Code No. 2520/CBCS

FACULTY OF ENGINEERING

B.E. III Semester (CBCS)(Civil) (Backlog) Examination, December 2019

Subject: Fluid Mechanics-I

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

Note: Answer all questions from Part-A & any five questions from Part-B

PART – A (10 x 2 = 20 Marks)

1 Distinguish between isothermal and adiabatic processes and state the governing equations.
2 What is meant by stagnation point and stagnation pressure?
3 What is the discharge through a mouthpiece of diameter 25 mm under a head of 80 cm. Assume a suitable value for the coefficient of discharge.
4 Explain the equilibrium of forces in the functioning of a rotameter.
5 State any two limitations of the Bernoulli's equation $\frac{p}{\gamma} + z + \frac{v^2}{2g} = H$
6 If V= $(2x^2+y^2)i$ - 4xyj, check whether the continuity equation for incompressible 2D flow is satisfied.
7 Why is ideal fluid flow irrotational?
8 Give two practical examples of two dimensional steady non-uniform flow.
9 What is the capillary rise of water in a 2 mm diameter tube if the surface tension of water is 0.075 N/m.
10 Differentiate between a perfect gas and an ideal gas.

PART – B (5 x 10 = 50 Marks)

11. a) Explain the terms density and specific weight, density and specific volume, dynamic and kinematic viscosity, bulk modulus and compressibility?
b) A cylindrical barrier of diameter 2.0 m and width 3.0 m retains water on both sides with water surface elevations of 1.5 m and 0.5 m above the lowest point of the barrier, respectively. Calculate the resultant hydrostatic force on the barrier.

12. a) Prove that for a stream tube bound by stream lines ψ_1 and ψ_2, the discharge $Q = \cdot_1 - \cdot_2$
b) Given the stream function ψ = 3xy, determine the corresponding velocity potential function. Also, estimate the discharge, per unit width, in the z-direction passing between the streamlines through the points (1,3) and (3,3).

13. a) Distinguish between convective and local acceleration. Which among these are zero and non-zero for the various combinations of temporal and spatial variations of velocity?
b) Derive the Euler's equation of motion along a streamline.

14. a) Starting from the Euler's Equation of motion for ideal fluid flow along a streamline, derive the Bernoulli's equation through integration and state the constraints explicitly.

….2

b) A 15 cm diameter pipe is reduced to 7.5 cm diameter through a gradual contraction. At this contraction the difference between piezometric heads at the main and the contracted section is 4 cm of mercury. By neglecting losses, calculate the discharge of water.

15. a) Bring out the difference between forced vortex and free vortex. Give examples for each of them.

b) A 40 cm diameter cylindrical tank is 35 cm high and is open at the top. Initially it contains water to a depth of 20 cm. If the tank is rotated about its vertical axis at 120 rpm, calculate the amount of water spilled out.

16. a) Why is the coefficient of discharge of mouthpiece higher than that of an orifice?

b) A closed tank contains kerosene of specific gravity 0.8. to a depth of 2.5 m. The top portion of the tank contains air under pressure of 25 KPa. If a sharp edged circular orifice of diameter 3 cm and C_d = 0.61 is provided at the bottom of the tank, estimate the discharge through the orifice.

17. a) Derive the expression for Mach cone angle.

b) An airplane is moving in an atmosphere with pressure p = 44 KPa absolute and density of 0.63 Kg/m^3. A pitot tube on the plane records the stagnation pressure of 70 KPa absolute. Estimate the speed of the airplane and the stagnation temperature is $K = 1.4$ and R = 287 J/(Kg^o K)

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Code No.2528/CBCS

FACULTY OF ENGINEERING

B.E. III-Semester (CBCS) (EE/Inst.) (Backlog) Examination, December 2019

Subject: ELECTROMAGNETIC FIELDS

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

PART – A (20 Marks)

Note: Answer all questions from Part- A & any five questions from Part-B.

1. Define Potential and potential gradient. [2]
2. Define Gauss's law and divergence theorem [2]
3. Write Poisson's and Laplace equations. [2]
4. State Uniqueness theorem and write its equation. [2]
5. State Faraday's laws of electromagnetic induction. [2]
6. Show the analogy between electrical and magnetic circuits. [2]
7. Write the Maxwell's equations in integral form. [2]
8. Describe potential function for static field. [2]
9. Describe the uniform plane wave propagation. [2]
10. Describe reflection of uniform plane waves. [2]

PART – B (50 Marks)

11. (a) Define work done and electric potential. Show that the electric field intensity is negative Gradient of potential. [5]
    (b) Find the value of electric field intensity at any point along the axis of a uniformly charged disc. [5]

12. (a) What is an electric dipole and dipole moment? Derive an expression for torque experienced by an electric dipole. [5]
    (b) A parallel plate capacitor has conducting plates of area equal to 0.04 m^2. The plates are separated by a dielectric material whose Єr = 2 with the plate separation of 1cm. Find its capacitance value. [5]

13. (a) Using ampere's circuital law, find MFI due to an infinite sheet of current. [5]
    (b) A steady current of I amperes flow in a circular bent in the form of square loop of side 'a'. Find the MFI (H) at the center of the loop. [5]

14. (a) Explain the concept of scalar and vector magnetic potentials. [5]
    (b) Derive the expression for energy stored and energy density in a magnetic field. [5]

15. (a) What happens when an EM wave passes from one linear/homogeneous/isotropic medium into plastic; etc..? [5]
    (b) What fraction of the incident EM wave energy is reflected back from the interface @ z = 0? [5]

16. (a) A uniform line of charge ρl = 2.5 μC/m lies along the z-axis and a circular cylinder of radius 3m has a surface charge density of ρs = -0.12 μC/m2, both the distributions are infinite in extent. with respect to z-axis. Using Gauss's law, find *D* in all regions. The region is free space. [5]
    (b) A steady current of 10 A is established in a long straight hollow aluminum conductor having Inner and outer radius of 1.5 cm and 3 cm respectively. Find the value of B as function of radius. [5]

17. (a) Derive the boundary conditions of two dielectric media. [5]
    (b) Explain about equation of continuity in electrostatic fields. [5]

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Code No. 2534/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) III-Semester (CBCS)(Backlog) Examination, December 2019

Subject : Switching Theory and Logic Design

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 Write the binary and octal equivalent of the hexadecimal number "A5C". 2

2 Applying DeMorgan's theorem to the following expressions and write the resultant expression 2
i) ((X+Y)'+Z')' =?
ii) ((W+X+Y)Z)'=?

3 Convert the following Canonical SOP expression to an equivalent Canonical POS expression. 2
F(A,B,C) = ABC+AB'C'+AB'C+ABC'+A'B'C

4 Design a single bit digital comparator circuit. 2

5 Bring out the comparison of combinational and sequential circuits. 2

6 Define a multiplexer and list its important applications. 2

7 Draw the diagram of a 2:4 Decoder. What is the relation between a decoder and a De-mux? 2

8 Draw the circuit diagram of SR FF and derive the characteristic equation. 2

9 If the propagation delay of each flip-flop is 50ns, AND gate is 20ns, for a MOD – 8 counter calculate the maximum frequency that can be given for its reliable operation for (i) Synchronous counter(ii) Asynchronous counter 2

10 What are the applications of shift registers? 2

PART – B (50 Marks)

11 (a) Express the following function as a sum of minterms and also as a product of Maxterms. F(A,B,C,D) = B'D+A'D+BD 5
(b) Use Karnaugh maps to find the minimum-cost SOP and POS expressions for the function F(A,B,C,D)=∑(0,2,5,7,8,10,13,15) 5

12 Use the Quine Mcklusky's Tabular method to simplify the following function: f(A,B,C,D)=∑m(0,2,3,6,7,8,10,12,13) +d(4,11). 10

13 (a) Implement 8 : 1 mux using 4 : 1 muxes and minimum extra logic. 5
(b) Design a full adder circuit, and implement it with minimum number of 2-input NAND gates. 5

..2

14 (a) Why does is Race Around condition occur in J-K Flip-Flops? Give one solution to overcome it. Draw the circuit diagram of MASTER – SLAVE JK flip flop and explain its operation. 5

(b) Convert S-R Flip-Flop to a J-K Flip-Flop. Show all design steps. 5

15 Design a Modulo-8 up/down counter using J-K FFs. Show the state diagram, state table, excitation equations, implementation, and timing diagram. 10

16 (a) Design and explain with a neat block diagram the operation of a 4 bit BCD adder using 4-bit binary adder IC and minimum extra logic. 5

(b) Design a 4:2 priority encoder. Why is priority encoder used instead of a simple encoder? 5

17 Write short notes on any **two** of the following:

(a) What are static hazards? Illustrate with one example how a circuit can become a hazard-free circuit? 5

(b) Design a Mod-6 counter using IC 7490. 5

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Code No. 2538/CBCS

FACULTY OF ENGINEERING

B.E. (M/P) III – Semester (CBCS) (Backlog) Examination, December 2019

Subject: Fluid Mechanics

Time: 3 hours **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1. Define dynamic and kinematic viscosity. 2
2. If specific gravity of oil is 0.76, find density and specific weight. 2
3. A stream function is given by $\Psi = 3x^2-y^3$. Determine the y-component of velocity at point (2,1). 2
4. A pitot static tube is to measure the velocity of water in a pipe. The stagnation pressure head is 6m and the static pressure head is 5m. Calculate the velocity of flow assuming the coefficient of the tube equal to 0.98. 2
5. Which is more efficient of venturimeter and orificemeter and why? 2
6. Differentiate form drag and friction drag. 2
7. Define Mach number and classify the types of flows based on it. 2
8. Define streamline and streakline. 2
9. Find the discharge of water flowing over rectangular notch of 2m length when the constant head over the notch is 300mm. Take $C_d = 0.6$. 2
10. Define zone of silence and zone of action. 2

PART – B (50 Marks)

11. (a) Explain stream function and velocity potential function. Show that the stream lines and velocity potential lines are perpendicular to each other. 5

    (b) A cylinder of 100mm diameter and length 300mm rotates about a vertical axis inside a fixed cylindrical tube of 105mm diameter and length 300mm. If the space between the tube and the cylinder is filled with liquid of dynamic viscosity of 0.125 N-s/m^2, determine the speed of rotation of the cylinder which will be obtained if an external torque of 1Nm is applied to it. 5

12. (a) Derive the Bernoulli's equation and also state the assumptions made in its derivation. 5

    (b) A pipe bend tapers from a diameter of 500mm at inlet to 250mm at outlet and turns through 45^0 in the horizontal plane. The pressure at inlet is 40 KPa. If the pipe is conveying oil of specific gravity 0.85, find the magnitude and direction of the resultant force on the bend, when the oil flow rate is 450 l/s. 5

13. (a) Explain the construction details and working of a venturimeter used for measuring the discharge through a pipe with the help of a figure. 5

…..2

(b) Water is flowing through a pipe having diameters 30cm and 20cm at the bottom and upper end respectively. The intensity of pressure at the bottom and the upper end is 24.525 N/cm^2 and 9.81 N/cm^2 respectively. Find the difference in datum head if the rate of flow through the pipe is 50 liters/sec. 5

14. (a) Derive the expression for Darcy's Weisbach equation for the loss of head due to friction in a pipe. 5

(b) A smooth pipe 12 cm in diameter and 1000 mts long carries water at the rate of 7.2 lts/sec. If the kinematic viscosity of water is 0.02 stoke, calculate the head lost, wall shearing stress, center line velocity, shear stress and velocity at 4 cm from the center line. 5

15. (a) Explain the phenomenon of boundary layer separation on a curved plate. 5

(b) A flat plate 1.2m x 1.2m moves at 60 km/hr in a stationary air of density 1.15 kg/m^3. If the coefficient of drag and lift are 0.15 and 0.75 respectively, determine (i) drag force (ii) lift force (iii) resultant force (iv) power required to keep the plate in motion. 5

16. (a) Obtain the expressions for the stagnation pressure and stagnation density in term of Mach number. 5

(b) Calculate the Mach number and Mach angle at a point on a jet propelled aircraft, which is flying at 1100 Km/hr at sea level where temperature is 28^{0}C. Take k = 1.4 and R = 287 J/Kg K. 5

17. Write short notes on the following: 10

(a) Rotational and Irrotational flow.

(b) Bourdon's pressure gauge.

(c) Reynolds Experiment.

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Code No: 2543/CBCS

FACULTY OF ENGINEERING

B.E. III Semester (AE)(CBCS) (Backlog) Examination, December 2019

Subject: Automotive Engineering Drawing

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

Note: Answer all questions from Part A & Part B.

PART – A (4 x 5 =20Marks)

1. Explain the following, indicating the symbol to be used in each case:
   (a) First angel projection
   (b) Third angel projection
2. Draw the sectional front view and top view of a double riveted lap joint for 10 mm thick plates.
3. State different types of sunk keys and sketch the sunk key with gib head.
4. Sketch front view, side view and top view of the component given in figure.1

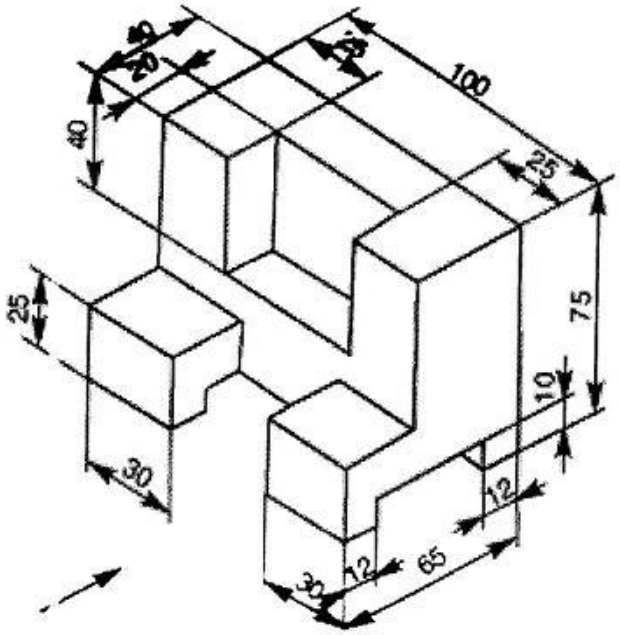


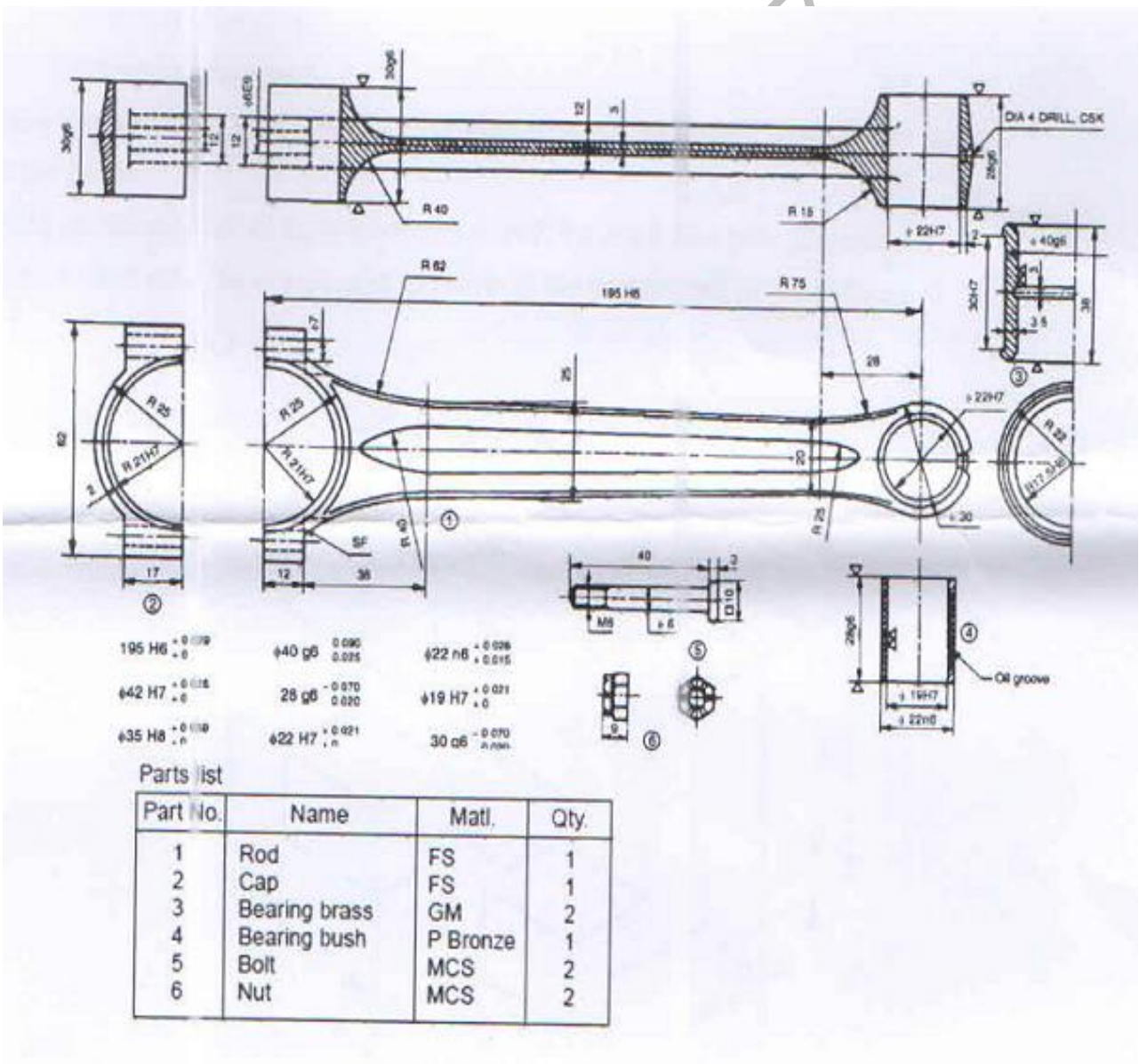
Figure 1

Contd…2…

PART – B (50 Marks)

5. Assemble the parts of the piston, shown in Fig. 2 to form connecting rod assembly and draw.
   (a) Full sectional front view and (25 marks)

(b) top view (25 marks)



Parts list

Part No.	Name	Matl.	Qty.
1	Rod	FS	1
2	Cap	FS	1
3	Bearing brass	GM	2
4	Bearing bush	P Bronze	1
5	Bolt	MCS	2
6	Nut	MCS	2

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Code No. 2546/CBCS

FACULTY OF ENGINEERING

B. E. III Semester (CBCS) (CSE) (Backlog) Examination, December 2019

Subject: Logic and Switching Theory

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

PART–A (20 Marks)

1 Simplify the following Boolean Expression to a minimum number of Literals. (2)
   i. ABC + AB$\bar{C}$ + A $\bar{B}$
   ii. ($\overline{A + B}$) . ($\bar{A}$ + $\bar{B}$)

2 Obtain the truth table of the following Boolean Function. (2)
   F= (($\bar{A}$ + $\bar{B}$)($\bar{B}$ + C)

3 Differentiate between Combinational and Sequential Circuits. (2)

4 Construct a NOT gate using Exclusive OR gate. (2)

5 Distinguish between Decoder and Demultiplexer. (2)

6 Draw the Full Adder circuit using two half Adders and other logic gates. (2)

7 Write about PAL and PLA. (2)

8 Design a D type flip – flop using JK flip flop. (2)

9 What is a State Table, Give example? (2)

10 What is PROM? (2)

PART – B (50 Marks)

11 i) Simplify the Boolean Function to a minimum number of literals
   XY + $\bar{X}$ Z + Y Z
   A B C + $\bar{A}$ B + A B $\bar{C}$ (5)
   ii) Express the complement of the function given in sum of min terms and draw the logic diagram
   F (X, Y, Z) = ∑m(0, 3, 6, 7). (5)

12 Using Tabulation method, generate set of Prime Implicants and obtain minimal expression for the function
   F (W, X, Y, Z) = ∑m(0, 1, 4, 5, 6, 7, 9, 11, 15). (10)

13 Design 4-bit carry look ahead Adder and draw the circuit. (10)

14 Minimize using K- Maps
   F (A,B,C,D,E)= ∑m (0,2,3,4,5,6,7,11,15,16,18,19,23,27,31). (10)

15 a) Explain with suitable examples, Why NAND and NOR gates are called Universal gates. (5)
   b) Differentiate between Mealy and Moore Machines. (5)

16 Design a B C D – to – 7 Segment Decoder and Realize with a minimum number of gates. (10)

17 a) Design a mod– 12 Synchronous Counter using JK FF. (7)
   b) State De-Morgan's Law. (3)

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Code No. 2551 / CBCS

FACULTY OF ENGINEERING

B.E. (I.T) III – Semester (CBCS) (Backlog) Examination, December 2019

Subject: Environmental Studies

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

Note: Answer all questions from Part-A and any five questions from Part-B

PART – A (10x2 = 20 Marks)

1 Explain the terms famine and environment

2 What are renewable and non-renewable resources?

3 Distinguish between the terms endangered and vulnerable species

4 What is the impact of excessive usage of pesticides and fertilizers?

5 Define the term biological oxygen demand

6 What is meant by endemic species?

7 What are the causes of biodiversity loss?

8 What is global warming?

9 What is water shed management?

10 What are the affects of landslides?

PART – B (5x10 = 50 Marks)

11	a)	Explain the various types of ecological pyramids.	5
	b)	What are food webs and food chains?	5
12	a)	Explain the various types of ecological pyramids.	5
	b)	Write about the structure and characteristics of Ocean Ecosystem.	5
13	a)	Illustrate briefly about the biographical classification of Indices	5
	b)	Explain in detail about genetic biodiversity and species biodiversity.	5
14	a)	What are the penalties for violating provisions in the water Act?	6
	b)	Write the treatment measures of drainage line.	4
15	a)	What are the issues involved in enforcement of Wildlife Protection Act 1972?	5
	b)	Write briefly about thermal pollution.	5
16	a)	Discuss the significance of Environmental Ethics.	5
	b)	What are the mitigation measures of earthquakes?	5
17	a)	Write short notes on Acid Rain and its effects.	5
	b)	State the features of Hot Spots of Biodiversity.	5

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Code No: 2011

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I-Semester (Backlog) Examination, December 2019

Subject: Building Planning and Drawing

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A & answer any five questions from Part-B.

PART – A (25 Marks)

1) Draw the conventional sign for sand and plaster (3)
2) Differentiate between English bond and Flemish bond. (2)
3) Draw the isometric view of a queen closer. (3)
4) Draw the isolated footing of ashlar fine masonary. (2)
5) Draw a line diagram of compound fink truss of 10 m span. (3)
6) Sketch the elevation of a glazed window? (2)
7) List the various type of footings. (3)
8) What you mean by baluster and balustrade in staircase? (2)
9) What are the important aspects of building? (3)
10) What are the principles of building planning? (2)

PART – B (5 x 10 = 50 Marks)

11. Draw the plan and isometric view of wall junction for one and a half brick wall in English bond. Draw minimum 4 layers. (10)

12. Draw front elevation and sectional elevation of a paneled door and glazed door of 1.2m x 2.1m to a scale of 1: 50. (10)

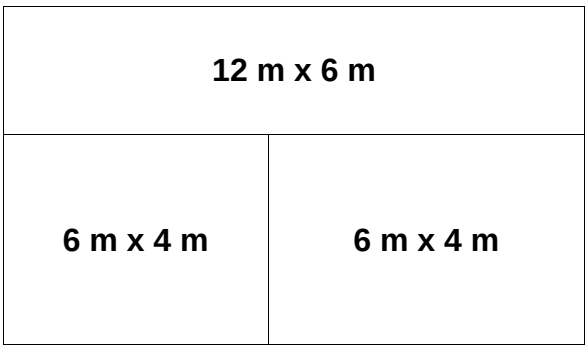
13. Draw the plan and elevation of isolated RCC column stepped footing of a foundation in a residential building. (10)

14. Draw the front and sectional elevation of a open well staircase in a residential block to reach a floor height of 3.1m. (10)

15. Draw the plan and elevation of a isolated RCC column stepped footing of a foundation in a residential building. (10)

16. What are the steps involved in developing the line diagram of a building. (10)

17. The line diagram of a building is shown in the figure below. Draw plan and sectional elevation to a scale of 1 : 50 and locate doors and windows . Take thickness of wall as 300mm. (10)



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Code No. 2016

FACULTY OF ENGINEERING

B.E. 2/4 (EEE/Inst.) I-Semester (Backlog) Examination, December 2019

Subject: Electronic Engineering - I

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A & any five questions from Part - B

PART - A (25 Marks)

1. A Silicon diode has reverse saturation current of 2.5 μA at 300K. Find forward voltage for a forward current of 10mA (2M)
2. What is an ideal diode? How can it be represented as a switch? Draw its characteristics (3M)
3. Give the importance of filters in rectifier circuits. (3M)
4. What is the effect of PIV of a silicon diode (2M)
5. Explain Early effect in a BJT (3M)
6. Distinguish between DC and AC load lines of a BJT (2M)
7. List out the salient features of low frequency BJT Amplifier circuits? (2M)
8. What do you mean by the holding current and latch current of an SCR? (3M)
9. Explain what is pinch-off voltage in a FET. (2M)
10. List the advantages of MOSFET over JFET? (3M)

PART - B (5x10 = 50 Marks)

11 a) Explain the V-I characteristics of a p-n junction diode using the current equation. (6M)

b) Differences between Avalanche Breakdown and Zener Breakdown (4M)

12 A Centre-tapped transformer has a 220 V primary winding and a secondary winding rated at 12-0-12 V and is used in a full wave rectifier circuit with a load of 100Ω. What is the DC output voltage, DC load current and the PIV rating required for diodes? (10M)

13 a) Define various stability factors in Biasing circuits (3M)

b) Design a biasing circuit for a Si transistor in CE configuration with β = 50, V_{BE} = 0.6 V, V_{CC} = 24V and collector resistance R_C = 5.6KΩ, design to establish a Q-point at V_{CE} = 12 V, I_C = 1.5 mA and a stability factor S ≤ 3 (7M)

14 a) What are h-parameters and what is their significance? Obtain h-parameter Equivalent circuit of a BJT (5M)

b) Explain the operation of SCR and Forward breakover voltage of SCR (5M)

15 a) Define various FET parameters and obtain the relationship between them (5M)

b) Explain the operation of Depletion mode MOSFET (5M)

16 a) Draw the equivalent circuit and characteristics of a Photo diode and explain its operation (5M)

b) Draw the block diagram of Cathode Ray Oscilloscope and explain its principle of operation? (5M)

17 Write short notes on any two of the following (10M)

a) LC and CLC Filter

b) TRIAC

c) Biasing of JFET

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Code No. 2024

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I-Semester (Backlog) Examination December 2019

Subject : Electromagnetic Theory

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B

PART-A (2.5 X 10 = 25 Marks)

1. State and prove Coulombs Law for n-point charges? $2^{1/2}$
2. The potential function in an electric field is given by V = exp $\overline{e}^{\,z/xy}$ Volts. Find the electric field intensity at P(1,2,2.5) mts. $2^{1/2}$
3. State Divergence Theorem? $2^{1/2}$
4. Obtain relation between Electrostatic Force and Energy? $2^{1/2}$
5. Define Biot - Savart's Law? What are the limitations? $2^{1/2}$
6. Define Vector & Scalar Magnetic Potentials? $2^{1/2}$
7. Describe Maxwell's equations in point form and Integral form? $2^{1/2}$
8. State and Prove Poisons and Laplace equations? $2^{1/2}$
9. Describe the concept of Polarization? $2^{1/2}$
10. State and prove Poynting theorem ? $2^{1/2}$

Part - B(5x10 = 50 Marks)

11. a. A Line Charge is located in air has its axis along z-direction of cylindrical coordinates. The Line Charge density of the line is 0.5μC/mt. Find the work done in moving a point charge of 0.8μC/mt. from r = 5mts. to r = 2mts. 5
    b. Derive an expression for Divergence of Electric flux Density? 5

12. a. Derive an expression for Capacitance of two concentric spheres? 4
    b. A Capacitor consisting of two concentric spherical shells of radii 10cm and 12 cm and separated by a dielectric medium of relative permittivity 2.5. Find the Capacitance and energy stored in the capacitor if the potential difference between the spheres is 1000volts.Find the maximum and minimum values of Potential gradient? 6

13. a. State and prove Magnetic Boundary conditions? 5
    b. Show that Magneticfield intensity inside a Long straight circular wire of radius 'a' , and carrying uniform distributed current I is given by $\overline{H}\left(\frac{Ir}{2® a^3}\right)$û¤ . 5

14. a. Define displacement current and derive expression for it? 4
    b. In a material for which σ = 6Simens/mt. and ϵ_r =1; the electric field intensity is E = 300 Sin(10^{10}) t Volts/mt. Determine the Conduction and displacement current densities and frequency at which they have equal magnitudes? 6

15. a. State and prove Poynting theorem and give two applications ? 6
    b. Define Critical angle of Incidence and total reflection , derive expressions too? 4

16. a. Derive an expression for free space wave equation? 5
    b. Show that Intrinsic Impedance of free space is 377ohms. 5

17. Write short notes on the following: 10
    a. State and prove Stokes Theorem?
    b. Magnetic flux density and Magnetic flux?
    c. Electrostatic Boundary Conditions?

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Code No. 2028

FACULTY OF ENGINEERING

B.E 2/4 (M/P/AE) I Semester (Backlog) Examination, December 2019

Subject: Mechanics of Materials

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part A, & any five questions from Part B

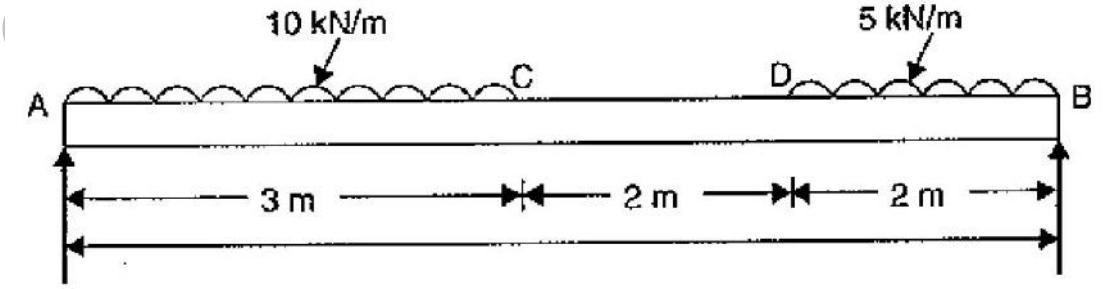
PART – A (25 Marks)

1 State and explain Hooke's law. [2]
2 What is the relationship between three elastic constants? [3]
3 What are the various loads acting on a beam? [2]
4 A cantilever beam of length 2m carries a point load of 2KN at its free end and another load of 3KN at distance of 1.5m from the fixed end. Draw the Shear force and Bending moment diagram. [3]
5 Define spring? What are the various types of springs? [2]
6 Find the torque transmitted by a shaft of 100 mm diameter and 2m length, if the maximum angle of twist is not to exceed 1.5^0. Take Modulus of Rigidity as 70 GPa. [3]
7 Draw the shear stress distribution diagram for T -Section. [2]
8 Define Principal planes and Principal stresses. [3]
9 Define Slenderness Ratio. [2]
10 A thin cylindrical shell of 400mm diameter is to be designed for an internal pressure of 2.4MPa.Find the suitable thickness of the shell, if the allowable circumferential stress is 50MPa. [3]

PART – B (50 Marks)

11 A steel tube of 30mm external diameter and 20mm internal diameter encloses a copper rod of 15mm diameter to which it is rigidly joined at each end. If at a temperature of 10^0C there is no longitudinal stress, calculate the stresses in the rod and tube when the temperature is raised to 200^0C. take E for steel and copper as 2.1×10^5 N/mm^2 and 1×10^5 N/mm^2 respectively. The value of co-efficient of linear expansion for steel and copper is given as 11×10^{-6} per ^{0}C and 18×10^{-6} per ^{0}C respectively. [10]

12 Draw the shear force and bending moment diagrams for a beam as shown in below . [10]



13 A solid aluminium shaft 1m long and 50mm diameter is to be replaced by a hollow shaft of the same length and the same outside diameter, so that the hollow shaft could carry the same torque and have the same angle of twist. What must be the inner diameter of the hollow shaft? Take modulus of rigidity for the aluminium as 28GPa and that for steel as 85GPa. [10]

…2

14 The shear force acting on a T- section of a beam is 50KN. It has the following dimensions, flange = 100mm X 20mm and Web = 80mm X 20mm. The moment of inertia about the horizontal neutral axis is 314.221 X 10^4 mm^4. Calculate the shear stress at the neutral axis and at the junction of the web and the flange. Also draw the shear stress distribution diagram. [10]

15 A closed cylindrical shell 3m long, 15mm thick and it has an internal diameter of 1m. Calculate the circumferential and longitudinal stresses induced and also calculate changes in the dimensions of the shell, if it is subjected to an internal fluid pressure of 1.5N/mm^2. Take E = 2 X 10^5 N/mm^2. And poisson's ratio as 0.3. [10]

16 Derive the formula for deflection at the centre of a simply supported beam carrying a point load at the centre. [10]

17 A hollow alloy tube 5m long with external and internal diameters 40mm and 25mm respectively was found to extend 6.4mm under a tensile load of 60KN. Find the buckling load for the tube when used as a column with both ends pinned. Also find the safe load for the tube, take factor of safety as 4. [10]

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Code No: 2035

FACULTY OF ENGINEERING

BE 2/4 (CSE) I-Semester (Backlog) Examination, December 2019

Subject : Data Structures Using C++

Time: 3 Hours **Max. Marks: 75**

Note: Answer All Questions From Part-A & Any Five Questions From Part-B.

PART-A (25 Marks)

1 What is a data structure? List down any four applications of data structures. (2M)
2 Define ADT. Write ADT for polynomial representation. (3M)
3 Evaluate the given post fix evaluation: 6 2 3 + - 3 8 2 / + * 2 3 / +
What is the stack top after evaluating the given expression? (3M)
4 How is linear queue different from Circular queue? (3M)
5 What is a generalized list? (2M)
6 What is meant by Available space list? Explain. (2M)
7 Differentiate between binary tree and threaded Binary Tree. (3M)
8 Explain LL and LR rotation to balance the AVL tree with an example. (3M)
9 Define MAX heap. (2M)
10 Write Graph ADT? (2M)

PART-B (50 Marks)

11 a) Explain Performance Analysis of an Algorithm. (5M)
b) Explain Knuth-Morris-Pratt Algorithm for string pattern-matching. (5M)

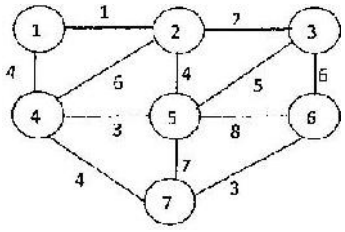
12 a) Explain Inheritance in C++. (4M)
b) Write an Algorithm for infix to postfix conversion. (6M)

13 Write a C++ program to implement circular queue using Single Linked List. (10M)

14 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. (10M)

15 a) Construct a Binary Search Tree(BST) from the following data (3M)
20,35,16,48,21,70,10
b) Write a C++ Program to implement the Quick sort. (7M)

16 a) Define the terms Sub-Graph, Path and Cycle of a Graph. (3M)
b) Explain Kruskal's Algorithm to construct Minimum Cost Spanning Tree for the following graph. (7M)



17 Write Short Notes on the following
a) Sparse Matrices (5M)
b) Templates in C++ (5M)

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Code No: 2040

FACULTY OF ENGINEERING

B.E. 2/4(I.T.) I Semester (Backlog) Examination, December 2019

Subject: Micro Electronics

Time: 3 hours **Max Marks: 75**

Note: Answer all questions from Part-A and any five questions from Part-B

PART – A (25 Marks)

1	List the applications of PN Junction diode.	(2)
2	Briefly explain the principle of operation of a Varactor diode.	(3)
3	List the different terminals of MOSFET.	(2)
4	What are different modes of operation of BJT?	(3)
5	Define Oscillator. Which type of feedback is used in it?	(3)
6	List the four basic Feedback topologies.	(2)
7	List the ideal characteristics of Operational amplifier.	(3)
8	Define CMRR and Slew rate of Op-amp.	(2)
9	What is noise margin?	(2)
10	Write the features of CMOS logic.	(3)

PART – B (50 Marks)

11	a) Explain working of full wave rectifier, with the help of input, output waveforms.	(7)
	b) Write the advantages of full wave rectifier over half wave rectifier.	(3)
12.	Explain the input &output characteristics of BJT in CB configuration.	(10)
13.	Write the expression for gain of feedback amplifier. Explain the advantages of negative feedback in amplifiers.	(10)
14.	Explain the function of Op-amp as	(10)
	(a) Adder (b) Subtractor	
15.	Explain the Voltage transfer characteristics of CMOS Inverter.	(10)
16.	(a)Explain V-I characteristics of PN junction diode.	(5)
	(b) Explain the working of MOSFET.	(5)
17.	Write short notes on the following	(10)
	(a) Hartley oscillator	
	(b) PUN & PDN of CMOS Logic	

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Code No.2892/AICTE

FACULTY OF ENGINEERING

B.E. (CE) (AICTE) III – Semester (Main) Examination, December 2019

Subject: Surveying & Geomatics

Time: 3 hours **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1. What is the fundamental difference between surveying and leveling? 2
2. Define the terms 'Local attraction' and 'declination'. 2
3. Explain the importance of orientation in plane table survey. 2
4. Briefly explain about reciprocal leveling. 2
5. List out the characteristics of contour. 2
6. What is axis signal correction? Give the required equation. 2
7. What are the checks in closed traverse? 2
8. Enumerate different methods of setting out simple circular curves. 2
9. What are the advantages of a total station? 2
10. Explain about electromagnetic spectrum. 2

PART – B (50 Marks)

11. (a) Differentiate between the radiation and intersection method of Plane table survey. 4

    (b) The following consecutive readings were taken with a dumpy level 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 meters. The level was shifted after third, sixth and eighth readings. Calculate the R.L. of the points if the first reading was taken on a B.M of 432.384m. 6

12. (a) Explain the permanent adjustments of a theodolite. 4

    (b) Find the R.L of Q from the following observation:
    Horizontal distance between P and Q = 9290m, Angle of elevation from P and Q = $2^0 6' 18''$
    Height of signal at Q = 3.96m, Height of instrument at P = 1.25m
    Coefficient of refraction = 0.07, Rsin1'' = 30.88m, R.L. of P = 396.58m. 6

13. (a) State the different methods of calculating the length of a transition curve. 4

    (b) Two straights AB and BC intersect at a chainage of 4242.00m. The angle of deflection is 140^0. It is required to set out a simple circular curve of radius 150m to connect the straights. Calculate all the data necessary to set out the curve by the method of offsets from the chords produced with an interval of 30m. 6

14. (a) Describe the parts of a Total station with its principle. 5

    (b) Explain about the different segments of global positioning systems. 5

…..2

15. (a) Explain the interaction of EMR with the atmosphere and the earth surface. 5

    (b) Explain about the relief displacement in aerial photogrammetry. 5

16. (a) Differentiate between prismatic and surveyors compass. 5

    (b) The following perpendicular offsets were taken from a chain line to an irregular boundary. 5

Distance(m)	0	10	20	30	40	50	60	70
Offset(m)	3.10	4.20	5.35	6.45	7.15	8.25	7.95	5.20

Find the area using Simpson's rule and trapezoidal rule.

17. Write short notes on any two: 10

    (a) Elements of reverse curves.
    (b) Gale's traverse table.
    (c) Classification of surveying.

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Code No: 2893/AICTE

FACULTY OF ENGINEERING

BE III – Semester (AICTE) (EEE) (Main) Examination, December 2019

Subject: Electrical Circuit Analysis

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

Note: Answer all Questions from part-A & any five Questions from part-B

PART – A (10 x 2=20)

1 Draw the impedance triangle of series R-L and R-C circuits.

2 Define active and reactive power of alternating quantity and write their expressions.

3 State Compensation theorem.

4 Explain Source Transformation with suitable examples.

5 What is meant by time constant of a R-L circuit? What are its applications in power system?

6 Derive transient response for R-C circuit using DC excitation.

7 List merits and demerits of Laplace transform.

8 Distinguish between classical and Laplace transform method of solution of a network.

9 Define the hybrid parameters.

10 Express Y-Parameters in terms of Z-parameters.

PART- B (5 x 10 = 50 Marks)

11 (a) Define and prove the quality factors of inductor and capacitor. Show that how they are equal to each other.

(b) Three impedances of Z= 15 + j20 Ω. are joined

(i) in star

(ii) in Delta, across 440 V, 50Hz, 3-phase A.C. Supply. Find line current and line power in each case.

12 (a) State and explain Norton's theorem.

(b) For the circuit shown in fig-1 below, find currents I_a, I_b and I_c nodal analysis method.

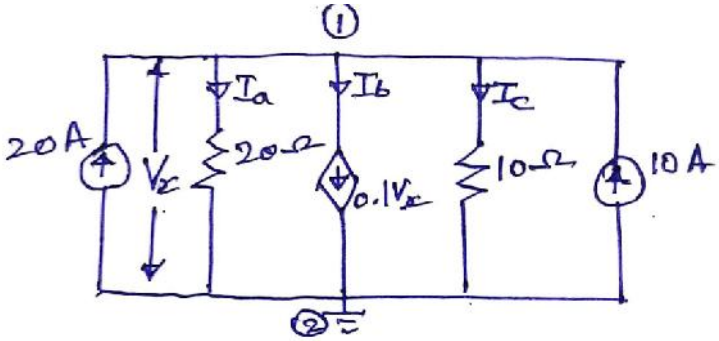

Fig-1

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13 (a) Describe the transient response and steady state response in detail.

(b) A series R-L circuit with R=30 Ω, L=15 H has constant voltage V = 60 V applied at $t = 0^+$ as shown in fig-2 below. Determine the current, (i), the voltage across Resistor and Inductor

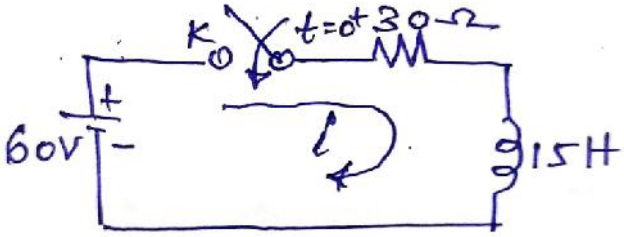

Fig-2

14 (a) State, explain and get the equation of final value theorem.

(b) A two mesh network is shown in Fig – 3. Obtain the expression for $I_1(S)$ and $I_2(S)$, when the switch is closed.

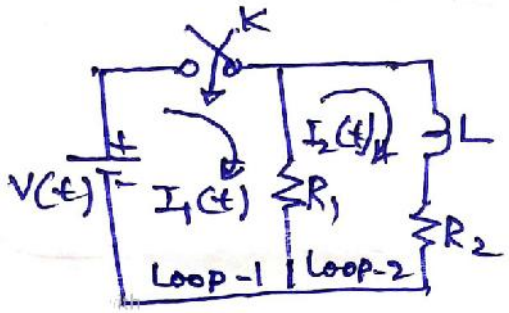

Fig-3

15 (a) Find out the combined parameters, when 2 numbers of two port networks are connected in series.

(b) Following measurements are obtained on a two port network:

(i) When voltage of 100 volts applied at input port with output port open, I_1=20 A and V_2=25V.

(ii) When voltage of 100 volts applied at output port with input open, I_2 = 10 A and V_1= 50 V. Write loop equations for the network and determine the driving point and transfer impedance.

16 (a) Show the relationship between line emf and phase emf in star connection and relationship between line current and phase current in delta connection.

(b) Develop the equation for power factor by using two wattmeter readings, while measuring the 3-phase power by two watt meter method.

17. Write Sort note on any two:

(a) Resonance response curve

(b) Expression for voltage and current when R-L connected in series

(c) Resonant frequency of parallel circuit when there is no resistance in capacitive branch.

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Code No: 2896/AICTE

FACULTY OF ENGINEERING

BE III Semester (AICTE) (Inst) (Main) Examination, December 2019

Subject: Network Theory

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

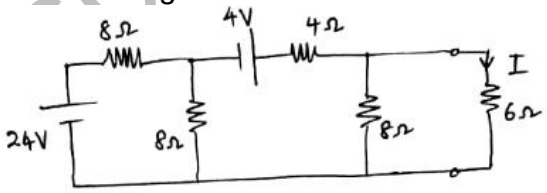
NOTE: Answer all questions from Part-A & Any five questions from Part-B

PART – A (20 Marks)

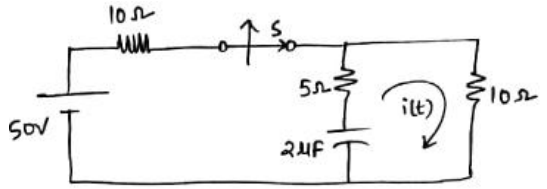
1. State Kirchhoff's Laws. [2M]
2. State Thevinin's Theorem and draw its equivalent circuit. [2M]
3. Define Step function. [2M]
4. What are the initial conditions for L & C? [2M]
5. For a series R-L circuit R=5Ω & L=13mH. Determine power factor of the circuit. [2M]
6. Define Active Power and Reactive Power. [2M]
7. Compare Star(Y) and Delta(Δ) connected systems of a 3-∅ system. [2M]
8. Derive Resonant frequency for a series RLC circuit. [2M]
9. Write the generalized equations of Z-parameters of a two port network. [2M]
10. For a two port network, Z_{11} = 10Ω, Z_{12} = Z_{21} = 5Ω & Z_{22} = 15Ω. Determine Y-parameters. [2M]

PART – B (50 Marks)

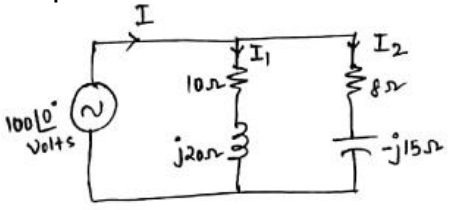
11. (a) State Maximum Power Transfer Theorem. [3M]
    (b) Determine the current 'I' using Thevinin's Theorem. [7M]



12. For the circuit shown in fig., Find the current equation when the switch 'S' is opened at t=0. [10M]



13. Find I, I_1, I_2 for given series-parallel circuit. [10M]



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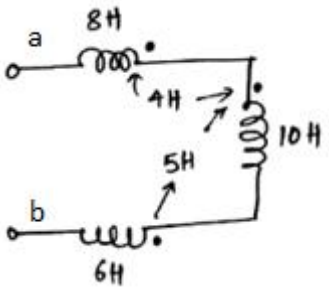
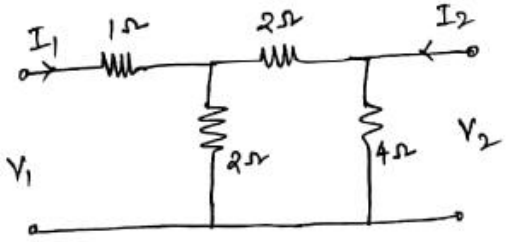
14. (a) Calculate effective inductance of the circuit shown in figure across terminals a & b. [5M]



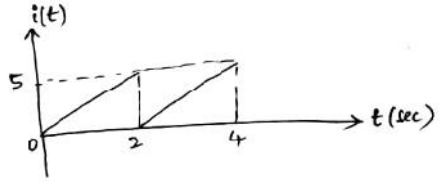
(b) A balanced delta connected load of (2+j3) Ω per phase is connected to a balanced three phase 440V supply. Determine
(i) Phase current
(ii) Power factor
(iii) Active Power
(iv) Reactive Power. [5M]

15. Determine ABCD parameters of a given two port network. [10M]



16. (a) Calculate half power frequencies, resonant frequency, Bandwidth and Q-factor for a series RLC circuit with R = 0.2Ω, L = 100mH & C = 50μF. [5M]
(b) Derive Z-parameters for series connection of 2 two port network. [5M]

17. (a) State & Explain Norton's Theorem. [5M]
(b) Find the voltage drop, v(t) & power dissipated, p(t) across 8Ω resistor when the given current waveform passing through it. Also draw the waveforms of v(t) & p(t). [5M]



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Code No.2904/AICTE

FACULTY OF ENGINEERING

B.E. III Semester (Main)(AICTE) Examination, December 2019

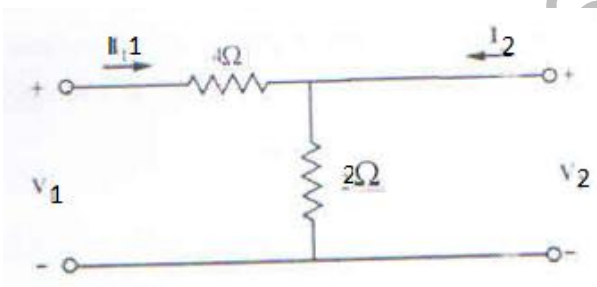
Subject: Network Theory

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

Note: Answer all questions from Part-A & any five questions from Part-B

PART – A (10 x 2 = 20 Marks)

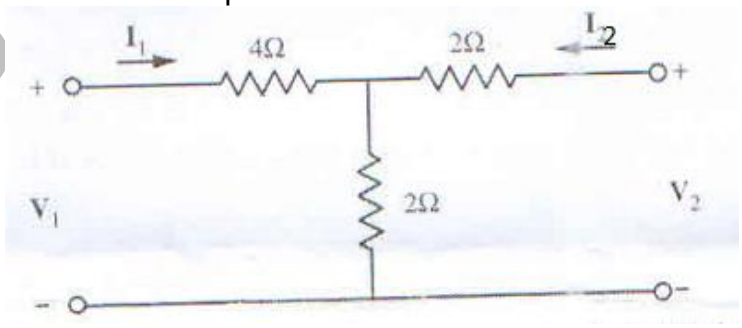
1 State Reciprocity Theorem.
2 Explain the reason for using Z-parameters for series-series interconnection of two port networks.
3 Define image and iterative impedance.
4 Find Iterative impedance of the network.



5 What are the advantages of a composite filter?
6 What is the criterion in choosing 'm' value in m-derived filter?
7 Design a symmetrical lattice attenuator with a Ro = 600Ω and attenuation of 60-dB
8 What are the applications of Equalizers?
9 Test Whether the polynomial $P(S) = 2s^4 + 5s^3 + 6s^2 + 2s + 1$ is Hurwitz.
10 List the properties of positive Real function.

PART – B (5 x 10 = 50 Marks)

11. a) Determine the admittance parameters of the T network shown below



b) Define ABCD parameters of a Two Port network. Establish the relation between Admittance parameters and ABCD Parameters.

12. a) For L-network has series arm impedance-j500Ω and shunt arm impedance is j1000 Ω. Determine its iterative and image impedances
b) A symmetrical ® network consists of a series arm of 300 Ω and two shunt arms of 600 Ω each. Determine characteristic impedance and propagation constant of Network.

….2

13. a) Design a constant 'K' T-section low pass filter having cutoff frequency of 2kHz and nominal characteristic impedance of 600 ohms.

    b) i) What is a high pass filter? In what respects it is different from a low pass filter and derive the equations to find the inductances and capacitances of a constant K high pass filter.

14. a) Design an asymmetrical T-attenator so that it works between a source and load impedance of 250 ohms and 480 ohms respectively and provides an attenuation of 40dB.

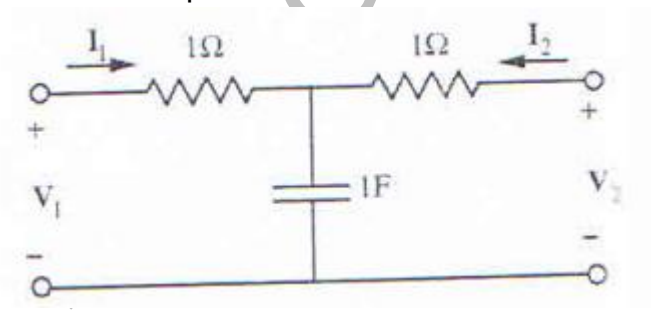
    b) In a symmetrical T-attenuator the series arm resistance is 1200 ohms calculate the load resistance if attenuation is 40 db.

15. a) Synthesis Y(S) = S(S+2)/(S+1)(S+2) is Foster Forms.

    b) Synthesize the following LC impedance function using the cauer Form I

$$Z(s) = \frac{s(s^2+4)(s^2+6)}{(s^2+3)(s^2+5)}$$

16. a) Determine the transmission parameters in the S domain for the network shown.



    b) Obtain the expressions for the image and iterative impedances of an asymmetrical Pi-network.

17. a) Answer any two of the following

    i) Calculate the elements of a band elimination filter to suppress harmonic whistles between 8.5 KHz to 9.0 KHz. The filter has to work between terminal impedances of 2000Ω.

    ii) The attenuation and characteristic impedance of a symmetrical lattice attenuator are 40 dB and 450 ohms . Design the network.

    iii) Determine whether the following functions are positive real.

    Z(s) = (s+3)/(s+2)

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Code No. 2914 / AICTE

FACULTY OF ENGINEERING

B.E. (I.T) (AICTE) III – Semester (Main) Examination, December 2019

Subject: Data Structures

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

Note: Answer all questions from Part-A and any five questions from Part-B

PART – A (10x2 = 20 Marks)

1. What are access modifiers?
2. What is a class and object?
3. Explain program organisation in C++?
4. Differentiate between array and linked list.
5. Convert the following infix expression to postfix form A+B/C∗D-E
6. Write the difference between graphs and trees.
7. What are threaded binary trees?
8. What is a balance factor of a node in AVL tree?
9. What is spanning tree and minimum cost spanning tree?
10. What is weighted graph? Give example.

PART – B (5x10 = 50 Marks)

11 a) Explain functions and inline functions In C++ with examples and how they are different? (6)
   b) Write a recursive program in C++ to find the factorial of a given number. (4)

12 a) Write a C++ program for stack as ADT? (5)
   b) Explain inheritance methods in C++. (5)

13 What are templates in C++? Explain two types of templates with examples. (10)

14 a) What is hashing? (2)
   b) Explain the following over flow handling techniques linear probing, quadratic probing and chaining. (8)

15 Create a AVL tree in following order MARCH, MAY, NOVEMBER, AUGUST, APRIL, JANUARY, DECEMBER, JULY, FEBRUARY, JUNE, OCTOBER, SEPTEMBER (based on alphabetical order i.e., January > February because j > f August > April because second letter u > p). (10)

16 a) Explain BFS with an example. (5)
   b) Write Prim's algorithm and explain with an example. (5)

17 Write short notes on:
   a) Merge sort (4)
   b) Max heap and min heap (3)
   c) Binary tree traversal techniques. (3).

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Code No : 2910/AICTE

FACULTY OF ENGINEERING

BE III Semester (AICTE) (CSE) (Main) Examination, December 2019

Subject: Operations Research

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

Note: Answer all questions from Part – A, & any five questions from Part – B

PART - A (20 Marks)

1. Explain the scope and methodology of Operations research.
2. What is linear programming? What are its major assumptions and limitations?
3. What is the principle of duality in linear programming? Explain its advantages?
4. What is the essential difference between regular simplex method and dual simplex algorithm?
5. How is Hungarian method applied for obtaining a solution if matrix is rectangular?
6. Explain how to resolve degeneracy in a transportation problem.
7. State major limitations of game theory.
8. What are the situations which make the replacement of items necessary?
9. Define queue discipline.
10. Explain principal assumptions made while dealing with sequencing problem.

PART – B (5 x 10 = 50 Marks)

11. Max $Z = 3X_1 + 5X_2 + 4X_3$
STC $2X_1 + 3X_2 \leq 8$
$2X_2 + 5X_3 \leq 10$
$3X_1 + 2X_2 + 4X_3 \leq 15$
$X_1, X_2, X_3 \geq 0$

12. Use dual simplex method to solve following LPP
Max $Z = -2X_1 - 2X_2 - 4X_3$
STC $2X1 + 3X_2 + 5X_3 \geq 2$
$3X_1 + X_2 + 7X_3 \leq 3$
$X_1 + 4X_2 + 6X_3 \leq 5$
$X_1, X_2, X_3 \geq 0$

13. Determine minimum transportation cost.

Warehouse \ Customer					
	3	6	8	5	20
	6	1	2	5	28
	7	8	3	9	17
	15	19	13	18	

.....2

14. Determine optimum assignment schedule.

160	130	115	190	200
135	120	130	160	175
140	110	125	170	185
50	50	80	80	110
55	35	80	80	105

15. The maintenance cost per year of a truck whose purchase price is Rs 8000 are given below. Determine at which time it is profitable to replace the truck.

Year	1	2	3	4	5	6	7	8
Maintenance cost	1000	1300	1700	2000	2900	3800	4800	6000
Resale price	4000	2000	1200	600	500	400	400	400

16. Determine a sequence for the jobs that will minimize the elapsed time.

Job	1	2	3	4	5	6
Machine A	8	3	7	2	5	1
Machine B	3	4	5	2	1	6
Machine C	8	7	6	9	10	9

17. Write short notes on
    a) NSGA technique
    b) Two person Zero Sum game giving a suitable example.

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