Code No. 5019 / O

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I – Semester (Old) Examination, December 2015

Subject: Engineering Materials and Construction

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	List out different methods used in quarrying of a stone.	3
2	List out different steps in the manufacturing of brick clay.	3
3	What is chemical composition of cement?	3
4	Explain the importance of bulking of sand.	2
5	Classify different type of mortars.	2
6	What is ASCU treatment?	2
7	List out some types of recycled materials.	2
8	Classify types of varnish.	3
9	Define scaffolding.	2
10	Differentiate between Plastering and Pointing.	3

PART – B (50 Marks)

11 a) What is meant by dressing of stone? Explain different dressed surfaces with neat figures.
   b) Explain the process involved in burning bricks using Hoffman's kiln with a neat sketch.

12 a) List out different tests performed on cement and explain any two tests in detail.
   b) Explain the process of preparation of light weight aggregate and also explain its applications.

13 a) What is the importance of compaction of concrete? And explain different compaction methods.
   b) Explain different types of reinforcing steel with all specifications.

14 a) Define seasoning of timber. Explain different seasoning methods.
   b) Describe about different constituents involved in paint.

15 a) Classify different type of floors. Also explain the method of construction of any two in detail.
   b) Classify different type of arches. Sketch any two in detail.

16 a) What is the importance of Blended Cements? Also classify blended cements.
   b) Explain the process of conservation of energy through different materials.

17 Write short notes on the following:
   a) Load bearing and non-load bearing building blocks
   b) Tempering of brick earth
   c) Ready mix concrete.

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Code No. 5052 / N

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I - Semester (New)(Main) Examination, December 2015

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 What is seasoning of stones? (3)
2 What is a Tamping ? (2)
3 Define Load bearing and Non Load bearing block. (2)
4 What is bulking of sand? (3)
5 What are fly ash bricks? (3)
6 What is Ready mix concrete? (3)
7 What do you mean by smart materials? (3)
8 What is plastering? (2)
9 Define distemper. (2)
10 What are the uses of formwork? (2)

PART – B (50 Marks)

11 (a) What is Quarrying? What are the various methods of Quarrying of stones? (5)
(b) What is dressing of stones? Explain different dressed surfaces of a stone with neat sketches. (5)

12 (a) Explain the process of burning of bricks in Hoffman's kiln with a neat sketch. (6)
(b) What are Light weight bricks and their sues? (4)

13 Explain in detail the manufacturing process of concrete. (10)

14 (a) What is seasoning of timber and its importance? (6)
(b) Draw the cross section of timber and label its parts. (4)

15 (a) What are the characteristics of a good paint? (5)
(b) What are the constituents of paint? (5)

16 (a) Explain the construction process of concrete flooring and mosaic flooring. (5)
(b) Explain with the help of neat sketches any two types of Arches. (5)

17 Write a note on the following:
(a) Importance of scaffolding (3)
(b) Different types of varnish (4)
(c) Define Color wash and White wash (3)

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Code No. 5023 / O

FACULTY OF ENGINEERING

B.E. 2/4 (EEE) I – Semester (Old) Examination, December 2015

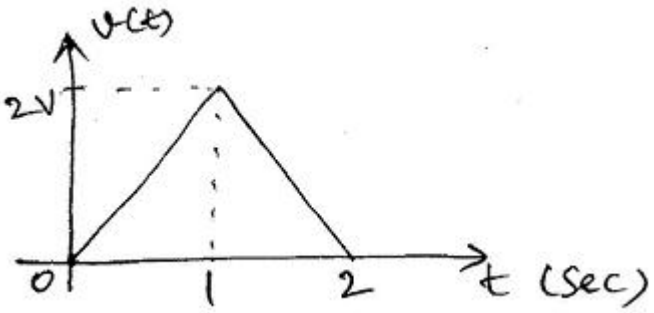
Subject: Electrical Circuits – I

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

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

PART – A (25 Marks)

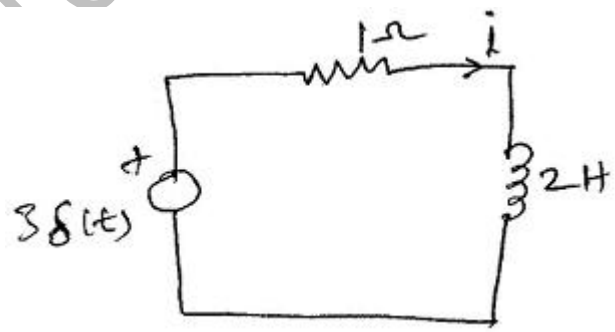
1 An inductor of 2 mH is supplied a voltage waveform as shown below. Obtain the current wave form in the inductor. 3



2 A solenoid 50 cm long and 10 cm in diameter is wound with 1500 turns. Find (i) the inductance (ii) the energy stored in the magnetic field when a current of 4A flows in the coil. 3

3 In an A.C. circuit, show that the maximum power delivered to a load is when $R_{Load}=R_{th}$ and $X_{load} = -X_{th}$. 3

4 Find the values of $i(0^+)$ and $i(\infty)$ for the current shown below. 2



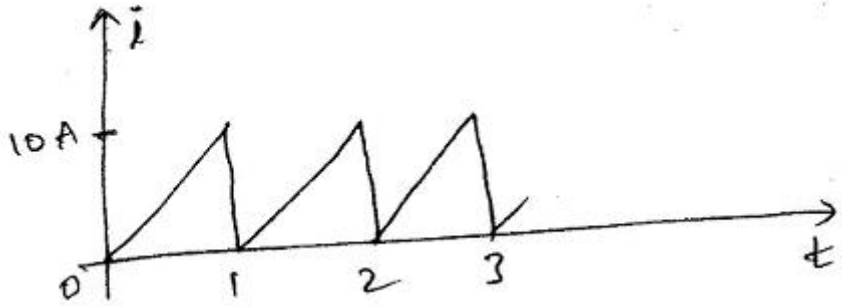
5 What is time constant? Explain with reference to RL and RC circuits? 2

6 Enumerate the differences between natural response and forced response. 2

7 An alternating current source having E = 110 sin (wt + $\frac{®}{3}$) is connected in an a.c. circuit. If the current drawn from the circuit varies as i(t) = 5 sin (wt + $\frac{®}{3}$), find the impedance of the circuit. 2

8 Current having waveform shown below is flowing in a resistance of 10Ω.

Find the average power. 3



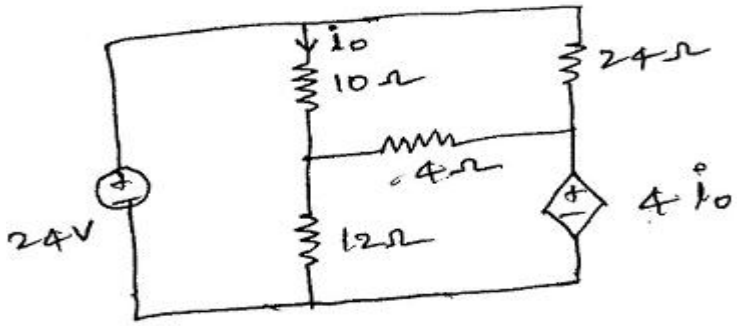
9 A series RLC circuit when excited by a 10V sinusoidal voltage source of variable frequency, exhibits resonance at 100 Hz and has a 3 dB bandwidth of 5 Hz. Find the voltage across the inductor L at resonance. 3

10 A 3-phase star-connected symmetrical load consumes P watts of power from a balanced supply. If the same load is connected in delta to the same supply, find the power consumption. 2

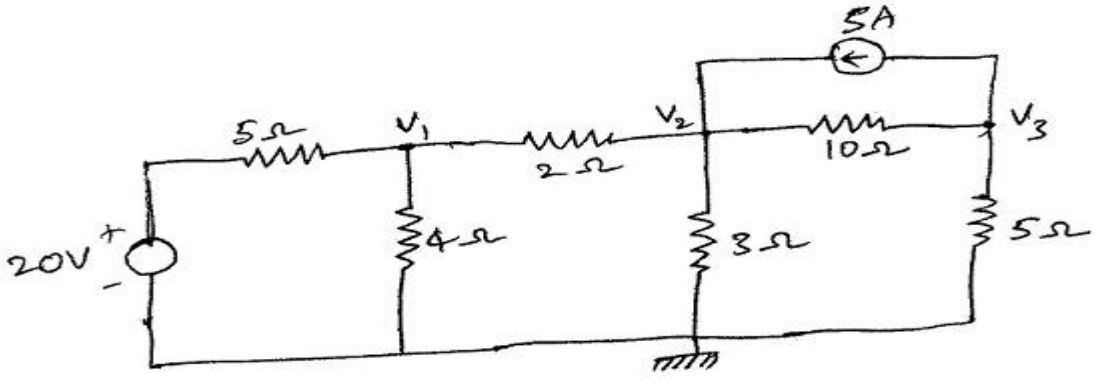
PART – B (50 Marks)

11 a) Derive the expressions for energy stored in inductor and capacitor. 4

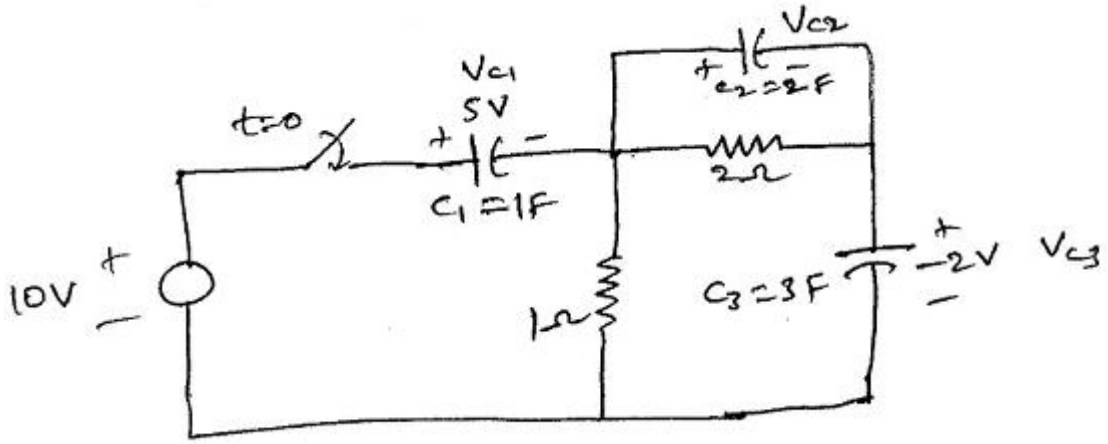
b) Use mesh analysis to obtain 'i_o' in the circuit given below. 6



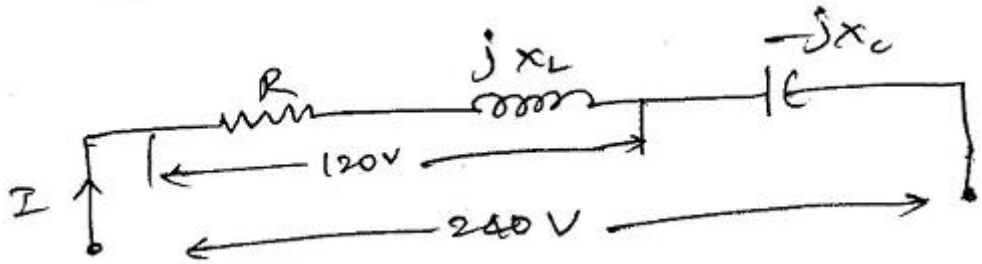
12 Find the node voltages V_1, V_2 and V_3 in the network shown and find the current I_x. 10



13 Find the voltages across the three capacitors at t = 0^+. The initial voltages across the capacitors are indicated as shown. 10



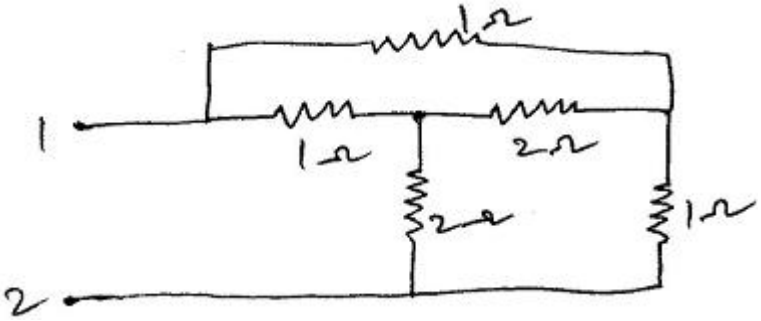
14 A single phase load takes 300 watts and draws 5A at a lagging power from a 120 V, 1Φ supply. Determine the reactance of a pure capacitor required to be placed in series with this load so that it takes the same current when connected to a 240 V supply. 10



15 An inductance of 0.5 H, a resistance of 5 Ω, and a capacitance of 8 «F are in series across a 220 a.c. supply. Calculate the frequency at which the circuit resonates. Find the current at resonance, bandwidth, half power frequencies and the voltage across capacitance at resonance. 10

16 a) Three impedances each of 5+j 12 Ω, connected in star are connected to a 220 V, three phase, 50 Hz supply. Calculate the line currents. 7

b) Find the equivalent resistance between the terminals 1 and 2 of the network shown. 3



17 Write short notes on:

a) Super mesh analysis 4

b) Low pass, High pass and Band pass filters. 6

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Code No. 5056 / N

FACULTY OF ENGINEERING

B.E. 2/4 (EEE) I - Semester (New) (Main) Examination, December 2015

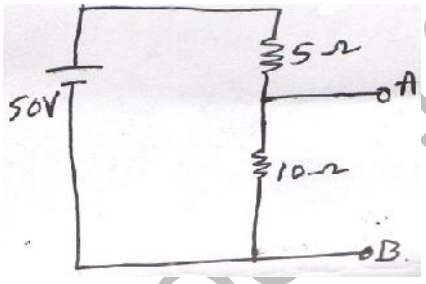
Subject : Electrical Circuits – I

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 Distinguish between principle node and super node. (2)
2 What are the advantages of parallel circuits? (2)
3 State Compensation theorem. (2)
4 Differentiate cut-set and circuit matrix. (3)
5 Find voltage across 10Ω Resistor. (3)



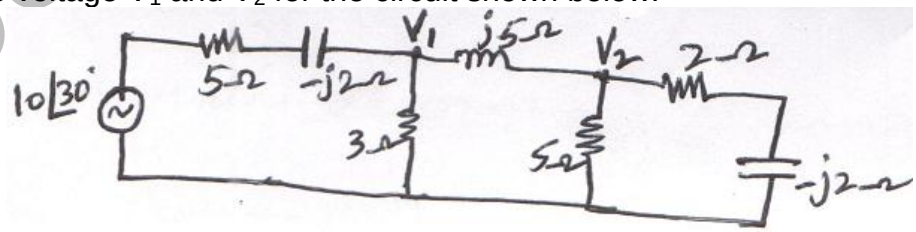
6 Draw phasor diagram of RLC circuit when $\mu L > \frac{1}{\mu C}$. (3)

7 Discuss Dot convention. (2)
8 Define Band Width and Q factor. (3)
9 What are the advantages of poly-phase circuits? (3)
10 Discuss about unbalanced loads. (2)

PART – B (50 Marks)

11 (a) Discuss about active and passive elements. (5)
(b) Explain steady state response of series – parallel circuits. (5)

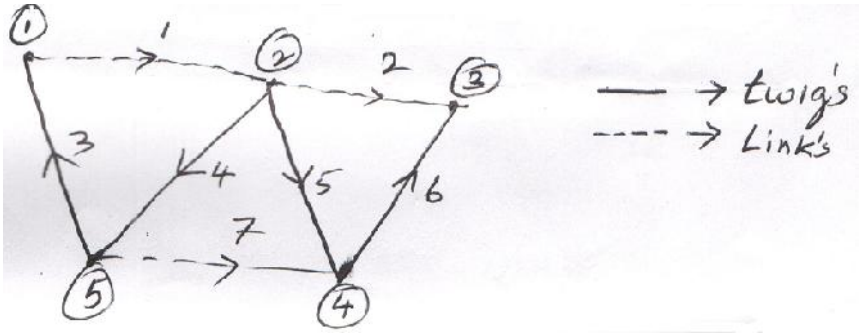
12 Find Node voltage V_1 and V_2 for the circuit shown below: (10)



13 A series RL circuit has R = 25 Ω and X_2 = 32Ω, It is connected in parallel to a capacitor of 100 μF and the combination is connected across a 200V, 50Hz supply, find current in each branch, Draw vector diagram showing the total current. (10)

14 A symmetrical three phase 400V system supplies a balanced delta connected load, the current in each branch is 20A and phase angle 40^o lag, calculate line current and total power. (10)

15 For the below graph find tie set and cut set matrices and obtain KVL and KCL equations. (10)



16 (a) Explain and derive the relationships for band width and half power frequencies of RLC series circuit. (5)

(b) Determine Q – factor of a coil R = 10Ω, L = 0.1H and C=0.1μF. (5)

17 (a) Explain Tellegen's and Millman's theorems. (5)

(b) Discuss the analysis of circuits with mutual inductance. (5)

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Code No. 5028 / O

FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) I - Semester (Old) Examination, December 2015

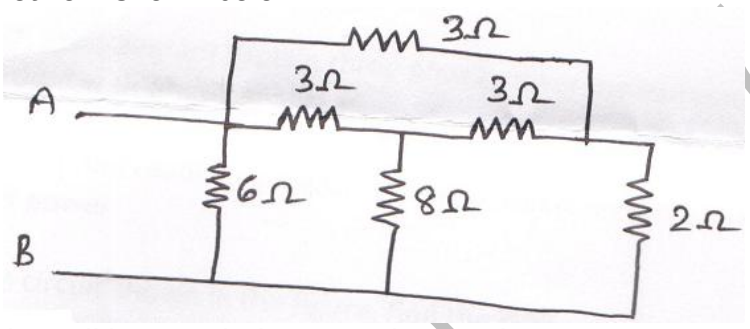
Subject : Network Theory

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)

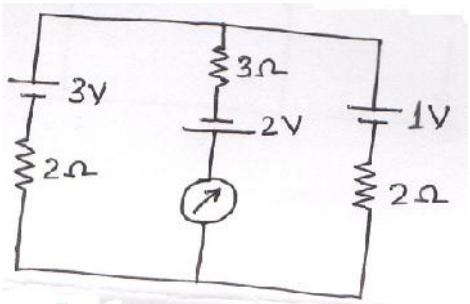
1 What are the Active and Passive Elements?
2 State Superposition Theorem.
3 Find R_{AB} in the network shown below.



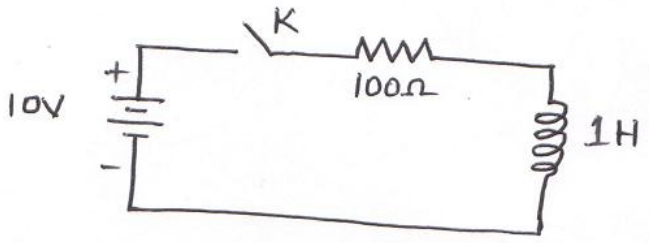
4 Explain the initial conditions for inductor and Capacitor.
5 What is Duality? Explain.
6 Define Average and RMS values for Periodic time functions.
7 Explain Selectivity and Bandwidth with respect to series RLC circuits.
8 Define Resonance.
9 What is Mutual Inductance?
10 Write the generalized expressions for Impedance parameters of a two port network.

PART – B (50 Marks)

11 (a) Explain the steps involved in Thevenizing an electrical circuit.
(b) Using Thevenin's theorem, find the current in the Ammeter shown in the given circuit.



12 (a) Derive the expression for (t) in a series RC circuit which is excited with a DC voltage source V, when the switch is closed at time t = 0.
(b) The switch 'K' is closed at t = 0 for the circuit shown below. Find the values of i, di/dt and d^2i / dt^2 at t = 0.



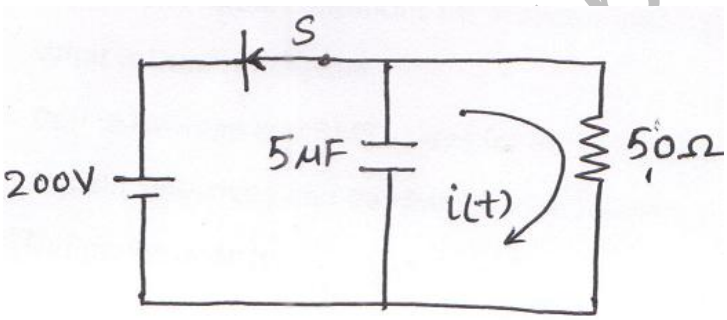
..2

13 Find the current *i (t)* in a series RLC circuit with R = 3Ω, L = 1H and C = 0.5μF, when it is driven by an impulse voltage of $\delta(t-2)$.

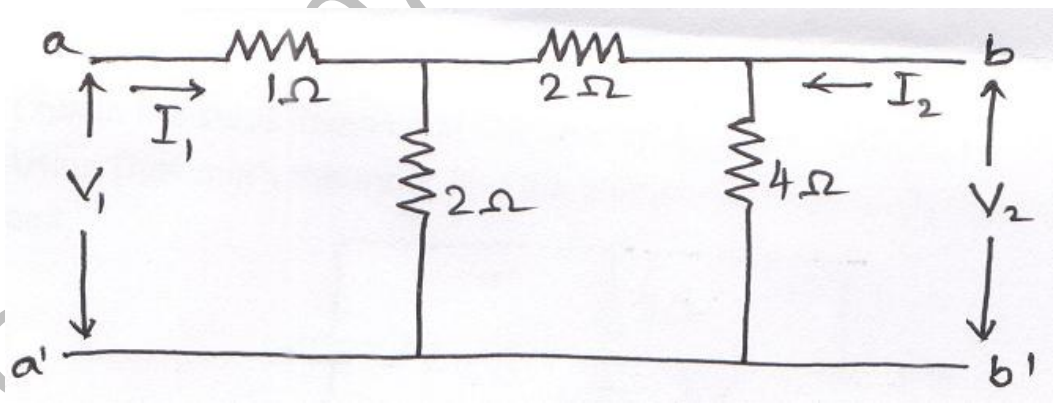
14 Three inductors each of resistance 2 ohms and XL=8Ω/ph are connected in star with a 3-phase supply of 230V, 50Hz. Calculate the line and phase current and voltages. Also calculate the power input and power factor.

15 (a) With neat diagram explain three phase power measurement by two wattmeter method with phasor diagram.
(b) A balanced three phase load takes 10KW at a power factor of 0.9 lagging. Calculate the readings on each of the two watt meters connected to read input power.

16 For the circuit shown in the figure, find the current equation when the switch is opened at t = 0.



17 Find the Y – Parameters for the network shown in the figure.



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Code No. 5061 / N

FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) I - Semester (New)(Main) Examination, December 2015

Subject : Network Theory

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

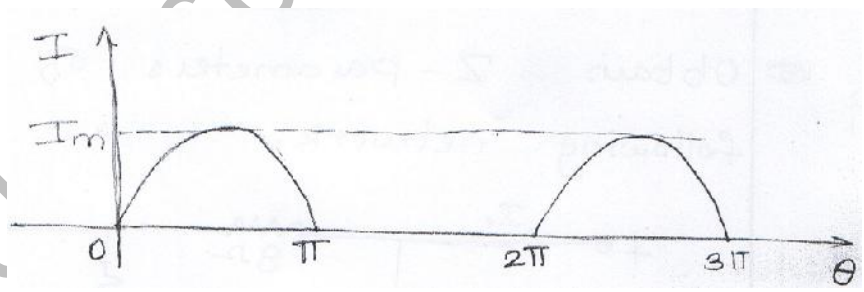
Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Write short notes on exponential excitation. (3)
2 Discuss about Parallel networks. (2)
3 Define Active and Passive elements. (3)
4 Discuss about sinusoidal response of RL network. (3)
5 Write short notes of two post networks. (2)
6 Define duality. (2)
7 The power in 3ϕ circuit is measured using 2-Waltmeters. If the total power is 100 KW and PF is 0.66 leading, what will be the reading of each waltmeter. (3)
8 The Z-parameters of circuit are given by $Z_{11}=4\Omega$, $Z_{12} = Z_{21} = 10\Omega$ and $Z_{22} = 6\Omega$. Obtain transmission parameters. (3)
9 Define and explain the terms selectivity and quality factor and how are they related. (2)
10 State Norton's theorem and draw its equivalent circuit. (2)

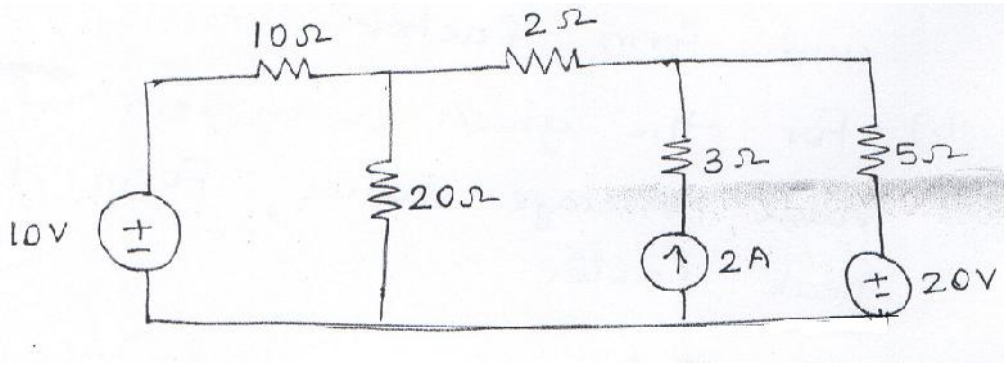
PART – B (50 Marks)

11 (a) Define RMS, Average values, Peak factors and form factor. (4)
(b) For the given waveform find, RMS value, Average value, Form factor and peak factor. (6)

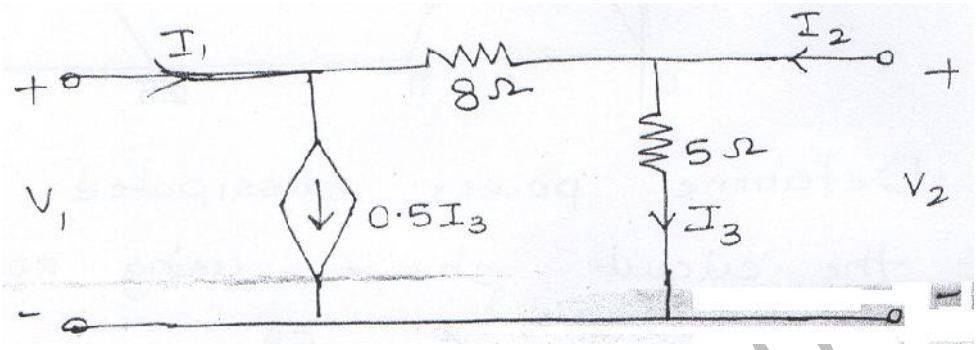


12 Derive relation between line and phase quantities with a neat phasor diagram for star connected circuit. (10)

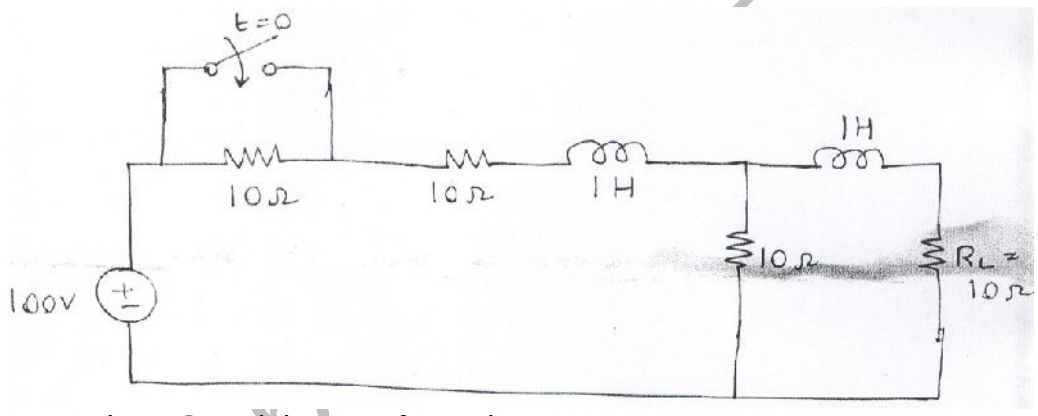
13 (a) State and explain Thevenin's theorem. (4)
(b) Find Voltage across 2Ω resistor using superposition theorem in the figure shown below: (6)



14 Obtain Z – parameters of the following network. (10)



15 In the network shown below, the switch is closed at t = 0, find the expression for current in R_L.



16 (a) Discuss about Star-delta transformation.
(b) Explain Terminated two ports.

17 (a) Discuss about two Waltmeter method.
(b) Write short notes on series parallel network.

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Code No. 5030 / O

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I-Semester (Old) Examination, December 2015

Subject : Basic Circuit Analysis

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

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

PART – A (25 Marks)

1 Use source transformation in the circuit of figure 1 to find v_o. (2)

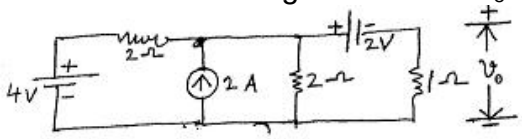


Figure 1

2 Derive an expression for the energy stored in an inductor at any instant of time. (3)

3 Differentiate zero input response and zero state response. (2)

4 In the circuit of figure 2 below, find the steady state value of response $v_o(t)$. (3)

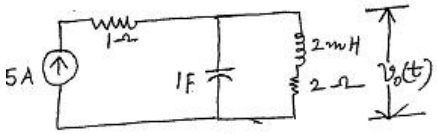


Figure 2

5

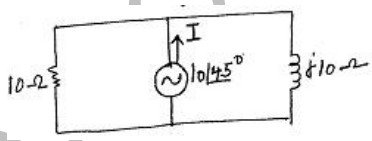


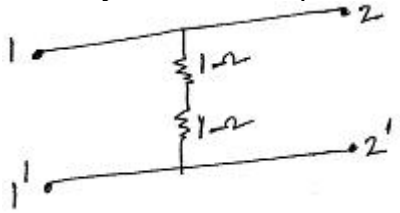
Figure 3

In the circuit of figure 3 find the complex power supplied by the source. (3)

6 State maximum power transfer theorem for ac circuits containing reactive elements. (2)

7 Express the Z-parameters of a network formed by series interconnection of two two port networks. (3)

8 Find the two y-parameters, y_{11} and y_{12} of the two-port network shown in figure 4. (2)



Figure

9 Identify the complex frequencies present in the voltage signal, $v(t)=5+6e^{-3t}+7\cos(8t)$. (2)

10 Find the expressions for the two 3-dB frequencies of a series RLC resonant circuit. (3)

PART – B (50 Marks)

11 Using nodal analysis find the current i_x in the circuit of figure 5. (10)

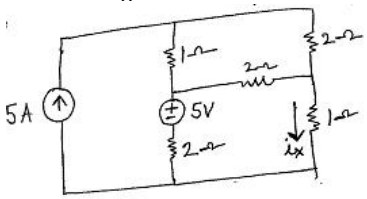


Figure 5

..2

12 (a) Define incidence matrix and find the same for the circuit show below in figure 6. (4)

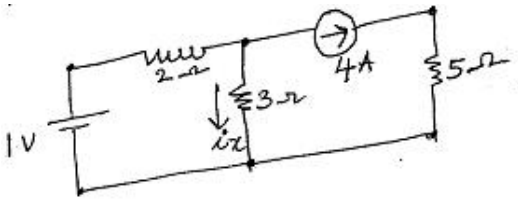


Figure 6

(b) In the above circuit of figure 6 find i_x using tie-set analysis. (6)

13 (a) The switch S in the circuit of figure 7 is closed at t=0. If $i_L(0^-)$=10A, find and sketch $i_L(t)$ for $t \geq 0$. (6)

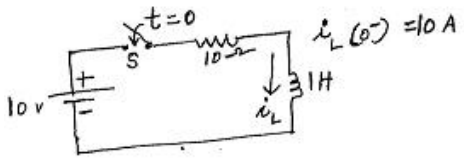


Figure 7

(b) Discuss the different cases of damping in case of second order RLC circuits. (4)

14 (a) Determine the Thevenin's equivalent circuit between the terminal AB in the circuit of figure. 8 (6)

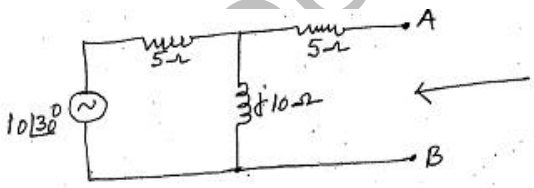


Figure 8

(b) Relate the terms: Complex power, apparent power, active power, reactive power. (4)

15 (a) Derive the ABCD parameters in terms of Z-parameters of a two port network. (4)

(b) Find Y parameters of the circuit of figure 9 . (6)

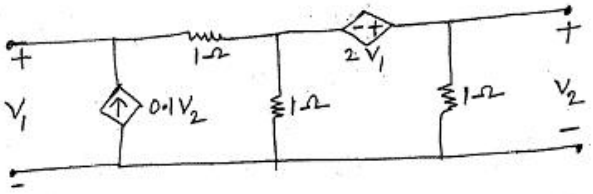


Figure 9

16 (a) Derive an expression for the quality factor of a series resonant circuit. (6)

(b) Find the impedance Z(s) of the circuit of figure 10. (4)

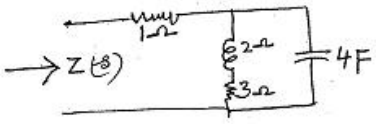


Figure 10

17 Write short notes on the following: (10)

(a) Duality and Dual networks

(b) Half power frequencies and Band width of resonant circuits

(c) Parallel and cascade interconnection of two port networks.

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Code No. 5063 / N

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I - Semester (New)(Main) Examination, December 2015

Subject : Basic Circuit Analysis

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

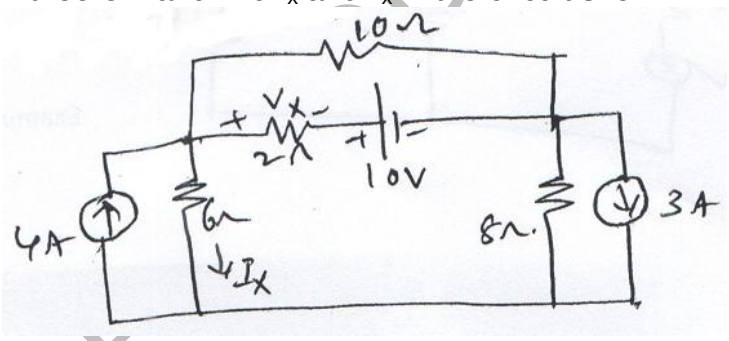
Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

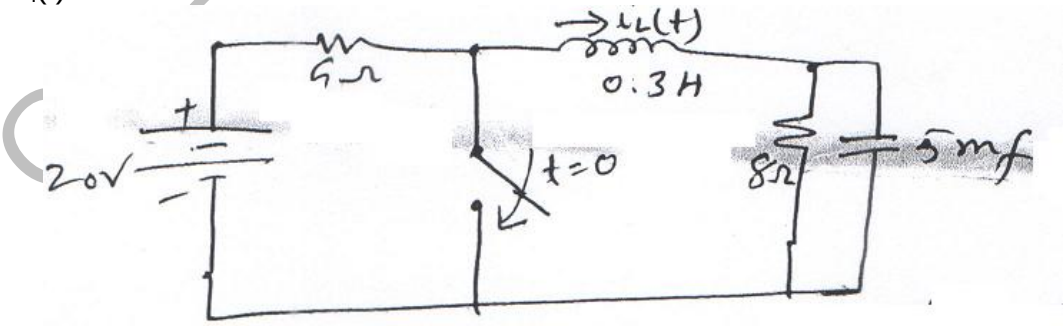
1 State and explain thevinen's theorem?
2 Define tieset and cutest matrix ?
3 Define transient response and steady state response?
4 What are the various solutions depending upon the roots in RLC circuits?
5 Define average power,apparent power and complex power in ac circuit?
6 What are the two rules of dot convention in magnetically coupled circuits?
7 State and explain Reciprocity theorem ?
8 Draw equivalent network of h-parameters?
9 Define Q-factor,selectivity and bandwidth?
10 Calculate Q-factor and resonant frequency for series RLC circuit if R=1ohm,L=3H and C= 0.1mf?

PART_B

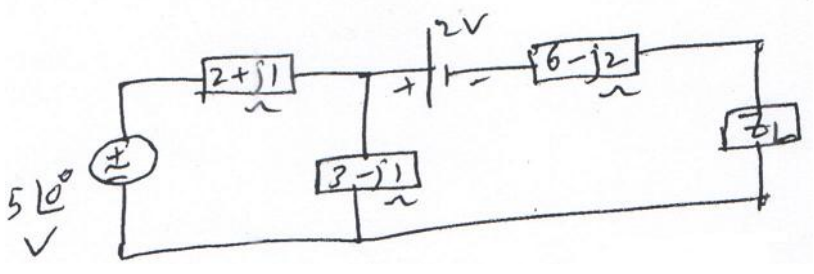
11 Use superposition theorem and find I_x andV_x in the circuit shown?



12 Find $i_l(t)$ for t>=0 in the circuit shown?



13 In the circuit shown find the maximum power delivered to load Z_L ?



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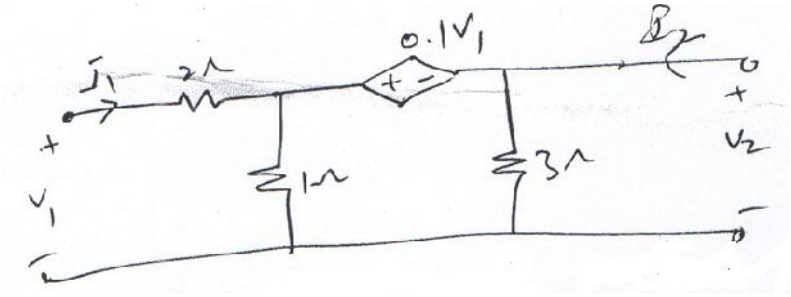
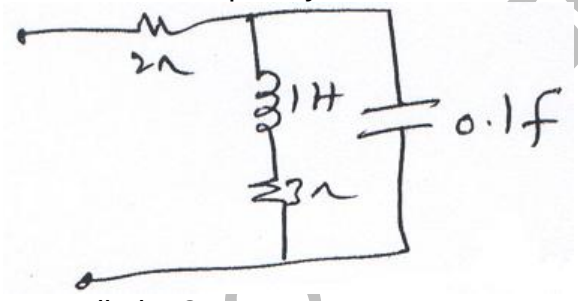
14 (a) Find Z-parameters for the circuit shown?



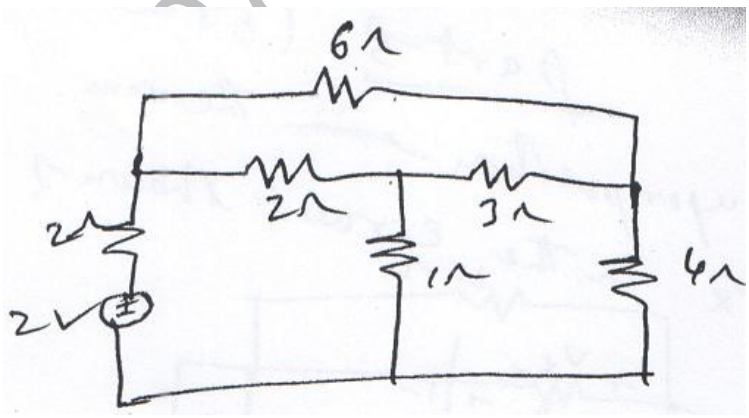
(b) What are ideal and practical transformers?

15 (a) Derive expression for resonant frequency for the circuit shown ?



(b) What is pole-zero constellation?

16 Write tie-set schedule and calculate branch currents and branch voltages for the circuit shown?



17 Write short notes on :
(a) Magnetically coupled circuits
(b) Tellegen's theorem
(c) Duality of networks.

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Code No. 5035 / O

FACULTY OF ENGINEERING

B.E. 2/4 (M/P / A.E) I – Semester (Old) Examination, December 2015

Subject: Metallurgy and Material Science

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 What is the significance of a slip system?
2 What is twinning? How does it differ from slip?
3 What is Bauchinger effect?
4 Give at least three applications of diffusion in mechanical engineering.
5 What is Eutectoid reaction in non ferrous metals?
6 What is full annealing
7 Write the methods of production of pig iron
8 Explain in brief the method of production of Aluminium
9 Explain in brief the method of production of Bronze
10 Write the Muntz metal advantages

PART – B (50 Marks)

11 a) Explain the mechanisms of slip and climb with suitable examples.
b) Explain the effect of Hall-Fetch equation on mechanical properties of materials?

12 a) What is creep? Explain the various regions in the creep curve with suitable diagram.
b) Where do fatigue failures usually originate on a metal selection? Explain how to overcome.

13 a) How cast irons are classified and explain the characteristics of cast irons?
b) Explain construction of phase diagram of iron and iron carbide system with neat diagram.

14 a) Explain Austenite to Martensite transformation of eutectoid steel with help of TTT curves?
b) Discuss tempering process in detail.

15 Sketch a blast furnace. Describe its construction and working.

16 a) Explain the three main metallurgical stages that a sheet of cold-worked metal such as aluminium or copper goes through as it is heated from room temperature to an elevated temperature just below its melting point.
b) Explain various types of stainless steels.

17 Write a short note on any two of the following:
a) Surface heat treatment
b) Low cycle fatigue
c) Fracture under combined stress

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Code No. 5068 / N

FACULTY OF ENGINEERING

B.E. 2/4 (Mech/Prod/A.E.) I - Semester (New)(Main) Examination, December 2015

Subject : Metallurgy and Material Sciences

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 Distinguish between Edge and Screw dislocation.
2 Differentiate between recovery and recrystallization.
3 Define 'fatigue'. Explain the factors effecting fatigue.
4 With a neat sketch explain the three stages of creep.
5 Distinguish the terms solid solution, mixture and compound with examples.
6 State and explain 'Fick's second law of diffusion.
7 Differentiate between austempering and martempering.
8 What do you understand by the word called 'age hardening'?
9 Draw a neat sketch of cupola furnace.
10 What are the different composite materials?

PART – B (50 Marks)

11 (a) Discuss various engineering material properties.
(b) Discuss Griffiths theory of brittle fracture.

12 (a) Explain various methods of improving fatigue properties of materials.
(b) Explain the difference between creep curve and stress rupture curve.

13 (a) Draw and explain the cooling curves for (i) pure metal and (ii) alloy solid solution.
(b) Explain various invariant reactions in binary phase diagram.

14 (a) What are the different types of cast iron? Discuss the manufacture of malleable CI.
(b) Discuss Normalizing as heat treatment process and mention the applications.

15 (a) Discuss any one method of production of Aluminium.
(b) Explain method of production of steel by 'Electric Arc process'.

16 (a) Draw iron-iron carbide diagram and label all points, lines and areas.
(b) Discuss various alloys of copper and their applications.

17 Write short notes on the following:
(a) Effect of alloying elements of T.T.T. curve
(b) Bauchinger effect
(c) Flame hardening

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Code No. 5041 / O

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I – Semester (Old) Examination, December 2015

Subject: Discrete Structures

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 Simplify $\overline{(A \cup B) \cap C \cup B}$ 3

2 Define relative primes with an example 2

3 Give the properties of relations 2

4 How many integer solution are there for the equation C1+C2+C3+C4 = 25 if $0 \le C_i$; $1 \le i \le 4$? 3

5 Define group homomorphism. 2

6 What is the principle of duality? Write the dual of $\neg p \vee \neg q \wedge T_o$. 3

7 Define Hamiltonian graph. 2

8 Define bipartite and complete bipartite graphs with examples. 3

9 Find the generating function $P_d(n)$ where P_d is number of partitions of a positive integer n into distinct summands. 3

10 Write Eulers' formula for planar graphs. 2

PART – B (50 Marks)

11 a) Justify $q \rightarrow p$ is a valid conclusion from $u \rightarrow r$, $(r \wedge s) \rightarrow (p \vee t)$, $q \rightarrow (u \wedge s)$, $\neg t$ using conditional proof. 6

b) What is an equivalence relation and what are equivalence classes? Give an example. 4

12 a) A = {2, 3, 6, 12, 24, 36, 72} R: {(x,y) / x,y ϵ A, x divides y} write the partial order and draw the hasse diagram for R and compute lower bounds, upper bounds, greatest lower bound, least upper bound for {2,12, 24}. 6

b) If f: $A \rightarrow B$, g: $B \rightarrow C$ are two bijectives, then show that g of: $A \rightarrow C$ is also bijective. 4

13 a) Solve the recurrence relation $a_{n+2} - 8a_{n+1} + 16a_n = 8.5\, n^2 + 6.4\, n$, where $n \ge 0$ and $a_o = 12$, $a_1 = 5$. 6

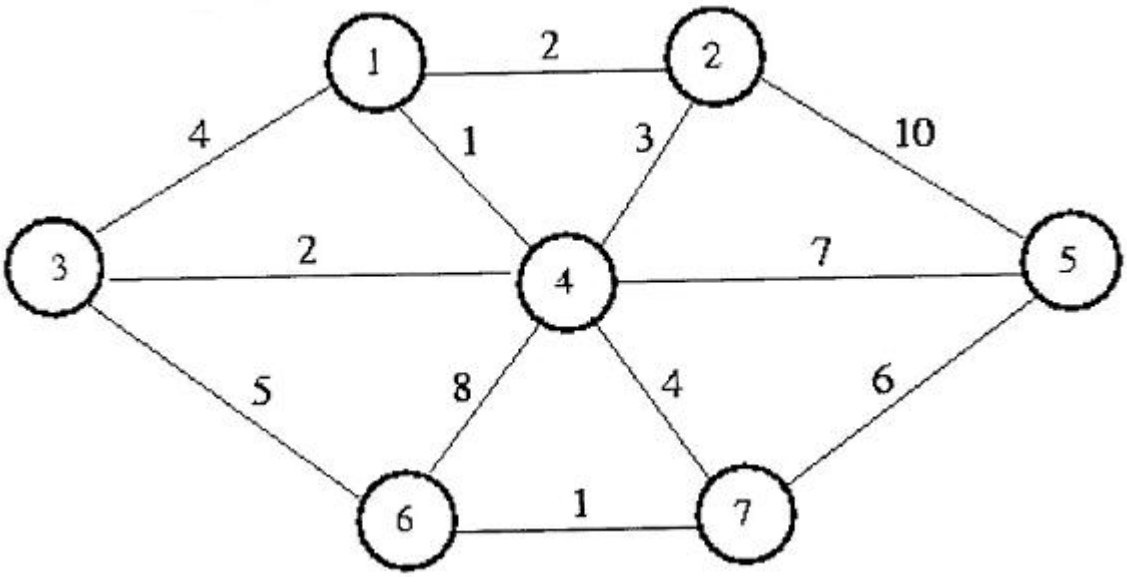
b) Find coefficient of x^{15} in the series $\frac{x^8}{(1-x)^2}$. 4

14 a) Prove every element in a group is its own inverse, then the group is abelian group. 6

b) What is an algebraic system? Write properties of $(Q^+, *)$ where $*$ is a binary operation defined by $a*b = a+b-5ab$. 4

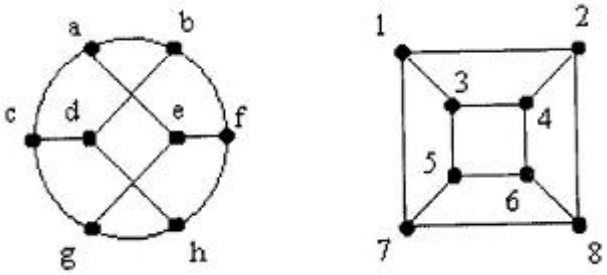
…2.

15 Explain Kruskal's algorithm and find the minimal spanning tree for the following using Kruskal's algorithm. 10



16 a) How many numbers from 1 to 100 are not divisible by 2, 3, 5? 4

b) Show that following graphs are isomorphiscs. 6



17 Write short notes on: 10

a) Summation operator

b) Graph coloring

c) Group codes and their applications

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Code No. 5074 / N

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I – Semester (New) (Main) Examination, December 2015

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 Compute the possible derangements of 1, 2, 3, 4, 5. (2)

2 Construct the truth table for $((\sim p \wedge \sim \text{ɤ}) \wedge \sim q) \rightarrow \sim p$. (3)

3 Define Relation. (2)

4 What is meant by Universal quantifier? (2)

5 Define Equivalence Relation with an example. (3)

6 What do you mean by generating function with an example? (3)

7 Discuss Algebraic structure. (2)

8 What is Bipartite graph K_{mn}. (3)

9 Define and draw dual of a graph. (3)

10 What is chromatic value of wheel graph? (2)

PART – B (50 Marks)

11 (a) Justify p is a valid conclusion from $(\sim p \vee \sim q) \rightarrow (r \wedge s)$, $r \rightarrow t$, $\sim t$. (6)

(b) Simplify the expression $\overline{\overline{(AUB)} \cap C} \cup \overline{B}$. (4)

12 (a) State Pigeonhole principle. (2)

(b) Larry returns from the laundraomat with 12 pairs of socks (each pair with different color) in a laundry bag. Drawing the socks from the bag randomly, he'll have to draw almost how many of them to get a matched pair. (2)

(b) IF A = {1, 2, 3, 4}, give an example of a relation R on A that is (6)

(i) Reflexive and symmetric but not transitive

(ii) Reflexive and transitive but not symmetric

(iii) Symmetric and transitive but not reflexive.

13 (a) Determine the coefficient of x^8 in $\frac{1}{(x-3)(x-2)^2}$. (5)

(b) Solve the recurrence relation

$a_n = 2(a_{n-1} - a_{n-2})$ where $n \geq 2$ and $a_o = 1$, $a_1 = 2$. (5)

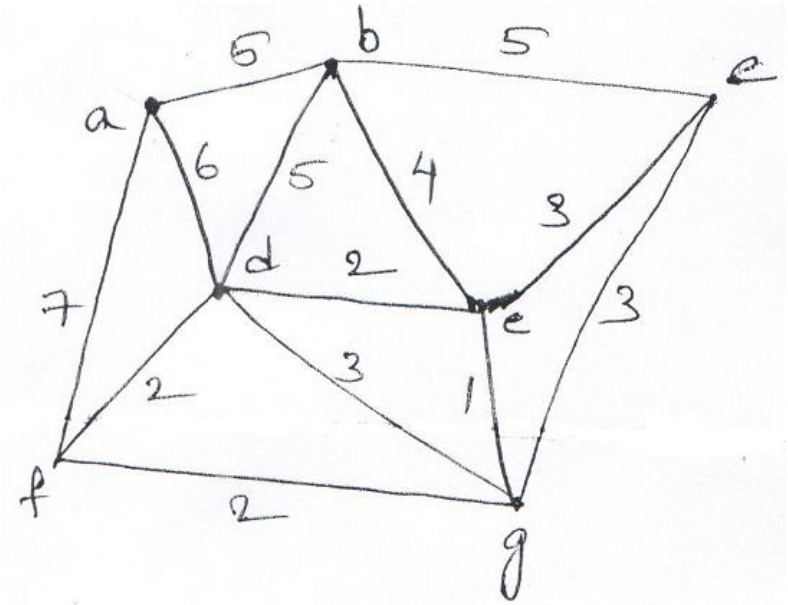
14 (a) What is Group? Define Abelian group, along with properties of algebraic system. (5)

(b) Let ({a, b}, *) be a semigroup where a * a = b show that

(i) a * b = b * a (ii) b * b = a. (5)

..2

15 Explain Kruskals algorithm and find the minimal spanning tree for the following using Krushkals algorithm. (10)



16 (a) Determine the number of positive integers n where $1 \leq n \leq 100$ and n is not divisible by 2, 3, or 5 Here S = {1, 2, 3, ….100} and N = 100 for $n \in S$, n satisfies (6)
(i) condition C_1 if n is divisible by 2
(ii) condition C_2 if n is divisible by 3
(iii) condition C_3 if n is divisible by 5

(b) State the principle of inclusion and exclusion and give the generalization of the principle. (4)

17 Write short notes on the following: (10)
(a) POSET
(b) Hamilton path
(c) Partition of Integers

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Code No. 5047 / O

FACULTY OF INFORMATICS

B.E. 2/4 (IT) I – Semester (Old) Examination, December 2015

Subject: Digital Electronics and Logic Design

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	Realize Ex-OR gate using minimum number of NAND gates.	2
2	Write the VHDL code for the function f = $a'b + ab'$	2
3	Implement 4 to 1 multiplexer using decoders and gates.	3
4	Differentiate between CPLDs and FPGAs	3
5	Write the VHDL code for the D flip-flop	3
6	Differentiate between Latch and flip-flop	2
7	What is Mealy state mode? Draw the state diagram of Mealy state	3
8	Draw the circuit of up counter	2
9	Give the list of elements of ASM charts	2
10	Briefly explain the significance of hazards	3

PART – B (50 Marks)

11	a)	Write in detail about the design process and development process.	5
	b)	Find the minimal POS and SOP forms of F(A,B,C,D)=Σ(0, 1, 3, 6, 7, 8, 9, 13, 15)	5
12	a)	Draw and explain the general structure of FPGA.	5
	b)	Write the VHDL code for full adder in behavioural model.	5
13		Draw and explain the structure and gate level diagram of PLA. Differentiate between PAL and PLA.	10
14	a)	Explain the operation of J-K flip-flop. Write the truth table and characteristic equation.	5
	b)	What are the different types of counters? Explain any one in detail.	5
15	a)	Explain the steps required to design a synchronous sequential circuits.	5
	b)	Discuss about algorithmic state machine charts.	5
16	a)	What is synthesis? How is it different from analysis?	5
	b)	Give the state reduction procedure with an example.	5
17		Write short notes on the following: a) State assignment problem b) Formal model of synchronous sequential circuits	10

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Code No. 5080 / N

FACULTY OF INFORMATICS

B.E. 2/4 (IT) I - Semester (New)(Main) Examination, December 2015

Subject : Digital Electronics and Logic Design

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 Determine whether or not the following expression is valid. (3)

$x_1x_3^1 + x_2x_3 + x_2^1x_3^1$

$= (x_1 + x_2^1 + x_3)(x_1 + x_2 + x_3^1)(x_1^1 + x2 + x_3^1)$

2 Realize XOR gate using minimum no. number of NAND gates. (2)

3 Define PLD. Write two differences between PLA and PAL. (3)

4 Define Shannon's theorem. List two applications of multiplexers. (3)

5 Convert J-K flip-flop to T-flip from and D-flip flop. Draw circuit diagram. (3)

6 List three differences between synchronous counters and asynchronous counters. (3)

7 Distinguish between Moore model and Mealy model. (2)

8 Draw three elements of ASM charts. (2)

9 Define static and dynamic Hazards. (2)

10 Define setup and hold time of a flip flop. (2)

PART – B (50 Marks)

11 (a) Minimize the following expression using K-maps into SOP and POS forms. Realize them with NAND gates only and NOR gates only. (7)
F(A, B, C, D) = Σ m (5, 6, 9, 10, 12, 13, 14, 15) + d(2, 4)

(b) Write VHDL program to implement XOR gate. (3)

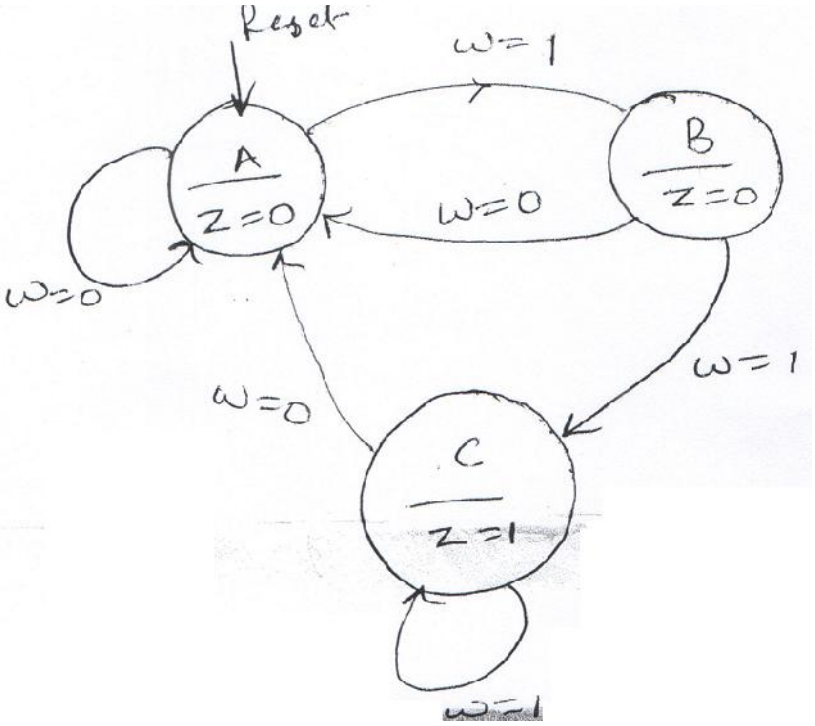
12 (a) Implement the following Boolean function using. (7)
(i) 2 – to – 1 multiplexer
(ii) 4 – to – 1 multiplexer
(iii) 8 – to – 1 multiplexer
$F(w_1, w_2, w_3) = w_1w_2 + w_2w_3 + w_1w_3$
Use Shanon's theorem.

(b) Implement the following Boolean function using PLA. (3)
$f_1 = x_1x_2 + x_1x_3^1 + x_1^1x_2^1x_3$
$f_2 = x_1x_2 + x_1^1x_2^1x_3 + x_1x_3$

13 (a) Draw and explain Gated SR Latch with neat timing diagram. Draw truth table- Mention SR latch disadvantage in the timing diagram. (7)

(b) Explain Johnson counter with neat diagram. (3)

14 (a) An FSM is defined by the following state diagram. Derive a circuit that realizes the FSM using D-flip-flop. Also draw timing diagram. (8)



(b) Convert D flip flop to T-flip flop using excitation table. (2)

15 (a) Minimize the following state table using partition procedure. (5)

Present state	Next state		Output Z
	W=0	W=1	
A	B	C	1
B	D	F	1
C	F	E	0
D	B	G	1
E	F	C	0
F	E	D	0
G	F	G	0

(b) Explain FSM as an arbiter circuit with a neat state diagram. (5)

16 (a) Implement hazard-free circuit for the following Boolean function (5)

$f = x_1x_2 + x_1^1 x_3$

(b) Explain Asynchronous sequential circuits design procedure. (5)

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

(a) Arithmetic comparison circuits

(b) Synchronous sequential circuits

(c) VHDL programming

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