between creep curve and stress rupture curve.

13 (a) Draw Iron-Iron carbide diagram and label all points, lines and areas.
    (b) Explain various invariant reactions in Iron-Iron carbide phase diagram.

14 (a) Describe the tempering process in detail.
    (b) Discuss Narmalising as heat treatment process and mention the applications.

15 Explain in detail the production of steel using Bessemer Converter.

16 (a) Explain the method of production of steel by Electric Arc Process.

    (b) What is age hardening? Describe different steps in age hardening.

17 Write short notes on the following:
    (a) Point Defects
    (b) Cumulative Fatigue
    (c) Maraging Steels.

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FACULTY OF ENGINEERING
B.E. 2/4 I - Semester (CSE) (Backlog) Examination, November 2021

Subject: Discrete Structures

Time: 2 Hours   **Max. Marks: 75**

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1. Write logical equivalence to $(p \vee q \vee r) \wedge (p \vee t \vee \sim q) \wedge (p \vee \sim t \vee r)$.
2. Let f be the function from {a, b, c, d} to {1, 2, 3, 4} with f(a) = 4, f(b) = 2, f(c) = 1 and f(d) = 3. Is f bijecitve function? How?
3. Find the co-efficient of x^5 in $1/(1- 2x)^8$.
4. Obtain Recurrence relation for the closed form $A(K) = K^2 - K$.
5. Define groups and monoids with examples.
6. Obtain a multiplication table for a monoid using binary operation 3* on set A = {a, b}.
7. What is complete bipartite graph?
8. Find the chromatic number of a wheel graph.
9. What is Monoid Homomorphism?

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

10. (a) Show that from set of premises:
    (i) P→q
    (ii) q→ (r∧s)
    (iii) ~rv(~tvu)
    (iv) p∧t
    The conclusion is "u".
    (b) Construct the truth table for (p∧(p->q))->q.

11. Find the no. of integers between 1 and 1000 inclusive that are non-divisible by 2, 3 and 5.

12. (a) Find the coefficient of x^{12} in $(1-x^6)^4/(1-x)^4$.
    (b) Explain about generating functions.

13. Define the binary operation o on Z by x o y = x + y + 1. Verify that < Z, o > is an abelian group.

14. (a) What are Isomorphic graphs? Explain various conditions for proving the given groups are isomorphic.
    (b) Explain about minimum spanning trees with example.

15. Use Grinberg's theorem show that there are no planar Hamiltonian graphs with region of degree 5, 8, and 9 with exactly one region of degree 9.

16. Write short notes on any two of the following:
    (a) Recurrence relation
    (b) Cartesian product
    (c) Groups.

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FACULTY OF ENGINEERING
B.E. 2/4 I - Semester (IT) (Backlog) Examination, November 2021

Subject: Digital Electronics and Logical Design

Time: 2 Hours **Max. Marks: 75**

PART – A

Note: Answer any seven questions. **(7x3 = 21 Marks)**

1 Use algebraic manipulation to find the minimum product of sums expression for the function.
2 Synthesize the logical expression f= AB+BC+CA.
3 Obtain the logic diagram of a full adder.
4 Write the truth table of a 4 to 2 priority encoder.
5 Write the excitation tables of SR and D Flip-Flops.
6 Write VHDL code for D Flip-Flop.
7 Compare Mealy and Moore FSM.
8 Draw the ASM chart of T and JK FFs.
9 Analyze an asynchronous SR latch.
10 Define compatible states.

PART – B

Note: Answer any three questions. **(3x18 = 54 Marks)**

11 (a) Minimize the logic function $f(A,B,C.D)= \sum m(9,10,12)+D(3,5,6,7,11,13,14,15)$ and realize using NAND gates only.
   (b) With a neat diagram and explain the development process of logic circuits.

12 (a) Design a BCD to 7-Segment display code converter.
   (b) Realize a full adder using a 3 to 8 decoder and an OR gate.

13 (a) Design a Mod-10 asynchronous counter suing T flip-flops.
   (b) Draw the structures of all types of shift registers.

14 (a) Draw the state diagram and obtain the state table for a MOORE FSM to detect the
      sequence '110'.
   (b) Obtain the ASM chart of a serial adder.

15 (a) Obtain the state diagram, flow table, excitation table of a MOD-4 asynchronous counter.
   (b) Derive a hazard-free minimum-cost POS implementation of the function.
      $f)A,B,C,D) = \prod m(0,2,3,7,10)+d(5,13,15)$.

16 (a) Use tabular method to derive a minimum-cost SOP realization for the function
      $F(x_1, x_2, x_3, x_4) = \sum m(0,4,10,11,12,13,15)$.
   (b) Explain how 2-input XNOR gate can be implemented using two-input LUT.

17 Write short notes on
   (a) Conversion from T FF to JK FF, D FF to JK FF.
   (b) Analysis of asynchronous master-slave D flip-flop.

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FACULTY OF ENGINEERING

BE III-Semester (CBCS) (Civil) (Backlog) Examination, November   2021

Subject: Engineering Geology

Time: 2 Hours   **Max marks: 70**

Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Five questions**.   **(5x2=10 Marks)**

1. Define folds. Mention parts of a fold

2. Write classification of ligneous rocks and Sedimentary rocks

3. Define weathering. Explain Physical weathering?

4. What is a spring? Mention the classification of springs

5. Mention characteristic features of marine landform

6. What is rock mechanics?

7. Write short notes on artificial stones and granite as construction material

8. Draw a neat diagram of a dam and label its parts

9. Define over break and Payline.

10. How is an earthquake caused?

PART - B

Note: Answers any Four questions.   **(4x15=60 Marks)**

11. a) Write the geological description of Granite and Basalt
    b) Discuss primary and secondary structure

12. a) Write short notes on susceptibility of rocks to weathering and assessment of degree of weathering
    b) Describe the soil formation. Explain Indian soils.

13. a) Explain characteristic features of Glacian and Marine landforms
    b) Explain Aerial photography and types of aerial photography

14. a) Mention qualities of a good building stone
    b) Write short notes on Coarse aggregate and Fine aggregate

15. a) Define a dam. Explain the forces acting on a dam
    b) Explain briefly concrete dams and earth dams

16. a) What are the different problems of Tunnelling?
    b) Write short notes on Stand up time of rocks, and payline

17. a) Explain the geological aspects of Landslide. State three preventive measures for landslides.
    b) Write short notes on earthquake and tsunami.

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FACULTY OF ENGINEERING

B.E. III - Semester (CBCS) (EE/Inst) (Backlog) Examination, November 2021

Subject: Prime Movers & Pumps

Time: 2 Hours   **Max marks: 70**

Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Five questions**.   **(5x2=10 Marks)**

1. Where the units of   i) Dynamic Viscosity   ii) Kinematic Viscosity
2. How does viscosity of fluid vary with temperature?
3. Define Bernoulli's theorem?
4. Define the terms   i) Turbine   ii) Pump
5. Define specific speed of a turbine
6. What is priming? Why is it necessary?
7. Define the dryness fraction?
8. State the reason for modification of Rankine cycle for steam engine.
9. What methods are used in reducing the speed of the turbine rotor?
10. Write the applications of boilers.

PART - B

Note: Answers any Four questions.   **(4x15=60 Marks)**

11. a) Derive the Bernoulli's equation and list it applications.
    b) A plate 0.025 mm distant from a fixed plate, moves at 60 cm/s and requires a force of 2 N per unit area i.e, 2 N/m^2 to maintain this speed. Determine the fluid viscosity between the plates.

12. a) What are specific quantities? Define specific quantities for the turbine. Derive the expression for the specific quantities. Why are they important?
    b) Explain the performance characteristic curves of a turbine?

13. a) Explain manometric efficiency, mechanical efficiency, and overall efficiency of a centrifugal pump.
    b) A single acting reciprocating pump, running at 300 rpm delivers 0.03 m^3/s of water. The diameter of the piston is 150 mm and stroke length 300 mm. Determine the theoretical discharge and coefficient of discharge.

14. a) With neat sketch describe the working principle of steam engine?
    b) Describe the construction and working principle of Wilcox boiler.

15. a) Discuss the application of steam turbines for power generation.
    b) With a neat diagram describe the working of a closed cycle gas turbine. State merits and demerits.

16. a) Explain do you understand by degree of reaction of a turbine.
    b) Explain the working of gas turbine with neat sketch.

17. a) Describe the working principle of reciprocating pump .Define
       i) Slip   ii) Percentage of slip   iii) Negative slip
    b) A pipe of diameter 80 mm and 800 mm long carries water at the rate of 0.008 m^3/s calculate the loss of head. Take coefficient of friction as 0.004636.

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FACULTY OF ENGINEERING

B.E. III - Semester (CBCS) (ECE) (Backlog) Examination, November 2021

Subject: Electronic Devices

Time: 2 Hours **Max marks: 70**

Missing data, if any, may be suitably assumed

PART – A

Note: Answer any Five questions. **(5x2=10 Marks)**

1) For a Germanium diode calculate the voltage across the diode if the forward current through it is 1mA

2) Determine the AC resistance of the Si diode for a Forward bias voltage of 0.59V, reverse saturation current is 1 ηA.

3) What is critical inductance in rectifier with LC filter, give the expression for it

4) A Half wave rectifier having an internal resistance of the diode as 100Ω and a load resistance of 1KΩ rectifies an AC voltage of 220V, Calculate the peak, average and R.M.S values of current through the rectifier

5) What is thermal run away in transistor.

6) Calculate the collector current of a CE BJT amplifier if β= 100, $I_B = 10\,\mu A,\ I_{CO} = 1\mu A.$

7) For the H-parameters of BJT in CE configuration, convert them to the respective H - parameters in CC configuration.

8) What is SCR, Draw its structure and plot its V-I characteristics

9) Draw the structure of depletion MOSFET

10) A JFET has $V_P = -4.5V, I_{DSS} = 10\,mA, I_D = 2.5\,mA$, determine the trans-Conductance.

PART - B

Note: Answer any Four questions. **(4x15=60 Marks)**

11) a) Explain the working of PN junction diode in forward and reverse bias.
   b) Derive the expression for the depletion capacitance in reverse bias of a PN junction diode.

12) Draw the circuit diagram of a Full wave rectifier and explain its operation, derive its Ripple factor, Efficiency, TUF, PIV, % Regulation.

13) a) Draw the circuit diagram of BJT in common emitter configuration and explain its input, output V-I characteristics.
   b) Design a Collector to base bias circuit to establish the Q-point at I_C = 1mA, V_{CE} = 6V. Use a transistor with β = 200 and V_{BE} = 0.65V. Given V_{CC} = 12V.

14) a) For a Common Collector amplifier with R's = 1kΩ , R'$_L$ = 5 kΩ assume the H –parameters values are h$_{ie}$ = 1.1k Ω, h$_{re}$ = 250 μ , h$_{fe}$ = 50 , h$_{oe}$ = 25 μ mhos,

   Determine the following parameters:
   i) current gain **A$_I$**   ii) input resistance **R$_I$**
   iii) voltage gain **A$_V$**   iv) output resistance R$_O$
   b) Derive the approximate Hybrid model of BJT

   ..2

15)a) Draw and explain the V-I characteristics of JFET in Common source configuration.

b) For a JFET amplifier in Common Drain configuration, derive the expressions for

  i) current gain A_I ii) input resistance R_I

  iii) voltage gain A_V iv) output resistance R_O

16)a) Define stability factor, Derive the stability factor for a self bias circuit

b) Draw the circuit of full wave rectifier with **L-C (L – section)** filter and derive the expression for its ripple factor

17) Write short notes on the following:

a) Light Emitting diode

b) Charge Coupled device

c) TRIAC

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FACULTY OF ENGINEERING

B.E. III-Semester (CBCS) (M/P) (Backlog) Examination, November 2021

Subject: Engineering Thermodynamics

Time: 2 Hours   **Max marks: 70**

Missing data, if any, may be suitably assumed

PART – A

Note: **Answer any Five questions**.   **(5x2=10 Marks)**

1 Distinguish between intensive and extensive property.
2 explain first law of thermodynamics with example.
3 is work transfer is point function / path function. Explain?
4 explain isothermal and adiabatic process.
5 Define entropy and available energy.
6 define thermal efficiency and COP.
7 what is meant by dryness fraction?
8 discuss the terms saturation temperature and saturation pressure?
9 Define mass fraction and mole fraction.
10 Sketch P-V & T-S diagrams of carnot cycle and name the processes.

PART - B

Note: Answer any Four questions.   **(4x15=60 Marks)**

11 a) Explain quasi static process.
   b) Explain constant volume gas thermometer with neat sketch.

12 a) Explain energy- a property of the system.
   b) Derive heat flow and work transfer for constant temperature (isothermal) process with P-V diagram for non-flow process.

13 a) State and prove equivalence of Kelvin-Plank and Clausius statement.
   b) A reversible heat engine delivers 0.6 kW power and rejects heat energy to a reservoir at 300K at the rate of 24 KJ/min. Make calculations for the energy efficiency and the temperature of the thermal reservoir supplying heat to the engine.

14 a) Explain Moiller diagram.
   b) Explain P-V-T surface diagram.

15 a) An air standard Otto cycle is designed to operate with the following data:
      Maximum cycle pressure and temperature: 5 MPa and 2250 K.
      Minimum cycle pressure and temperature:0.1 MPa and 300 K.
      Determine the net work output per unit mass of working fluid and thermal efficiency.
   b) Distinguish between Otto cycle and diesel cycle.

16 a) Explain Maxwell relations.
   b) Explain Amagat-Leduc law of partial volumes?

17 a) Explain PMM-1 and PMM-2 with schematic diagrams.
   b) Define Zeroth law of thermodynamics and give examples?

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FACULTY OF ENGINEERING
B.E. III - Semester (AE) (CBCS) (Backlog) Examination, November 2021

Subject: Automotive Electrical & Electronics Engineering

Time: 2 Hours   Max. Marks: 70

Note: Missing data, if any, may be suitably assumed.

PART – A
Answer any five questions.   **(5x2 = 10 Marks)**

1 What is the specific gravity of batteries?
2 What is earth return system?
3 Starter motor takes ____ current due to ____ torque.
4 Draw the electrical characteristics of a series motor.
5 What is armature reaction?
6 What is the purpose of voltage and current regulator?
7 Name various sensors used for pressure measurement.
8 What is electromagnetic compatibility?
9 Name some security and warning systems.
10 What are the significant features of 8085?

PART – B
Answer any four questions.   **(4x15 = 60 Marks)**

11 With a neat sketch explain the working and functioning of a battery charging system.

12 Write short note on
   (a) Construction of Lead acid battery
   (b) Maintenance and charging of a battery.

13 Write short note on
   (a) Condition at starting
   (b) Bendix drive.

14 Write a short note on
   (a) DC shunt generator characteristics
   (b) Third brush regulation.

15 Discuss in detail current trends in automotive electronic engine management system.

16 With a neat sketch explain basic functional block diagram of a microprocessor and its applications in automobiles.

17 Write a short note on
   (a) Sensors used for temperature measurement.
   (b) Constructional aspects of bridge rectifier.

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FACULTY OF ENGINEERING
B.E. (CSE) III-Semester (CBCS) (Backlog)Examination, November 2021

Subject: Data Structures

Time: 2 hours   **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1. What is meant by time complexity and space complexity?
2. Explain LL and LR rotation to balance the AVL tree with an example.
3. How to implement a stack using queue?
4. Sort the following set of numbers using Bubble Sort Technique.
   25, 67, 53, 11, 89, 57,75, 33
5. What is a data structure? List down any four applications of data structures.
6. What is hash function? List few hash functions.
7. Compare and contrast DFS and BFS.
8. Give the best, average and worst caste time complexities of Insertion and Quick sort.
9. What is a circular linked list?
10. What are the disadvantages of implementing queues using arrays?

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) Explain in detail about insertion or deletion of elements in the doubly linked list.
    (b) Illustrate the deletion operation for linked list writing a suitable example.

12. (a) Explain in detail about the operation of queue with a suitable example.
    (b) Evaluate the following prefix expression "+ +26 + - 1324" .

13. (a) Write an algorithm to delete a node from a binary search tree.
    (b) Create AVL tree by inserting the following numbers in the order in which they are given 40, 30, 20, 60, 50, 80,15, 28, 25. Draw figures in each step.

14. (a) Explain the Krusal's algorithm.
    (b) Explain the representation of graph using adjacency matrix and adjacency list.

15. Illustrate an Algorithm for infix to postfix conversion.

16. (a) Sort the following array using insertion sort
    25, 30, 66, 99, 54, 28, 13, 58
    (b) Differentiate between Binary tree and AVL tree.

17. Write short notes on the following:
    (a) Heap Sort
    (b) Sparse Matrix
    (c) Arrays

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FACULTY OF ENGINEERING

B.E. III – Semester (IT) (CBCS) (Backlog) Examination, November 2021

Subject: Data Structures

Time: 2 hours   **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1   Define time complexity and space complexity of an algorithm.
2   What are the different types of linked lists?
3   What are the different binary tree traversals?
4   What is the advantage of using templates in C++?
5   Evaluate the postfix expression xyz *+ where x=2, y=3 and z=4 and show the stack contents while evaluation.
6   What are the advantages of linked list implementation of a stack over the linear implementation?
7   Define a sparse matrix and give an example.
8   Explain the splay tree operations.
9   Define a hash function.
10 Differentiate internal and external sorting.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 a) Write a C++ program to implement linked stack.
   b) Explain the different representations of graphs.

12   Write algorithms for insertion and deletion into a binary search tree, explain with example.

13 a) Explain how stack is used to convert the following infix expression to postfix,
                    a +b * c + (d * e + f) * g
   b) Write the prims algorithm for finding a minimal spanning tree.

14 a) Write an algorithm to implement queue using linked lists.
   b) Show the result of inserting the following elements into an initially empty AVL tree.
                    2, 1, 4, 5, 9, 3, 6, 7
15   Write C++ function for quick sort and trace the algorithms for the following elements.
                    44, 12, 34, 1, 12, 10, 77, 9, 166, 18
16 a) Define a B-tree, describe how insertion and deletion operations are carried out in a B-tree.
   b) Define a heap. Create a max heap with the following keys.
                    2, 14, 3, 12, 15, 10

17 Write short notes on the following:
   a) Threaded binary trees
   b) Applications of stacks
   c) Tree traversal techniques

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FACULTY OF ENGINEERING
B.E. III - Semester (CE/EE/EIE) (AICTE) (Backlog) Examination, November 2021

Subject: Industrial Psychology

Time: 2 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer any five questions.   **(5x2 = 10 Marks)**

1   Define "Industrial Engineering".
2   List the main theories of ORGANIZATIONS.
3   List the various MOTIVATING factors for an industrial worker.
4   Who is an internal candidate and an external candidate?
5   List methods of Advertisement presently available.
6   How is consumer preference identified for a product?
7   What is WORK CURVE?
8   List factors which can effect workers capabilities in an Industry.
9   List 4 causes for Accidents.
10 Does accidents have a COST associated with it? Name 2 costs.

PART – B
Note: Answer any four questions.   **(4x15 = 60 Marks)**

11 (a) List the historical developments in industrial engineering.
   (b) What are the MAIN departments in any industry? Explain their functions in brief.

12 (a) What are the main principles of an Organization?
   (b) Bring out the characteristics of each theory of an organization.

13 (a) How many TYPEs of Organizations are there? Compare a LINE organization
        Versus STAFF organization.
   (b) What does an ORGANIZATIONAL CHART indicate? Draw the organizational
        chart of your institution and indicate the hierarchy.

14 Assume that you are the manufacturer of "SMART ALEX" brand of Calculators.
   How would you make the product likable in the market?

15 (a) What do you understand by the terms "Efficiency at WORK", "Fatigue" and
        "Boredom"?
   (b) What are the factors which effect the performance of a worker in an industry?
        How does NOISE and ILLUMINATION affect the outcome?

16 (a) How is a JOB evaluated on the shop floor? Describe the Time Study and Motion
        Study methods.
   (b) What are ALLOWANCES? How many types of allowances are there?

17 Write short notes on:
   (a) Human and Economic Costs of an accident
   (b) ERGONOMICS in industry
   (c) Methods to prevent Accidents in Industry
   (d) Job enrichment and Job rotation.

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FACULTY OF ENGINEERING
B.E. (ECE/M/P/AE/I.T) III-Semester (AICTE) (Backlog) Examination, November 2021

Subject: Finance and Accounting

Time: 2 hours   Max. Marks: 70

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1 What is Ledger posting?

2 What do you mean by Trial balance error?

3 Distinguish between Gross profit and Net profit.

4 Distinguish between Capital expenditure and Revenue expenditure.

5 Define Money market.

6 What are the segments of financial markets?

7 Recall the decision criteria of NPV.

8 State the formula of payback.

9 What is Long term solvency ratio?

10 State the formula of Operating profit ratio.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 Explain the concepts and conventions of Accountancy.

12 Prepare a Bank Reconciliation Statement as on 31st December, 2003, from the following information:

  (a) Balance as per Pass Book (Credit Balance) Rs. 20,000

  (b) Cheques drawn, but not cashed at Bank Rs. 3,000

  (c) Cheques deposited in Bank, but not shown in the Pass Book Rs. 2,250

  (d) Dividend of Rs. 2000 collected by Bank directly on 30.12.2003 was not recorded in Cash Book.

  (e) Cheque amounting to Rs. 600 was deposited in Bank but it was recorded in the debit side of the Pass Book.

  (f) Bank charges recorded twice in Cash Book Rs. 50

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13 Prepare final accounts from the following information:

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
Purchases	15,000	Loan	35,000
Sales returns	500	Creditors	25,000
Bad debts	500	Capital	1,50,000
Carriage inwards	1,000	Bills payable	6,000
Salaries	5,000	Commission	2,000
Rent	4,000		
Furniture	10,000		
Plant and machinery	1,60,000		
Opening stock	20,000		
Debtors	2,000		
	2,18,000		2,18,000

Adjustment :
(i) Closing stock Rs. 5,000
(ii) Outstanding Rent Rs. 2,000
(iii) Advance receipt of commission Rs. 500
(iv) Provide depreciation on furniture @ 5%

14 Elaborate the concept of financial intermediation by giving examples.

15 There are the three projects A, B, C. The cost of the project is Rs. 20,000 in each case. The cash inflows are as follows:

Year	Project – A	Project – B	Project – C
1	5000	8000	6000
2	5000	6000	4000
3	5000	4000	5000
4	5000	2000	5000
5	5000	1000	2000

Calculate payback of each project and compare the results.

16 What are the regulations governing the money market mutual funds?

17 Explain the meaning, objective and computation of Activity / turnover ratios in detail.

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FACULTY OF ENGINEERING

B. E. (CSE) (AICTE) III – Semester (Backlog) Examination, November 2021
Subject: Data Structures & Algorithm

Time: 2 hours   **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1. Define Omega (Ω) asymptotic notation.
2. How friend function is different from a member function?
3. What are the applications of stack?
4. What is copy constructor? Give its syntax.
5. Write down the code snippet to count the number of nodes in a single linked list.
6. What is template? Give syntax for function template.
7. List out different access specifiers that can be used in a class and their effect.
8. How do you test for a circular queve full or not?
9. What is the advantage of circular linked list over single linked list?
10. Explain LL and LR rotations to balance the AVL tree with an example.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) Write a c++ program to overload '+' operator.

    (b) Explain different parameter passing techniques with suitable examples.

12. (a) Convert the given infix expression into postfix expression and explain the representation of stacks used for conversion.
    $A \wedge B * C – D + E / (F + (G + H))$

    (b) Write c++ functions for the following operations on 'queve' using linked list representation (i) Push (insert) (ii) POP(remove)

13. What is a binary search tree? Construct a BST for the following sequence of numbers.
    55, 36, 70, 23, 89, 100, 58, 39, 41, 60, 65, 25.
    Write preorder, in order and post order traversals of this tree.

14. (a) Explain different hash functions.

    (b) Write Prim's algorithm to construct minimum cost spanning tree.

15. (a) Sort the following numbers, using Merge Sort. Write the status of list at the end of each phase.
    12, 2, 16, 30, 8, 28, 4, 10, 20, 6, 18.

    (b) What is a weighed graph? Give an example.

16. (a) Write down differences between single linked list and double linked list.

    (b) Write c++ code to perform insert, index of operations on circular linked list.

17. Write short notes on:
    (a) Inheritance and its types.
    (b) c++ code snippet to reverse a single linked list.
    (c) Full and complete binary tree.

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FACULTY OF ENGINEERING
B.E. III - Semester (CME) (AICTE) (Backlog) Examination, November 2021

Subject: Logic and Switching Theory

Time: 2 Hours **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer any five questions. **(5x2 = 10 Marks)**

1 Define Minterms and Maxterms.
2 Realize the AND Gate functionality using NOR-Gates only.
3 Simplify the Boolean Function using theorems $F = (x + \overline{x}y)\,[(xz + x\overline{z})\,(y + \overline{y})]$.
4 Write the VHDL code to design 2-bit counter.
5 Design the Single output and Multiple output Logic circuit using Logical Gates.
6 Realize the Half-Adder using Basic gates.
7 Differentiate between the Mealy machine and Moore Machine.
8 Design 3x8 line decoder with AND Gates.
9 Explain about Ripple Carry Adder.
10 Differences between Synchronous counter and Asynchronous Counters.

PART – B
Note: Answer any four questions. **(4x15 = 60 Marks)**

11 Minimize the following function using K-Map method
   F(A,B,C,D)=Σm(1,4,5,7,8,9,12,14)+dm(0,3,6,10).

12 (a) Determine the minimal sum of products expression for
       F(W,X,Y,Z)= Σm(0,2,4,9,12,15).
   (b)Find the minimal product of sum expression for
       F(W,X,Y,Z)=ΠM(0,1,2,3,4,5,6,7,9,11).

13 Simplify the Boolean Function by using Tabulation method
       F(A,B,C,D,E)= Σ (0,12,8,10,11,14,15).

14 (a) Realize Full-Adder and draw the circuit diagram using NAND gates.
   (b) Draw the logic diagram of 4x1 Multiplexer with common selection input's and
       common Enable input.

15 Design Various types of Flip-Flops and their Characteristic tables and Excitation
   tables.

16 (a) Design state table and state transition diagram with suitable example.
   (b) Design a 3-bit binary up Counters.

17 Write short notes on:
   (a) Adders
   (b) Encoder and priority Encoders
   (c) Decoders.

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