FACULTY OF ENGINEERING

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

Subject : Engineering Materials and Construction

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

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

PART – A (25 Marks)

1 Why is the preliminary dressing of stones at the quarry site necessary?
2 Classify bricks. And indicate water absorption capacity of each type of brick.
3 Differentiate between Portland Cement and white cement
4 Define bulking of sand
5 Why is sea sand is not suitable for making motar?
6 Why does concrete need curing?
7 What are laminates
8 Differentiate between paints and varnishes.
9 Draw a neat sketch of horse shoe arch.
10 Differentiate plastering and pointing

PART – B (50 Marks)

11 (a) Explain the classification of stones. What are the qualities of a good building stone?
   (b) Explain the different methods of drying bricks.

12 (a) Explain in detail about the manufacturing process of cement
   (b) Briefly explain the importance of size, shape and texture on coarse aggregates

13 Define water cement Ratio. Discuss the importance of water cement ratio in preparing concrete.

14 (a) Describe two methods of seasoning of timber?
   (b) Discuss in detail the various types of Varnishes and its applications.

15 (a) Write the objectives of plastering and requirements of good plastering.
   (b) Explain about form work and scaffoldings?

16 (a) What do you understand by the term decay of timber?
   (b) Explain the different types of painting?

17 Write short note on the following:
   (a) Blended cement
   (b) Load bearing and non-load bearing wall
   (c) Light weight aggregate
   (d) Types of reinforcement
   (e) Segregation of concrete

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FACULTY OF ENGINEERING

BE 2/4 (EEE) I-Semester (Backlog) Examination, May / June 2019

Subject : Electrical Circuits-I

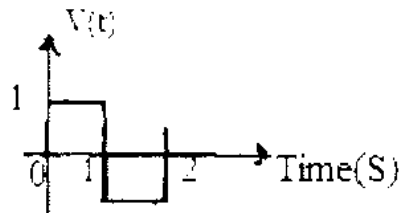**Time: 3 Hours**   **Max. Marks : 75**

Note: Answer All Questions From Part-A & Any Five Questions From Part-B
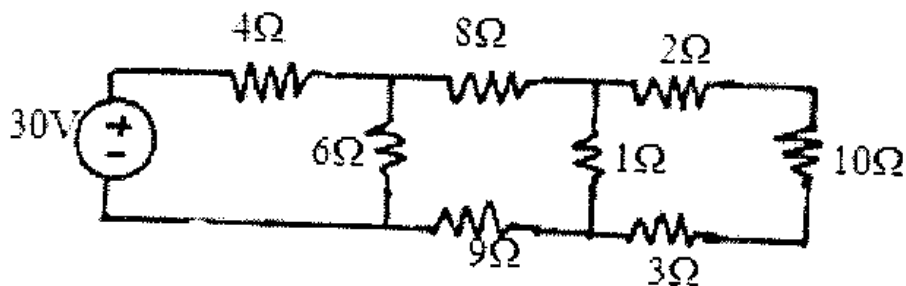
PART-A (25 Marks)

1	Differentiate Dependent and Independent sources	2
2	Define Peak factor and Form factor	2
3	Derive the expression for energy stored in inductor	3
4	Obtain the RMS and Average values of periodic waveform shown	3

|		
5	What do you mean by balanced and unbalanced loads?	2
6	What are the advantages of three phase over single phase circuits	3
7	Define Tree, Incidence matrix	2
8	State Maximum power transfer theorem and derive the condition for maximum power when a load R_L is connected to a DC voltage source with R_s internal resistance	3
9	Define Self and Mutual Inductance	2
10	What is resonance? Obtain the resonant frequency of series circuit	3

PART-B (50 Marks)

|			
11	a)	State and explain Kirchhoff's laws	4
	b)	Determine the current through 10Ω resistor in the circuit shown below.	6

12	In a series-parallel circuit, the parallel branches Q and R are in series with P. The impedances are $Z_p=(4+j2)\Omega$, $Z_Q=(2-j8)\Omega$ and $Z_R = (5+j2)\Omega$ and if the current in the series impedance Zp is 20A. Determine the branch currents, branch voltages and the total voltage and also draw the phasor diagram	10

13   a) A 400V, 50Hz 3 -supply has 50Ω between R and Y, 200mH between Y and B and
      36.4µ F between B and R. Find the line currents   7

      b) Write the relation between line and phase Voltages and Currents in Star and Delta
      circuits and also derive the power consumed by three phase star connected circuit   3

14   a) State and explain Superposition theorem with an example   6

      b) Obtain the Tie-set matrix of the graph shown below   4
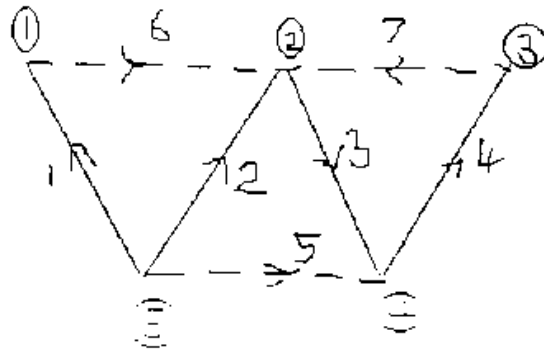
15   a) A resistance of 10KΩ inductance of 100mH and capacitance of 30µF are connected
      in parallel and supplied by a voltage of 10sinwt. Determine the resonant frequency,
      Quality factor, Bandwidth and power dissipated at resonance   5

      b) What is Locus diagram? Sketch the Locus diagram of a series RL circuit with
      variable Resistor   5

16   a) Determine the voltage across the capacitor in the circuit shown below   7
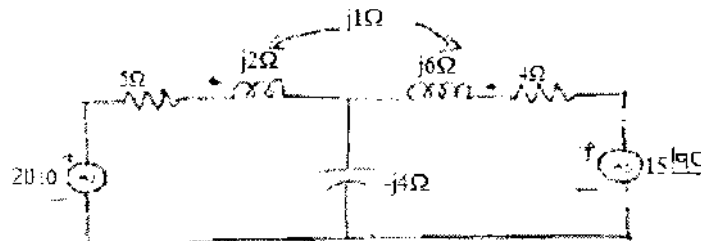
      b) What is Dot convention? Obtain the equivalent inductance when two coils are
      connected in series aiding.   3

17   Write Short Notes on:
      a) Network elements   3

      b) Un balance a loads   4

      c) Millman's Theoren   3

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FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) I Semester (Backlog) Examination, May / June 2019

Subject: Network Theory

Time: 3 Hours   Max. Marks: 75
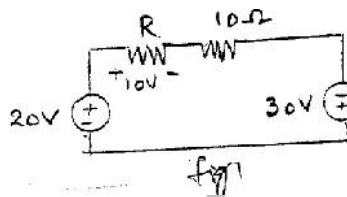
Note: Answer all questions from Part A & any five from Part B

PART – A (25 Marks)

1. What is an independent source?   2M
2. State Kirchhoff's current law.   2M
3. State the principle of current division.   2M
4. Find "R" in the circuit shown in figure 1.   3M

5. Derive the expression for energy stored in an inductor   4M
6. What is a unit unipulse function?   2M
7. What is meant by effective value of a periodic current?   2M
8. Define Q factor.   2M
9. What is meant by unbalanced loading in a three phase system?   3M
10. For a two-part bilateral network the three transmission parameters are given by A=6/5, B=17/5 and C=1/5. What is the value of D?   3M

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PART – B (5 x 10 = 50 Marks)

11. (a) State and explain Thevenin's Theorem.   5M

    (b) Find the Thevenin equivalent of the circuit shown in the figure 2, to the left of terminals a-b. Then find the current in the 36 ohm register.   5M
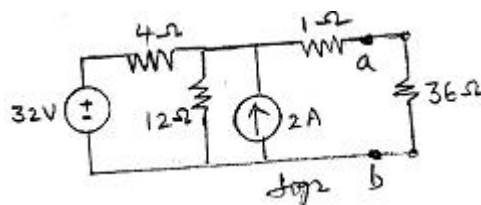
12. (a) Find the source current in the circuit shown in fig3.

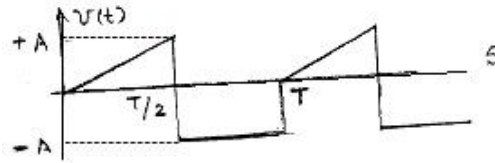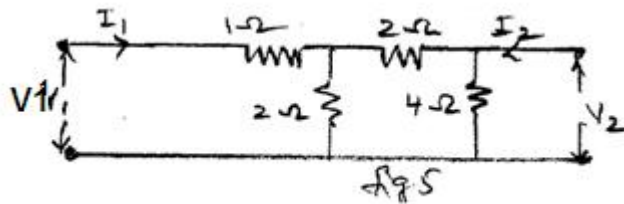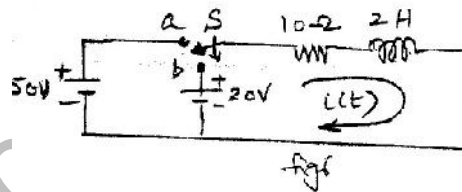(b) What is the RMS value of the periodic wave form shown in fig 4   10

Fig 4

13. Find the Y- Parameters for fig 5   10

14. In the circuit shown in fig 6 the switch 'S" was in position "a" for a long time. At t=0 the switch is moved to position "b". Determine the expression for current i(t).   10

15. In the circuit shown in fig7 impedances are $Z_A=4+j3$ ohms, $Z_B=4 - j 16/3$ ohms and $Z_C=2+j8$ ohms. If the current $I_C = (25+j10)$ A determine the branch currents, branch voltages and the total voltage. Hence calculate the complex power for each branch.10
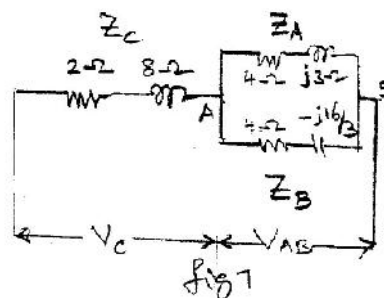
16. (a) Explain how power is measured by two wattmeter method.   5

    (b) Obtain the expression for bandwidth in a series resonant circuit in terms of resonant frequency and Q-factor.   5

17. (a) Write short notes on Norton's theorem.   5

    (b) Initial conditions in network.   5

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FACULTY OF ENGINEERING
B.E. 2/4 (ECE) I-Semester (Backlog) Examination, May / June 2019
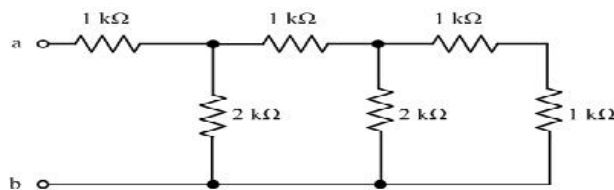
Subject: Basic Circuit Analysis

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. Mention the four type of dependent sources and give their symbols (2)

2. Calculate the effective resistance R $_{AB}$ of the network given below. (3)

3. Define transient response, steady state response and total response. (3)

4. Given R=10K ohm, L=10 milli Henry, Calculate Time constant for RL circuit (2)

5. Define impedance and admittance (3)

6. Calculate the power factor given $i(t) = 6 \cos (20t+45)^A$ and $v(t) = Cos(20t+75)$ V (2)

7. Mention the condition for reciprocity in terms of z parameters and h parameters. (3)

8. Draw the electrical equivalent circuit of y parameter model (2)

9. Derive the expression for quality factor. (3)

10. Obtain Z(s) and Y(s) given $V(s) = S+1$ and $I(S) = S^2+3s+2$ (2)

Part - B (5X10 = 50 Marks)

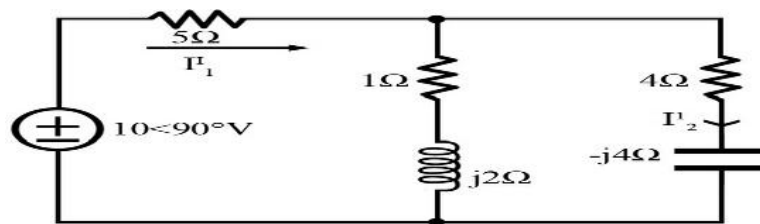11. a) Perform nodal analysis on the following circuit. (6)
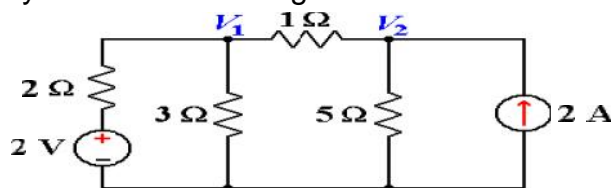
    b) What is meant by duality. Enlist the various electronic components and their duals. (4)

12. Obtain the capacitor current and voltage in the following transient circuit. (10)
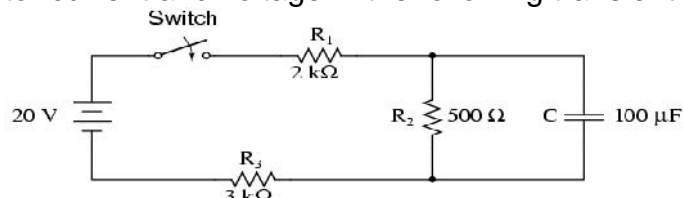
13. a) Obtain Nortons equivalent of the following circuit considering (4-j4)ohm as load impedance (6)

b) Explain DOT CONVENTION in magnetically coupled circuits. (4)

14. a) Calculate the z parameter model of the following circuit. (6)
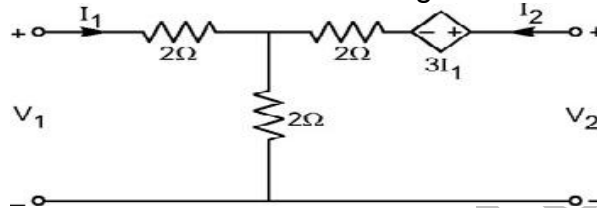
b) Define symmetric network and give condition for symmetric network in terms of h parameters. (4)

15. a) Obtain the relationship between F_0 , Bandwidth and quality factor for a resonant circuit (6)
   b) Calculate cut off frequencies for series resonant circuit given Fo = 150KHz and BW = 50 KHz (4)

16. a) Define the terms graph, tree, branch, cotree, incidence matrix with an example (6)
   b) Calculate the effective impedance of the following circuit and hence calculate current (4)
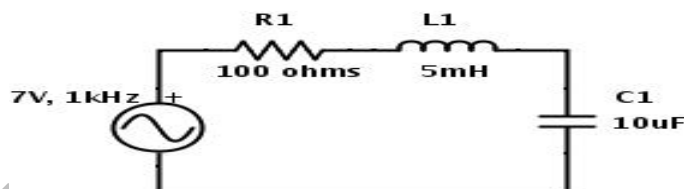
17. Write short notes on (3+4+3)
   a) Maximum power transfer Theorem
   b) Complex power
   c) Natural response from pole zero plot

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FACULTY OF ENGINEERING
B.E 2 /4 (M / P /A.E) I-Semester (Backlog) Examination, May / June 2019

Subject : Metallurgy and Material Science

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. Distinguish between edge and screw dislocations

2. What is Bauschinger effect?

3. Draw the structure of a fatigue fracture surface and identify the fracture zones.

4. List the applications of diffusion in mechanical engineering field.

5. Explain Allotropy of pure Iron.

6. What are the different types of Cast Irons?

7. Distinguish between Annealing and Normalizing?

8. How Nitriding is different from carborizing?

9. Sketch and explain the Electro Slag Refining Process.

10. Mention the applications of powder metallurgy.

PART-B (5 x10 = 50 Marks)
11. a) Discuss slip and twinning as mechanism of permanent deformation.
   b) Explain the different modes of fracture with the help of neat sketches

12. a) What is low cycle fatigue? Explain the method to estimate the fatigue damage in metals.
   b) Explain the three (3) stages of creep with the help of a neat diagram.

13. a) Draw the phase diagram for Bismuth (Bi) – cadmium (Cd) alloy system and label all points , lines and areas.
   b) Discuss the effect of any five alloying elements on plain carbon steels.

14. a) What are the different stages of tempering? Discuss in detail.
   b) What is Age Hardening? Describe briefly different steps in Age hardening process.

15. Explain with neat diagram the production of pig iron using blast furnace.

16. a) Discuss in detail the variation in properties and structure of material when a cold worked material is heated to successively high temperature.
   b) State and explain Fick's laws of diffusion.

17. Write short notes on the following
   a) Grey Cast Iron
   b) Induction hardening
   c) Steel making by L.D. process.

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FACULTY OF ENGINEERING
B.E 2/4 (CSE) I-Semester (Baklog) Examination, May / June 2018

Subject: Discrete Structures

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

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

PART-A (25 Marks)

1.   Express P Q using and only .   2

2.   Define the Rule of Universal Specification? Give one Example.   2

3.   If A = {1, 2, 3, 4} and R,S are relation on A defined by

      S = {(1,2)(1,3)(2,4)(4,4)}, S = {(1,1)(1,2)(1,3)(2,3)(2,4)} Find SOR, R^2 and S^2.   3

4.   What is Derangement?   2

5.   Find the coefficient of x^5 in $(1-2x)^{-7}$.   3

6.   Solve the Recurrence relation $F_{n+2} = F_{n+1}+F_n$ where n   0 and $f_o = 0$; $f_1 = 1$.   3

7.   Explain about Algebraic System.   2

8.   Explain about Isomorphism.   2

9.   Explain Hamiltonian cycle with example.   3

10.   What is Graph Traversing? Give one example for agraph G, where V(G)=

      {A,B,C,D}   3

PART-B (50 Marks)

11 a) If p, q are Primitive statement. Then Prove that P   Q   (P Q) V (P   Q) using Laws of

      Logic   5

      b) In a Group of 1000 people there are 750 who speak Hindi and 400 who can speak
      Bengali. How many can speak Hindi only? How many can speak Bengali only?   5

12. Let f: R   R be defined by
       f (x) = 3x-5,x > 0,

       = - 3x+1,x < = 0   10

      (i) Determine f(0),f(-1),f(5/3), & f(-5/3).

      (ii) Determine $f^{-1}(0)$, $f^1(3)$, $f^1(-6)$, & $f^1(-5,5)$.

13. a) List and Explain the properties of Binary relation with example?   5
    b) State and Explain the Principle of inclusion and Exclusion.   5

14. Solve the Non Homogeneous Recurrence Relation.   10
    T(k)-7T(k-1)+10T(k-2)=k^2+1 & T(0)=4,T(1)=17.

15.   a) Write and Explain the properties of Abelian Group.   5

      b) Prove that <Q^+,*> where * is a binary operation defined by a*b = ab/5 is a group. 5

16. Determine whether the following graphs are Isomorphic.   10

a(2)

e(3)

d(3)   b(3)

c(3)

(a) Graph (G)

a'(3)

d'(2)

e'(3)   b'(3)

c'(3)
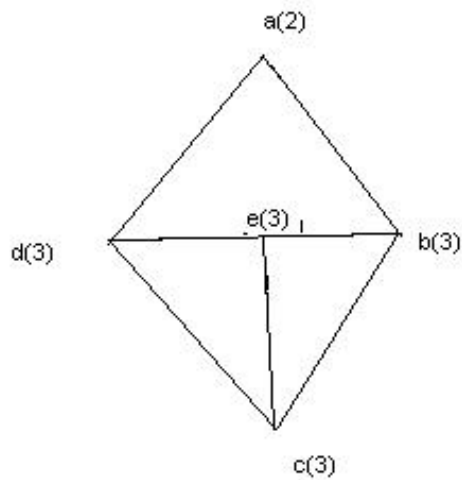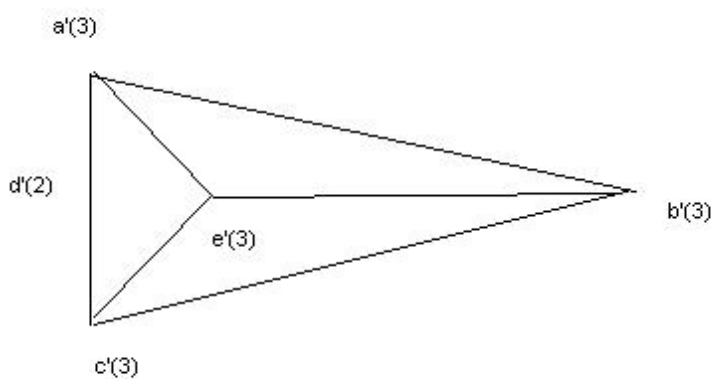
(b) Graph(G')

17   a) Explain about Homomorphism.   5

      b) Write a short note on

          (i) Minimum Spanning Tree   5

          (ii) Equivalence Relation

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FACULTY OF ENGINEERING
B.E. 2/4 (I.T) I-Semester (Backlog) Examination, May / June 2019

Subject : Digital Electronics and Logic Design

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	Prove that NAND and NOR gates are universal gates	2
2	Write a VHDL code for XOR gate	2
3	Differentiate between PLA and PAL	2
4	Give the structure of FPGA	3
5	Distinguish between synchronous and asynchronous counter with respect to speed and hardware	3
6	What is priority encoder? Give the truth table for 4 – to – 2 priority encoder	3
7	Distinguish between Moore and Mealy type FSMs	2
8	List and draw various symbols used in a ASM chart. Give one example	3
9	Define static hazard	3
10	Convert S-R flip-flop to D flip – flop	2

PART – B (50 Marks)

11	a)	Minimize the following expression using k-map method f(a,b,c,d) = m (0,2,8,9,10,15) + d (1,3,6,7)	6
	b)	Write a VHDL code for the above circuit	4
12	a)	Construct a 2 : 1 MUX using logic gates and construct a 4:1 MUX using 2:1 MUXes only	5
	b)	Explain the usage of "generate" statement in VHDL with a suitable example	5
13	a)	What is edge triggering? Draw the circuit that accomplishes it and explain	5
	b)	What is a Johnson counter? How does it differ from ring counter? Explain	5
14	a)	Explain the function of FSM as an arbiter	5
	b)	Draw the state diagram and design a Modulo 6 counter to count the sequences 010, 111, 100, 110, 001, 101	5
15	a)	Design an asynchronous sequential circuit to detect the sequence "111"	5
	b)	What is clock skew? Explain the significance of set up and hold time with respect to flip-flop	5
16	a)	Write a VHDL code for a full adder circuit and explain	6
	b)	Develop a comparator circuit and explain	4
17		Write detailed notes on	
	a)	ASM Charts	5
	b)	Digital hardware design process	5

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FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Suppl.) Examination, May/June 2019

Subject: Engineering Geology

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　Plumose markings are characteristic of

　　a) Sandstone　　　　b) Dolerite　　　　c) Laterite　　　　d) Schist

2　Explain about clay minerals.

3　Explain the stress-strain behaviour of rocks.

4　Define the terms Aquifers, Aquiclude and Aquitard.

5　Write causes of landslides.

6　What is stand-up time? Classify the rock according to stand-up time.

7　Draw a net sketch of Dam label it.

8　What is stripping of aggregates?

9　List out groundwater zones of India.

10　What is joint? What are types of joints?

PART – B (5x10 = 50 Marks)

11　Describe the mineral composition, texture, structure and engineering properties of the following rock types.
　　a) Dolerite　　　　b) Gneiss　　　　c) Sandstone　　　　d) Marble

12　What is Fault? Draw neat sketches of different faults, explain them. Add a note on the recognition of faults in the field.

13　a) Explain about movement of groundwater.
　　b) What is spring? Classify them.

14　a) Discuss in detail about the fluviate, Aeolian, glacial and marine land forms.
　　b) Explain with the aid of neat sketches the electrical resistivity and seismic refraction methods.

15　a) What are the characteristics of concrete aggregates? Discuss in detail.
　　b) Describe geological consideration for a masonry dam in detail.

16　Discuss the various problems in tunneling. Suggest the necessary solutions accordingly.

17　Identify the elements a risk, causes, typical effects and main mitigation measures of earthquakes.

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FACULTY OF ENGINEERING

B.E (EEE / EIE) III – Semester (CBCS) (Suppl.) Examination, May / June 2019

Subject: Prime Movers and Pumps

Time: 3 Hours   Max. Marks: 70

Note: Answer all questions from part A and any five questions from part B.

PART–A (20 Marks)

1. Define Non-Newtonian Fluids? Give examples
2. What is no-slip condition? What causes it?
3. Write the Bernoulli's equation for real fluid.
4. Explain the different types of fluid flow.
5. Define the draft tube? State its functions.
6. What is the function of a casing in a pelton turbine.
7. Write the differences between centrifugal and reciprocating pumps.
8. Differentiate between the turbines and pumps.
9. Write the applications of gas turbines?
10. How are the steam turbine classified?

### PART – B (5 X 10 = 50 Marks)

11. a) Derive the continuity equation for one dimensional steady flow.
    b) A Pitot tube is inserted in a pipe of 300 mm diameter. The static pressure in pipe is 100 mm of mercury (vacuum). The stagnation pressure at the centre of the pipe, recorded by the Pitot tube is 0.981 N/cm^2. Calculate the rate of flow of water through pipe, if the mean velocity of flow is 0.85 times the central velocity. Take C_v = 0.98.

12. a) Describe the working principle of an Kaplan turbine with neat sketch.
    b) What do you understand by the performance characteristic curves of a turbine? Explain them.

13. a) Describe the working principle of Reciprocating pump with neat sketch. Write an expression for the discharge and power of pump.
    b) Explain manometric efficiency, mechanical efficiency, and overall efficiency of a centrifugal pump.

14. a) Mention the merits and demerits of fire tube boilers
    b) With neat sketch describe the working principle of steam engine?

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

16. a) What do you understand by degree of reaction of turbine
    b) Differentiate between flywheel and governor.

17. a) Discuss the relative merits and demerits of venturimeter with respect to orifice meter
    b) The plunger diameter of a single acting reciprocating pump is 15 cm and stroke length is 30 cm and the pump runs at 50 rpm. Find the theoretical discharge.

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FACULTY OF ENGINEERING

B.E (ECE) (CBCS) III – Semester (Suppl) Examination, May / June 2019

Subject : Electronic Devices

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

**Note: Answer all questions from Part – A & Any five questions from Part – B.**

PART–A (20 Marks)

1. Obtain expression of Diode voltage and Calculate the diode voltage value for a silicon diode given Is = 1nA, I = 2 mAand Vt=26mV   (2)
2. Distinguish between depletion and diffusion capacitance of a PN junction diode.   (2)
3. Justify the statement "A Inductor filter cannot be connected in parallel to a rectifier to obtain DC voltage".   (2)
4. A HWRwith LC filter has RL=350 and Vm= 22 sin(100 t). Calculate critical inductance for the filter   (2)
5. Give the circuit of collector to base bias BJT. Calculate Q point if Rc=4K ,Rb= 750K , Vcc=12 V and Beta=100.   (2)
6. Define Stability Factor. Which biasing circuit has highest stability   (2)
7. Illustrate the VI characteristics of DIAC and explain the negative resistance region in it.   (2)
8. Give the approximate h parameter model of BJT in CE mode   (2)
9. Differentiate between BJT and FET   (2)
10. Draw the source self bias circuit and show that in this circuit Vgs is always negative. (2)

PART – B (5 X 10 = 50 Marks)

11.   a) Obtain the expression for diffusion capacitance in a linear graded junction (5)

b) A zener diode is used to supply an output voltage of 12v. The supply voltage is 18v. The zener is a 12v and requires a minimum diode current of 4mA. Calculate the series resistance and the range over which the load resistance RL can be varied.   (5)

12 a) Show the circuit diagram of a bridge rectifier circuit and explain its operation with waveforms.   (5)

b) The load resistance of a center-tapped full wave rectifier is 500 and the necessary voltage (end to end) is 60 sin(100 t). Calculate (i)peak, average and rms value of current;(ii) ripple factor and (iii) efficiency of the rectifier. Each diode has an idealized I-V characteristics having slope corresponding to a resistance of 50 .
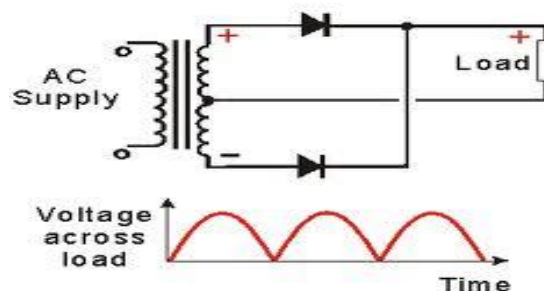
13 a) Illustrate using a PNP transistor that the current in a BJT is bipolar in nature.   (5)
   b) Draw a collector to base bias circuit and calculate operation point and stability factor.
       Assume Rc=4.7Kohm, Rb = 450Kohm, and Beta =150Vcc=12 Volts   (5)

14 a) Explain the working of a UJT andDraw the circuit of UJT relaxation oscillator   (5)
   b) Perform **approximate**AC analysis for the RC coupled common emitter BJT amplifier,
       assume hie = 1.1Kohm, hfe=50. GivenRc=4 K ohm, Rs = 1 K ohm, R1 = 75 K ohm,
       R2 = 15 K ohm, RL=5K ohm and Beta =100   (5)

15 a) Give the structure of Enhancement Mode MOSFET and explain its operation with VI
       characteristics.   (5)
   a) For the common source amplifier circuit shown in figure determineV_{GS} ,I_{DS} and
       voltage gain V_o/V_i.   Given gm=2mS and Rd = 75kohm.   (5)
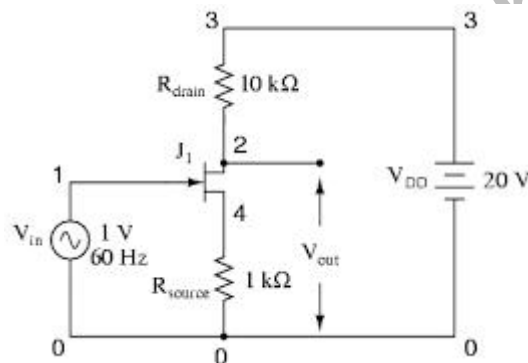
16 a) What is a breakdown diode. How can diodes operating in breakdown region be used
       for regulation   (5)
   b)Explain the concept of Thermistor compensation in BJT   (5)

17 Write short notes on   (2.5X4)
   a. Tunnel Diode   b. DC Load lines
   c. Low frequency PI model   d. BJT Vs FET

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FACULTY OF ENGINEERING
B.E. (M/P) III - Semester (CBCS)(Suppl.) Examination, May / June 2019

Subject : Engineering Thermodynamics
Time : 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part-A & any five questions from Part-B.
PART – A (20 Marks)
1 What is the need of microscopic approach in thermodynamics ?   [2]
2 Why does the free expansion have zero work transfer ?   [2]
3 Define work in thermodynamic sense.   [2]
4 What is first law of thermodynamics ?   [2]
5 What is Helmholtz and Gibbs function?   [2]
6 Define available and unavailable energy.   [2]
7 What is meant by triple point of water?   [2]
8 What is anomalous expansion of water?   [2]
9 Draw Otto cycle on P-V and T-S diagram.   [2]
10 Define mole and mass fraction.   [2]

PART- B (50 Marks)
11 (a) What do you understand by thermodynamic equilibrium?   [5]
     (b) Explain constant volume gas thermometer with the help of neat sketch.   [5]

12 (a) Derive the expression for work done for a reversible adiabatic process with the help of suitable graph.   [5]
     (b) 0.8kg/s of air flows through a compressor under steady state conditions. The properties of air at entry are : Pressure 1 bar, velocity 10m/s, specific volume $0.95m^3$/kg and internal energy 30kJ/kg. The corresponding values at exit are Pressure 8 bar, velocity 6m/s, specific volume $0.2m^3$/kg and internal energy 124kJ/kg. The outlet is inline with intake. Determine the power input to compressor and the pipe diameter at entry and exit.   [5]

13 (a) Why is second law of thermodynamics called as law of degradation of energy?   [5]
     (b) A reversible heat engine delivers 0.6kW power and rejects heat energy to a reservoir at 300K at the rate of 24kJ/min. Make calculations for the energy efficiency and the temperature of the thermal reservoir supplying heat to the engine.   [5]

14 (a) What is Clapeyron equation?   [5]
     (b) Find enthalpy and entropy of steam when the pressure is 2MPa and specific volume is 0.09 m^3/kg.   [5]

15 (a) What is difference between volumetric and gravimetric analysis?   [5]
     (b) An engine working on Otto cycle is supplied with air at 0.1MPa, 35°C. The compression ratio is 8, heat supplied is 2100kJ/kg. Calculate the maximum pressure and maximum temperature of the cycle, cycle efficiency and Mean effective pressure.   [5]

16 (a) Define quassi static process.   [5]
     (b) Explain Path and Point functions [5]

17 (a) Derive Maxwells equation and state its significance.   [5]
     (b) Represent Rankine cycle on P-V & T-S diagram and derive its efficiency.   [5]

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FACULTY OF ENGINEERING

B.E. (AE) III Semester (CBCS) (Suppl.) Examination, May / June 2019

Subject: Automotive Electrical and Electronics Engineering

Time: 3 Hours   Max. Marks: 70

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

PART – A (10x2 = 20 Marks)

1. Define Ampere hour efficiency.
2. What are the merits of LED lighting system?
3. Which motor is preferred for starting system and why?
4. List the various starter drive units.
5. Draw the various characteristics of shunt generator.
6. What is armature reaction?
7. What is Electromagnetic interference?
8. Discuss warning system in an automobile?
9. What is a microprocessor?
10. What is a solenoid?

Part-B (5 x 10 = 50 Marks)

11 a) Explain the charging methods of a lead acid battery.   [5]
   b) Illustrate the horn and wiper systems.   [5]

12 Explain the different types of starter drive units with neat diagrams.   [10]

13 a) Explain third brush regulation.   [5]
   b) Explain the constructional aspects of a bridge rectifier.   [5]

14 Write short notes on:
   a) Electronic dashboard instruments.   [5]
   b) Security and warning systems.   [5]

15 With a neat block diagram explain the basic functional units of a microprocessor.
   Draw the pin diagram of 8085 microprocessor.   [10]

16 a) Explain about maintenance and charging of batteries.   [5]
   b) Explain the construction and characteristics of starting motor.   [5]

17 Explain any two:
   a) Explain the principle of voltage and current regulators?   [5]
   b) Explain various sensors used for temperature measurements?   [5]
   c) Stepper motor relay.   [5]

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FACULTY OF ENGINEERING
B.E. (CSE) III - Semester (CBCS) (Suppl.) Examination, May / June 2019

Subject : Data Structures

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 down the code snippet to count the number of nodes in a single linked list.

2   What is a sparse matrix? Explain the sparse matrix representation.

3   Suppose on an empty stack, the following operations are performed. In what order will the elements be popped?
    Push A ; push B ; push C ; pop ; pop ; push D ; pop ; pop

4   Define Hashing. What are the advantages of hashing?

5   What is the difference between full binary tree and complete binary tree? Explain with examples.

6   Construct a Binary Search Tree for the following data :
    20,35,16,48,21,70,10.

7   Draw an undirected graph for the given specification of a graph G
    V (G)={1,2,3,4}   E(G)={(1,2), (1,3), (3,3), (3,4), (4,1) }

8   What is meant by minimum-cost spanning tree?

9   Explain why insertion sort has a worst case time complexity of $O(n^2)$ and best case $O(n)$.

10 Define a heap. What are the advantages of heap?

PART – B (50 Marks)

11 Explain in detail about insertion and deletion of elements in doubly linked list.   (10)

12 (a) Explain Space complexity of an Algorithm.   (3)
    (b) Insert the following keys into a hash table of size 7. Use the hash
        function K % 7 and linear probing to resolve collisions
        21, 35, 22, 37, 27, 38.   (7)

13 Write an algorithm for infix to postfix conversion. Give a suitable example.   (10)

14 (a) With the given inorder and postorder traversals draw a binary tree. (5)
    In order : G L R O A I H T M
    Post order: G R O L H M T I A
   (b) Construct AVL tree with the following example. (5)
    21 26 30 9 4 14 28 18 15 10 2 3

15 (a) Write an algorithm to delete a node from a binary search tree. (5)
   (b) What is BFS and DFS? Explain with an example. (5)

16 Show how dijkstra's algorithm works on the following graph source vertex
   as v1. (10)
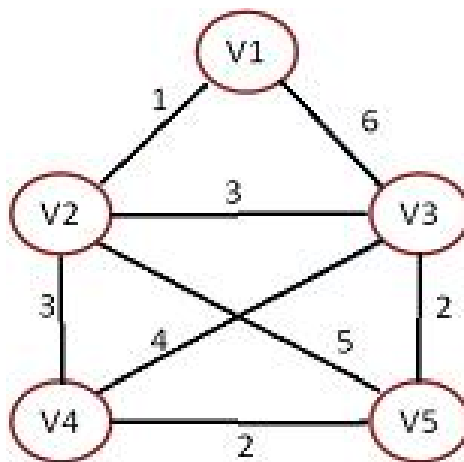
17 Explain the working of Quick Sort. Sort the following sequence of keys using
   quick sort. 66, 77, 11, 88, 99, 22, 33, 44, 55. Specify its time complexity. (10)

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FACULTY OF ENGINEERING

B.E III-Semester (CBCS) (I.T) (Suppl.) Examination, May / June 2019

Subject : Data Structures

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

Note: Answer all questions from Part – A & Any five questions from Part – B.

Part - A (20 Marks)

1. Define the terms Space and Time complexity.
2. What is a template? Give an example.
3. Define Abstract data type and Write ADT for Queue.
4. Convert the following infix expression to prefix and postfix
   (A * B * (C – A) – D)
5. Explain differences between linear and linked representation of a stack.
6. Define a double linked list with an example.
7. Why hashing is needed? What are its advantage over others?
8. Differentiate between trees and graphs.
9. Evaluate the following postfix expression 5 6 2 + * 12 4 /
10. Give the worst, best and average complexities for merge and selection sort.

Part-B (20 Marks)

11. a) Write a C++ program for implementing Insertion and Deletion in string ADT.   (5)

b) Compute the best and worst case step count analysis for the following function

   int sequential_search(int *a , const int n, const int x)   (5)

```
{ int i ;
for(i=0; i< n && a[i]!=x; i++);
if (i = = n ) return -1;
else return i ; }
```

12. Write a C++ code to implement stack as an ADT using templates.   (10)

13. Write procedure for insertion and deletion of an element from a doubly linked list   (10)

14. What is Minimum cost spanning tree. Use Prim's algorithm to find minimum cost

spanning tree for the following graph.   (10)
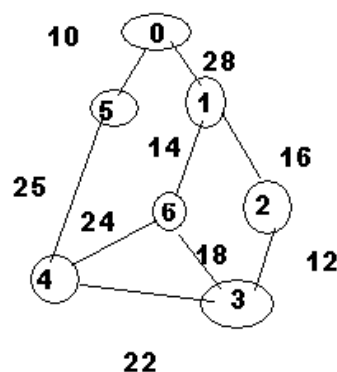
15. a) Construct AVL for the following input sequence:

    15, 6, 25, 11, 10, 13, 3, 29, 37   (6)

  b) Define Max-Heap. Explain how to insert an element into a Max Heap.   (4)

16. a) Explain Merge sort for the following elements.

    66, 48, 57, 92, 24, 65, 83, 72   (6)

  b) Write In order, Preorder, Post order and level order for the following binary
    Search tree.   (4)
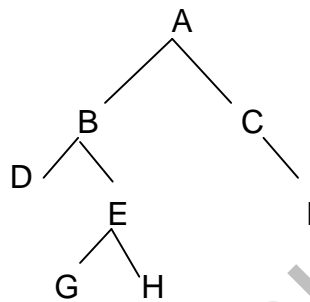
17. Write short notes on any of two: (10)

  a) Asymptotic notation.

  b) Red Black Tree.

  c) Quick Sort.

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