Code No. 427 / CBCS

FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) Examination, December 2017
Subject: Strength of Materials – I

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 Define rigidity modulus and write its relation with Young's modulus.

2 Differentiate between Ductile and Brittle materials.

3 State the assumptions in theory of simple bending.

4 Sketch bending moment diagram for a cantilever beam of span 'l' and subjected to a clockwise couple 'M' at its free end.

5 What is core of a section? Sketch the core for a rectangular section.

6 Sketch the flexural stress and shear stress distribution across a rectangular section.

7 Calculate the circumference stress in a thin spherical shell of diameter 120mm and 12 mm thick, subject an internal pressure of 4 N/mm^2.

8 Discuss in brief, about ellipse of stress.

9 State the transformation laws of product of inertia.

10 What is shear flow? Explain briefly.

PART – B (5x10 = 50 Marks)

11 a) The x, y and z axis are oriented along the length, width and thickness of a rectangular block 200 x 120 x 100 mm. It is subjected to axial forces in the 3-directions:

Px = 120 kN (tensile)
Py = 75 kN (tensile)
Pz = 100 kN (compressive)

Calculate the stresses and strains in the 3 directions, taking modulus of elasticity = $2x10^5$ N/mm^2 and Poisson's ratio = 0.25. 6

b) A conical bar tapers uniformly from a diameter of 4 cm to 1.5 cm in a length of 40 cm. If an axial force of 80 kN is applied at each end, estimate the elongation in the bar. Take E = $2x10^5$ N/mm^2. 4

12 Construct S.F. and B.M. diagrams for the simply supported beam shown in Fig. 1. 10

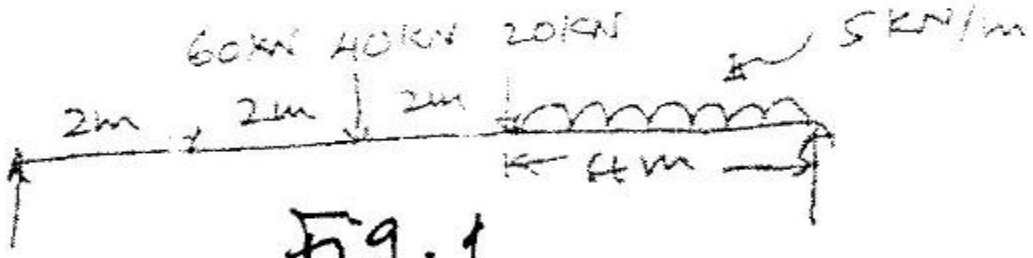

Fig. 1

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13 Find the maximum and minimum stress intensities at the base of a uniform circular chimney, 4m external diameter and 2m internal diameter, 20m high, subjected to horizontal wind pressure of 1.5 kN/m^2 of projected area. The density of masonry is 22 kN/m^3.

14 A 300 x 300mm timber section is strengthened by the addition of a 300mm x 6.25mm steel plates secured to its top and bottom surfaces. The composite beam is simply supported at its ends and carries a U.D.L of 25 kN/m, over an effective span of 6m. Find the maximum flexural stress in the steel and timber at mid span.
$E_s = 2 \times 10^5$ MPa, Et = 0.1×10^5 MPa. 10

15 A pipe of 200mm internal diameter and 50mm thickness carries a fluid at a pressure of 10 MN/m^2. Calculate the maximum and minimum intensities of circumferential stresses across the section. Also sketch the radial stress (pressure) distribution and circumferential stress distribution across the section. 10

16 a) Derive the equation for simple bending theory. 5

b) An I-section beam 340 mm deep and 200 mm wide has a web thickness of 10 mm and flange thickness of 20 mm. It carries a shearing force of 100 kN. Sketch the shear stress distribution across the section. 5

17 a) What do you mean by ellipse of stress. 3

b) Direct stresses of 120 N/mm^2 tension and 90 N/mm^2 compression are applied to an elastic material at a certain point, on planes at right angles. The greater principal stress is limited to 150 N/mm^2. what shearing stress may be applied to the given planes and what will be the maximum shearing stress at the point? 7

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Code No. 433 / CBCS

FACULTY OF ENGINEERING

B.E. (EEE) III – Semester (CBCS) (Main) Examination, December 2017
Subject: Electrical Circuits – I

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

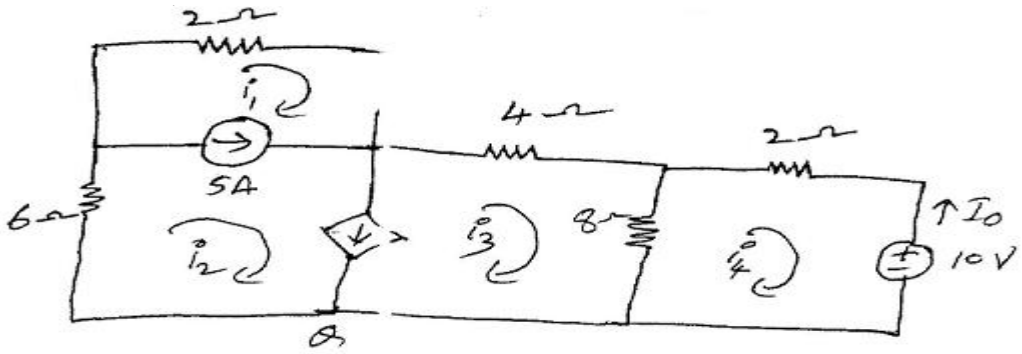
Note: Answer all questions from Part A and any five questions from Part B.

PART – A (20 Marks)

1	Discuss Nodal Analysis and Mesh Analysis.	2
2	Write conversion formula's for Δ to Y and Y to Δ.	2
3	Define bandwidth and Q factor.	2
4	Discuss three step's required to find step response of RL circuit.	2
5	State and explain Norton's theorem.	2
6	Explain steady state response of series parallel circuits.	2
7	Define self and mutual inductances.	2
8	Explain coefficient of coupling.	2
9	Describe initial conditions for RL circuit.	2
10	what are integro-differential equation.	2

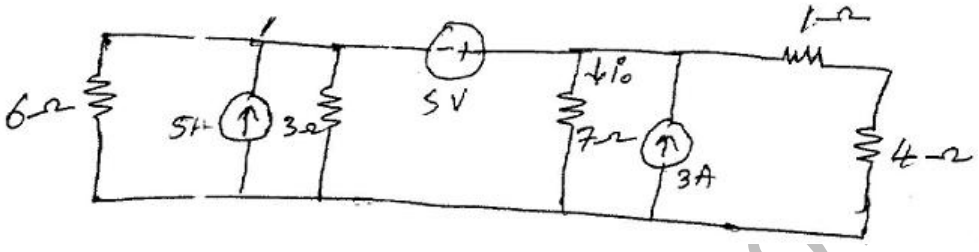
PART – B (5x10 = 50 Marks)

11	a)	What is super node and super mesh analysis.	5
	b)	Using mesh analysis find i_1 to i_4 in circuit below.	5

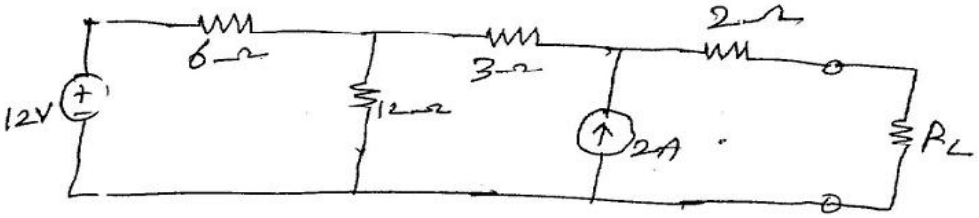


12	a)	Discuss step response of RC circuit.	5
	b)	Explain linearity property and discuss super position theorem.	5

13 a) Find i_o in the circuits given below using source transformation. 5



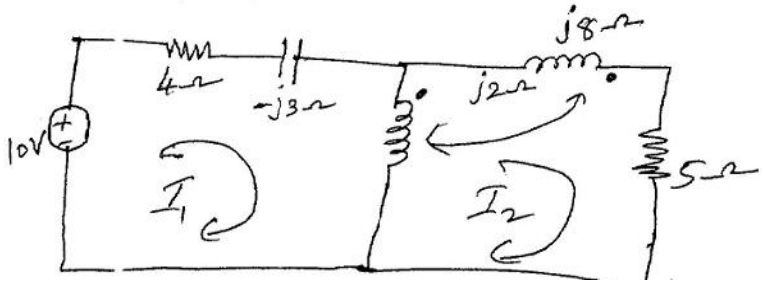
b) State maximum power transfer theorem, find value of RL for maximum power transfer in below Ckt. 5



14 a) Discuss Wyc – Wye connections with neat diagrams and equations. 5

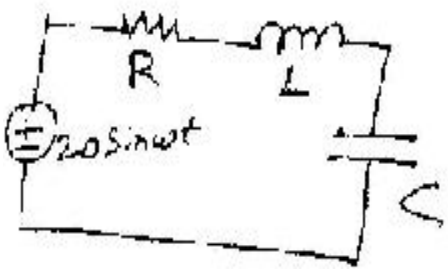
b) A balanced abc – sequence Y connected source with $V_{an} = 100 \angle 10$ V is connected to a Δ-connected balanced load $(8+j4)\Omega$ perphase, calculate I_{Ph} and I_L. 5

15 a) Calculate mesh currents in the circuit below. 5

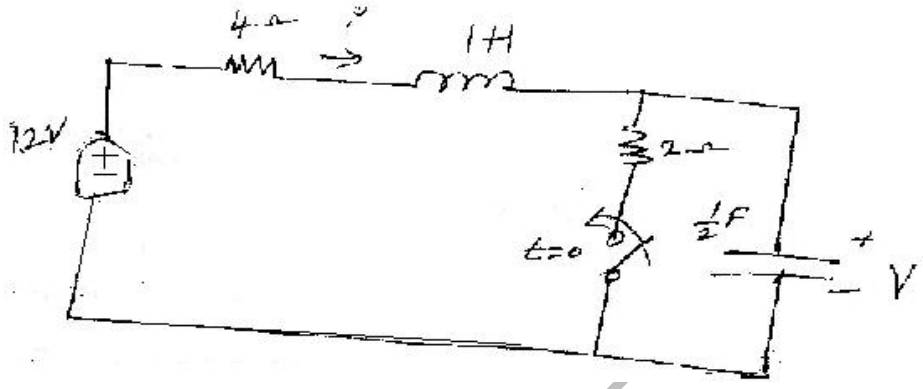


b) In the circuit shown R= 2Ω, L = 1 mH and C = 0.4μF. Find 5

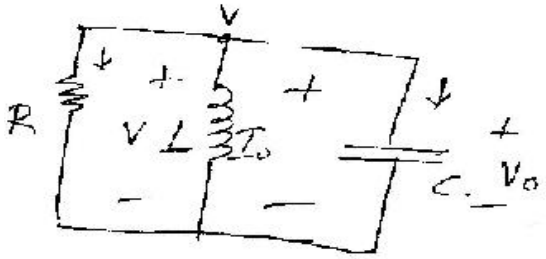
i) Resonant frequency and half power frequency
ii) Q Factor and bandwidth
iii) Determine amplitude of current at W_o, W_1 and W_2.



16 a) Find complete response 'V' and then 'I' for t > 0 in the below Ckt. 5



b) Discuss three possible solutions of a source free parallel RLC circuit. 5



17 a) Discuss impedance and admittance of RL circuit. 2

b) Deduce energy stored in capacitance. 4

c) Discuss source transformation and Star-Delta transformation. 4

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FACULTY OF ENGINEERING

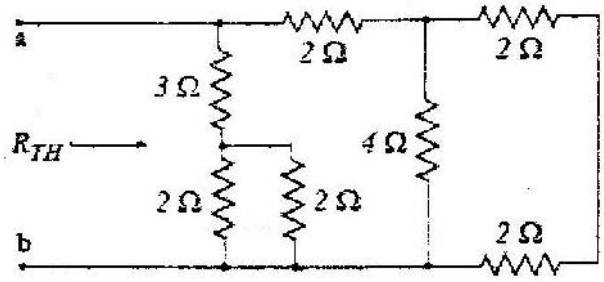
B.E. (Inst) III-Semester (CBCS) Main Examination, December 2017
Subject: Network Theory

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

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

Paper – A

1. A series R-C circuit consists of resistor of 10Ω and capacitor of 0.1F. A constant voltage of 20V is applied to the circuit at t=0. What is the current in the circuit at t=0? [2M]
2. Draw power triangle and write the units of various powers in AC circuits. [2M]
3. Define mutual inductance and give the relation between mutual inductance and coefficient of coupling. [2M]
4. Derive an expression for energy stored in conductance. [2M]
5. Find Thevenins resistance between terminal a & b. [2M]



6. Define duality. [2M]
7. The power in 3-ϕ circuit is measured using 2- wattmeters. If the total power is 100KW and power factor is 0.66 leading, what will be the reading of each wattmweter. [2M]
8. The Z- parameters of circuit are given by $Z_{11} = 4\Omega$, $Z_{12} = Z_{21} = 10\Omega$ & $Z_{22} = 6\Omega$, obtain transmission parameters. [2M]
9. Define and explain the terms selectivity and quality and how they are related. [2M]
10. A series RL circuit is supplied with 10V. Find the power factor and active power in the circuit. [2M]

PART-B

11. a) Define RMS value, average value , peak factor and form factor. [4M]

b) For the waveform shown in the figure 1 find RMS value, average value, peak factor and form factor. [6M]

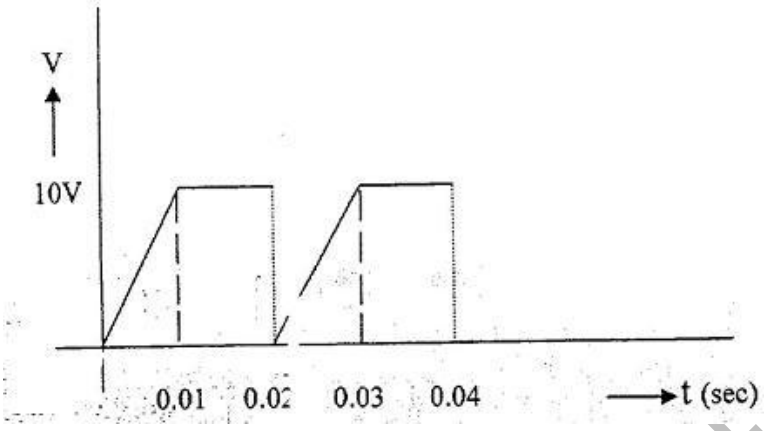


Fig 1

12. Determine power dissipated by 3Ω resistor in the circuit shown in figure 2 using node voltage method. [10M]

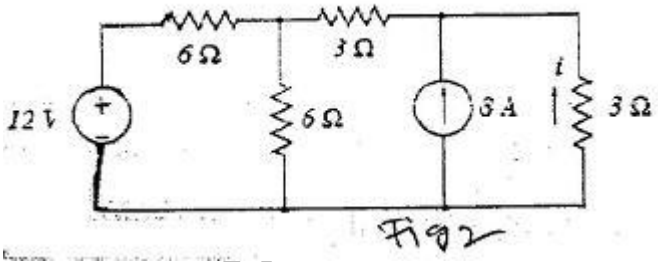


Fig 2

13. Derive relation between line and phase quantities with a neat diagram for star connected circuit. [10M]

14. a) State and explain Thevenins theorem. [4M]

b) Find voltage across 2Ω resistor using superposition theorem in the figure shown in fig 3. [6M]

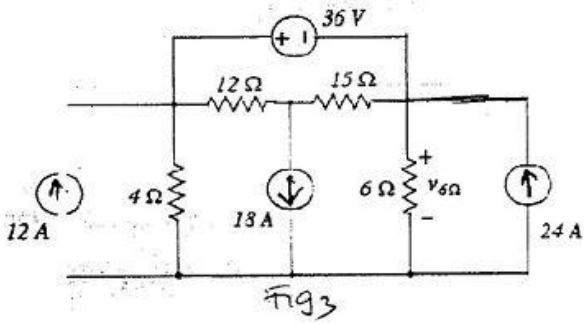


Fig 3

15. a) The following equations give the voltages V_1 and V_2 at the two ports of a teo port network. $V_1=5I_1+2I_2$, $V_2=2I_1+I_2$. A load resistance of 3Ω is connected across port 2. Calculate the in[put impedance. [5M]

    b) The Z – parameters of a two port network are $Z_{11}=5\Omega$, $Z_{22}=2\Omega$, $Z_{12}=Z_{21}=3\Omega$. Load resistance of 4Ω is connected across the output port. Calculate input impedance. [5M]

16. A series RLC circuit has the values: R = 10.9Ω, L=0.01H, C=100μF. Calculate resonant frequency quality factor, bandwidth and half power frequencies. [10M]

17. For the circuit shown in the figure 4 I_s= -0.15 A, R = 1KΩ, L = 70mH. The initial current in the inductor is 0.05A. find the time when the inductor current is equal to -0.05A also find the inductor voltage at that time. [10M]

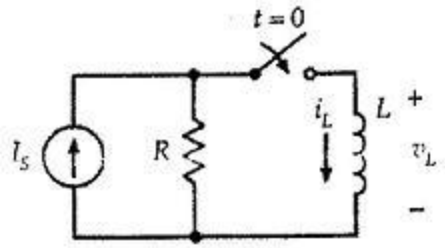


Fig 4

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Code No. 440/CBCS

FACULTY OF ENGINEERING

B.E (ECE) III – Semester (CBCS) (Main) Examination, December, 2017

Subject : Switching Theory & 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. Convert the given hexadecimal number 3AC5.F into its equivalent octal and binary. 2M
2. State Demorgan's theorem. 2M
3. Realize two input XNOR gate with minimum number of NOR gates. 2M
4. Simplify the following Boolean function using k-map
   $F(x,y,z)=\sum m(0,2,3,4,5,7)$ 2M
5. Define static hazard free situation with example. 2M
6. Write any three applications of multiplexer. 2M
7. Write the characteristic equation and excitation table for J K Flip Flop. 2M
8. Distinguish between decoder and demultiplexer. 2M
9. Compare asynchronous and synchronous counter. 2M
10. List out the applications of shift registers. 2M

PART – B (20 MARKS)

11. a) Perform arithmetic operations $(-42)_{10}$-$(-13)_{10}$ in binary using1's and 2's complement representation. 5M
    b) Simplify the following expression using Boolean algebra
    i)x'+y'+xyz' ii) a+a'b+a'b'c+a'b'c'd+ 5M

12. Minimize the following function using Quine Mc Cluskey method.
    $F(v, w, x, y, z)= \sum m(0,2,6,8,9,13,14,15,16,19,24,27,31)$ 10M

13. Design a circuit which converts BCD code into Excess -3 Code and draw its realization. 10M

14. a) Explain the operation of Master Slave J K Flip Flop. 5M
    b) Design a 4 by 2 priority encoder and implement it with logic gates. 5M

15. Design a sequential circuit with minimum hardware to produce the output when the input data stream contains 010. 10M

16. a) Simplify the following function using Boolean algebra and draw logic diagram for simplified function F(x,y,z)=(x+y)(x+yz)+x'y'+x'z'. 4M
    b) Obtain multilevel NOR circuit from a given Boolean function
    Y=[(A'+B)(C+D)']E+(F+G'). ' 6M

17. a) Design a divide by 64 counter using 7493 IC's. 5M
    b) Explain set up time and hold time. Also how to avoid Flip Flop enter into meta stable state. 5M.

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Code No. 445 / CBCS

FACULTY OF ENGINEERING

B.E (M / P) III Semester (CBCS) Main Examination of December 2017
Subject: Metallurgy and Material Science

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. What are the different imperfections in crystals?
2. Differentiate ductile fracture with brittle fracture
3. What is low cycle fatigue?
4. List the applications of diffusion in mechanical engineering.
5. What are the different types of cat irons?
6. Distinguish the terms solid solution, mixture and compound with examples.
7. Distinguish between carburizing and nitriding.
8. What is the purpose of heat treatment and how it is different from alloying?
9. Explain Electro slag refining process.
10. What is HSS? List some of its properties and applications.

PART – B (5 x10 = 50 Marks)

11. (a) Explain the influence of recovery, recrystallisation and grain growth on mechanical properties.
    (b) Explain the mechanism of plastic deformation by slip.

12. (a) Explain the three stages of creep with the help of a neat diagram.
    (b) Define "Fatigue". Explain various factors which affect the fatigue life of a material.

13. (a) How Cast irons are classified? Explain the manufacture of malleable cast Iron.
    (b) Explain the construction of phase diagram of partial eutectic alloy system with a neat sketch.

14. (a) Differentiate between annealing and normalizing.
    (b) Draw the TTT diagram for 0.8% carbon steel and label the phases.

15. (a) Explain the production of steel using Bessemer converter.
    (b) Explain the effect of important alloying elements on properties of steel.

16. (a) Explain the production of steel by L-D process with a sketch.
    (b) What is case hardening treatment? Explain Carbo-nitriding process.

17. Write short notes on:
    (a) Strain Hardening
    (b) Cumulative Fatigue
    (c) Ductile cast iron

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Code No. 448/CBCS

FACULTY OF ENGINEERING

B.E. (AE) III- Semester (CBCS) Main Examination, Dec, 2017

Subject: Thermal Engineering

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

Note: Answer all questions from Part-A and any Five Questions from part-B

PART – A

1. Define Thermodynamic equilibrium.
2. What are the limitations of 1st law of Thermodynamics?
3. Define Heat Pump and Heat Engine.
4. Define C.O.P of Refrigeration.
5. State the applications of compressed air.
6. State the 2nd law of Thermodynamics in terms of Kelvin Plank's statement.
7. Define Dryness function of steam.
8. What is the purpose of regeneration in Turbine?
9. Write the advantages of fuel cell.
10. Write the advantages of Hybrid systems.

PART – B

11. a) Derive the steady flow energy equation for Nozzle.

    b) A blower handles 1 kg/s at 20^0C and consumes a power 1 Kw. The inlet and outlet velocities of air are 100m/s and 150 m/s respectively. Find the exit air temperature assuming adiabatic condition. Take C_p=1.005 KJ/Kg K.

12. A Reversible Engine operating between 600^0 C and 40^0 C. This engine drives a reversible Refrigerator operating between 40^0C and -18^0C. Still there is a net work out put of 370 KJ and the heat received by the engine is 2100KJ . Determine the cooling effect.

13. Obtain the expression for change of entropy during a) Constant pressure Process.
    b) Isothermal process c) Polytropic process.

14. Explain the concept of Reheating and Regeneration employed in Gas turbines with the help of neat sketches Draw T-S diagrams for the same.

15. Explain the working principle of Vapour Compression Refrigeration System with neat sketch and T-S and P-h diagrams for the same.

16. A single stage double acting air compressor of 150 Kw power takes air in at 1 bar and delivers at 6 bar. The compression follows the law $PV^{1.35}$=C. The compressor runs at 160 r.p.m with average piston speed of 160 rpm. Determine the size of the cylinder.

17. Write a short note on:
    a) Hybrid Vehicles
    b) Solar Power Vehicles

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Code No. 453/CBCS

FACULTY OF ENGINEERING

B.E. (CSE) III - Semester (CBCS) (Main) Examination, December 2017
Subject: Discrete Mathematics

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. Write truth table for $p \leftrightarrow q$
2. What is well-ordering principle?
3. Define inclusion-exclusion principle.
4. What is derangement?
5. Write general form of linear homogenous recurrence relation
6. What is generating function?
7. What is monoid?
8. Define group.
9. Define isomorphism.
10. What is minimum spanning tree?

PART-B (50 Marks)

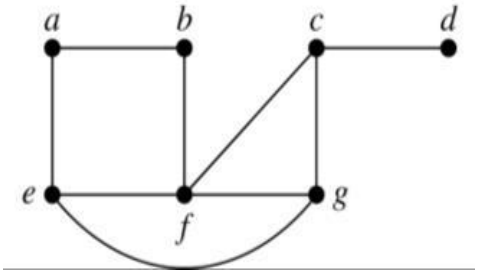
11.a) Prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ by using membership table method (5M)
b) Prove that $\sim(pvq) \leftrightarrow (\sim p) \wedge (\sim q)$ are logically equivalent (5M)

12. a) How many derangements are possible with 4 objects? (5M)
b) If $f(x)= e^x$, $g(x)= \sin x$ then find fof(x), fog(x),gof(x),gog(x) (5M)

13. a) Solve recurrence relation $a_n=5a_{n-1} – 6a_{n-2}$ with $a_0=1$, $a_1=1$, $n \geq 2$ (5M)
b) Find number of solutions of e1+e2+e3=17 where e1,e2,e3 are non-negative integers

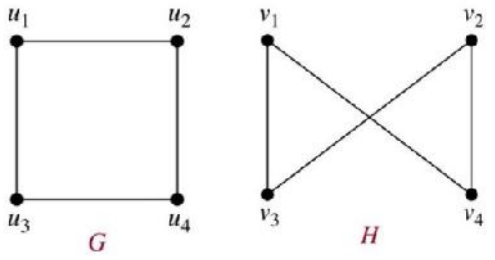
with 2<=e1<=5, 3<=e2<=6, 4<=e3<=7 (5M)

14.a) Find spanning tree of following graph (8M)



b) Define complete graph with an example (2M)

15.a) Show that graphs G & H are isomorphic (8M)



b) What is hamilton circuit? (2M)

16. Write short notes on

a) Semi-groups (5M)

b) Homomorphism (5M)

17.a) Explain kruskal's algorithm with an example (6M)

b) Discuss about general properties of algebraic system (4M)

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Code No. 455/CBCS

FACULTY OF INFORMATICS

B.E. 3/4 (I.T)(CBCS) III - Semester (Main) Examination, December 2017
Subject: Discrete Mathematics

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. Use truth table to verify the equivalence pv(p^q)⇔p.
2. Determine whether the integers 10,17 and 21 are pairwise relatively prime.
3. Find the hexadecimal expansion of $(177130)_{10}$.
4. Find the GCD of 414 and 662 using the Euclidean algorithm.
5. Define an equivalence relation.
6. Give an inductive definition of the factorial function F(n)=n!.
7. Construct the Hasse diagram for the poset ({1,2,3,4},≤).
8. Define a)Rooted tree b) Complete binary tree.
9. Define a minimum spanning tree.
10. What is the value of the postfix expression 723*-4↑93/+?

PART-B (50 MARKS)

11. a) Show that pv(qΛr) and (pvq)Λ(pvr) are logically equivalent using truth table method. (5)
    b) Show that ~(pv(~pΛq)) and ~pΛ~q are logically equivalent by developing a series of logical equivalences. (5)
12. a) Use mathematical induction to show that $1+2+2^2+\ldots.+2^n=2^{n+1}-1$ for all nonnegative integers n. (5)
    b) Give a recursive version of binary search algorithm. How do you prove a recursive algorithm correct? (5)
13. a) Find an explicit formula for the Fibonacci numbers. (5)
    b) Find all the solutions of the recurrence relation $a_n=3a_{n-1}+2n$. What is the solution with $a_1=3$? (5)
14. a) Prove that a tree with n vertices has n-1 edges. (5)
    b) What are the different tree traversal mechanisms? Explain with examples. (5)
15. a) Write the procedure for depth first search and explain how to find a spanning tree for a graph using depth first search. (5)
    b) Explain Kruskal's algorithm to find the minimal spanning tree of a graph with an example. (5)
16. a) Define a bipartite graph an give an example. (2)
    b) What is the chromatic number of K_n? Explain. (4)
    c) What are the different ways of representing graphs? Explain. (4)
17. a) Find the k-maps for a)$xy+x\bar{y}$ b)$\bar{x}y+x\bar{y}$ c)$\bar{x}\,\bar{y}+\bar{x}y+x\bar{y}$ and simplify these sum-of-products. (5)
    b) Explain the Quine-McCluskey method to simplify a sum-of-products expression. (5)

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Code No. 28

FACULTY OF ENGINEERING

B.E 2/4 (Civil) I – Semester (Back log) Examination, December, 2017
Subject : Engineering Materials and construction

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

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

Part – A (10 X 2 ½ = 25 MARKS)

1. Name the type of rocks according to geological classification.
2. What are the harmful ingradients in brick earth?
3. What are the uses of acid – resistant cement?
4. What are the main types of sand according to the natural source?
5. What are the precautions to be taken while preparing a cement mortar?
6. What is the importance of compaction?
7. What are the important qualities of timber?
8. Differentiate the application of white wash and colour wash
9. Name the components of scaffolding and there uses.
10. What is the importance of recycled materials in construction

PART B (50 Marks)

11. a) How does the deterioration of stone take place? Describe briefly the methods commonly used for their conservation. (5)
    b) What are the various stages involved in manufacturing of bricks? (5)
12. a) List any three types of cement and explain properties of each with specific use.
    b) Explain the grading of aggregates and its importance (5)
13. a) What is mortar? Give its types. Give typical proportion of mortars for various types of masonry (5)
    b) What are the factors affecting workability and also mention to improve the workability of concrete (5)
14. a) Explain about the Seasoning of Timber. (5)
    b) What is soft distempers? How is soft distemper identified? What are the advantages and disadvantages if soft distemper (5)
15. a) Explain in detail about two cusped flat arch
    b) Explain the remedies for minimizing defects in plastering work (5)
16. What are scaffoldings? Explain in detail the different types of scaffolding with neat sketches. (10)
17. Write short notes on the following:
    a) Hallow building blocks (3)
    b) Specifications of reinforcing steel (4)
    c) Indian standard specifications for formwork (3)

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Code No. 34

FACULTY OF ENGINEERING

BE 2/4 (EE / EEE) I - Semester (Backlog) Examination, December, 2017
Subject: Electronics Engineering - I

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	Draw the V-I characteristics of p-n junction diode	2
2	Distinguish between Zener and Avalanche breakdown	3
3	Explain about various filters	3
4	What is ripple factor	2
5	What is thermal runaway	2
6	When a reverse voltage of 10V is applied between gate and source of JFET the gate current is 0.001μF. Determine the resistance between gate and source	3
7	List out differences between DIAC and TRIAC	2
8	List out the features of UJT	3
9	Explain the effect of by pass capacitor on LF response	3
10	What is distortion in amplifier	2

PART – B (50 MARKS)

11	a)	Explain different types of PN junction formation techniques	5
	b)	Derive diode current equation under forward and reverse bias	5
12	a)	Explain the working of Half wave and Full wave rectifier with neat circuit	5
	b)	Compare LED and LCD	5
13	a)	Explain with suitable diagrams operation of CE, CB & CC configuration in BJT	5
	b)	Explain the operation of SCR with neat circuit diagram	5
14	a)	Explain in detail about difference amplifier	4
	b)	Consider a two state CE-CC cascade amplifier having $h_{ie} = h_{ic} = 2K$; $h_{fe} = 50$; $h_{fc} = -51$; $h_{re} = 6 \times 10^{-4}$; $h_{rc} = 1$ and $h_{oe} = h_{oc} = 25uA / V$ find the input impedance, voltage gain and current of Individual stages as well as combination. Assume values if required.	6
15	a)	Write short not3es on enhancement MOSFET	5
	b)	Discuss in detail JFET formation	5
16	a)	Describe the working of a full-wave rectifier with (i) L-section (ii) Pi-section filter	6
	b)	Derive the relationship between the beta ( ) and alpha (~) of a transistor	4
17		Write short notes on the following: a) CRO b) Biasing Circuit Design	10

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Code No. 39

FACULTY OF ENGINEERING

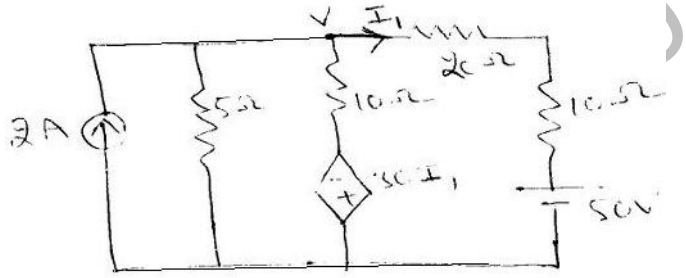
B.E 2/4 (ECE) I – Semester (Back log) Examination, December, 2017
Subject : Basic circuit analysis

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

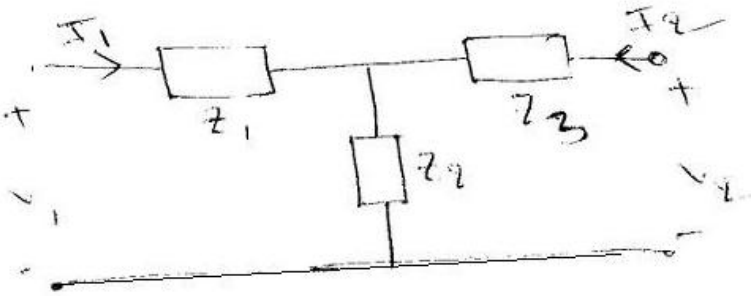
Note: Answer all questions from Part – A & Any five questions from Part – B.

Part - A (25 Marks)

1. State and explain Kirchhoff's laws of a network with one example (2)
2. Find voltage across the 5Ω resistor in the network shown below (3)



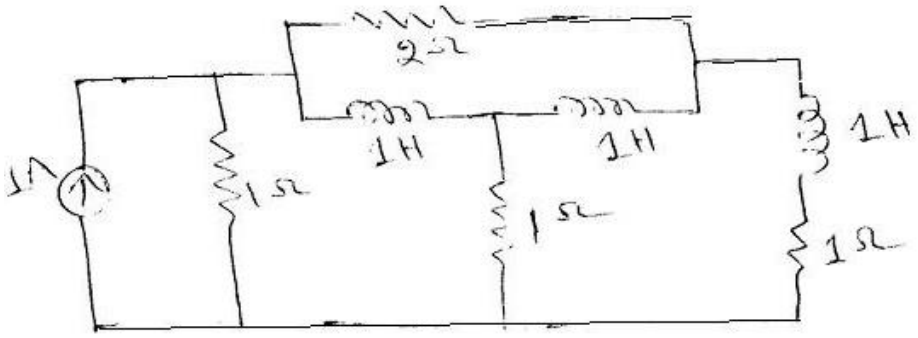
3. Explain zero state response and zero input response with one example (3)
4. Why is it impossible to change the current through inductor, voltage across a capacitor by a finite amount in zero time (2)
5. A voltage V(t) = 177 sin (314t+10^{o}) is applied to a circuit, it causes a steady state current to flow, which is described by I (t) = 14.14 sin (314t-20^{O}) Determine the power factor and average power delivered to circuit (3)
6. What is reciprocity theorem derive condition for reciprocity of a two port network (3)
7. Find Z- parameters of a network shown below (3)



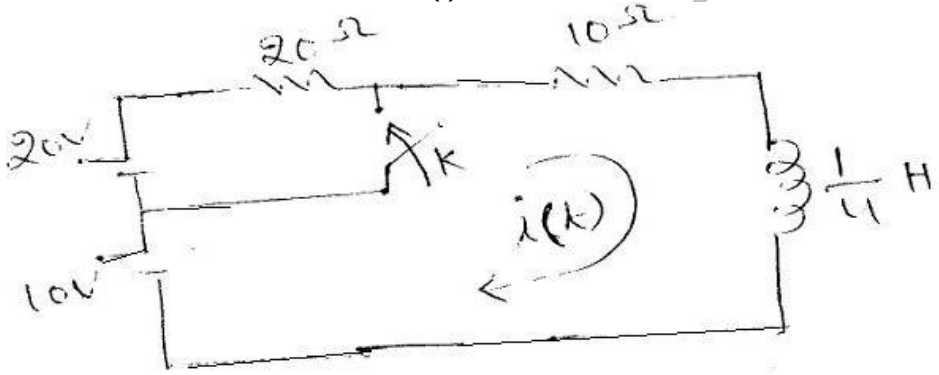
8. What is band width? What is the relation between band width and quality factor (2)
9. What is quality factor? Derive the quality factor expression for series RLC network (2)
10. Define steady state and Transient response (2)

Part - B (50 MARKS)

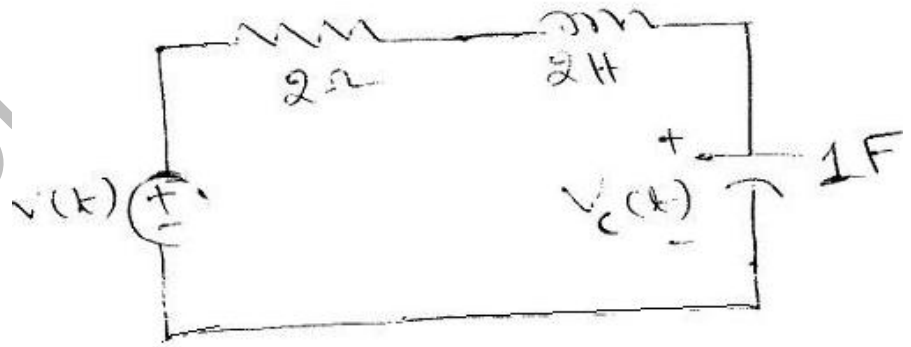
11. For the network shown below draw its graph and write a) incidence matrix b) tie-set matrix c) cutest matrix (10)



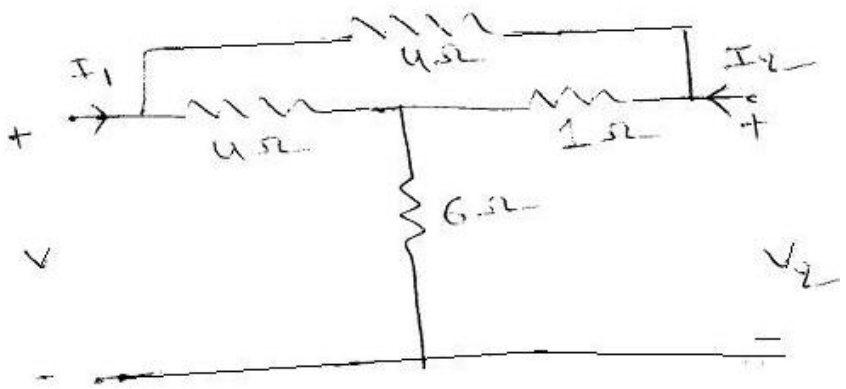
12 In the network show below a steady state is reached with the switch K is opened. At t=o, the switch K is closed find current i(t) for t>o (10)



13. Determine the expression for $V_c(t)$ in the network show below. Find $V_c(t)$ When $V(t)=e^{-t}$ u(t), V(t)= 20 sin(5t) (10)



14. Find the equivalent T-network for the network shown below (10)



15. A Series RLC circuit is excited from a constant voltage with variable frequency. The current in the circuit becomes maximum at a frequency of $\frac{800}{2\pi}$ Hz and falls to half of maximum value at $\frac{600}{2\pi}$ Hz. If the resistance in the circuit is 3Ω Find L, C values (10)

16. a) Construct pole - zero plot for the transfer function V(s) $\frac{8S}{\left(s^{2}+9\left(S2+6S+9\right)\right)}$ (3)
    b) Derive over damping, critical damping and under damping conditions with respect to series RLC circuit (7)

17. Explain the following
    a) Norton's theorem with one example (4)
    b) Driving point impedance and admittance function with one example (3)
    c) Tellegen's theorem with one example (3)

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Code No. 46

FACULTY OF ENGINEERING

B.E. 2/4 (M/P) I - Semester (Backlog) Examination, December 2017
Subject: Machine Drawing

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 Sketch a conventional representation of Internal and external threads. (5)

2 Sketch a taper sunk key and double headed feather key. (5)

3 Draw the sectional front view and the top view of double riveted butt joint with double strap, zigzag arrangement to join plates of 14 mm thick. Show all the dimensions. (5)

4 Draw a Sectional front view and top view of a figure 1. Shown below. (10)

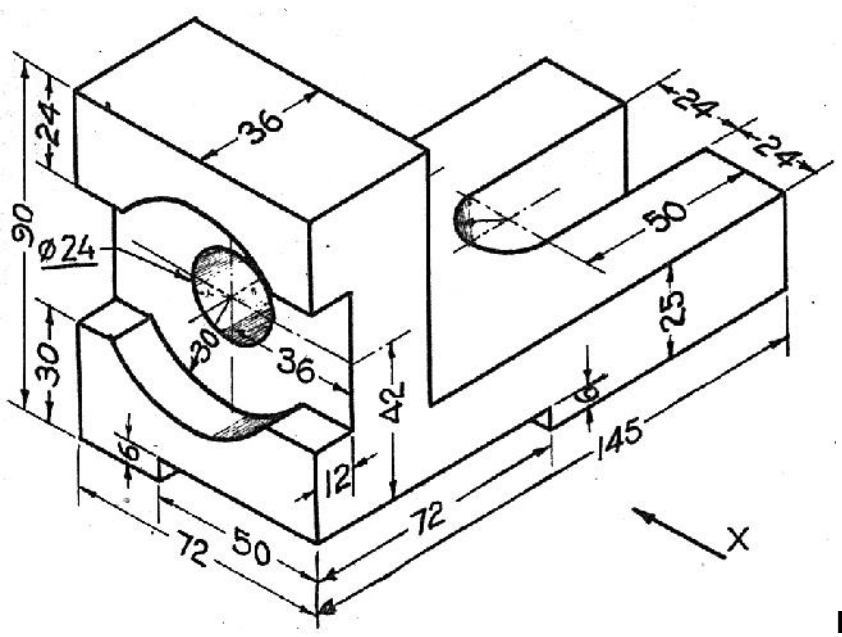
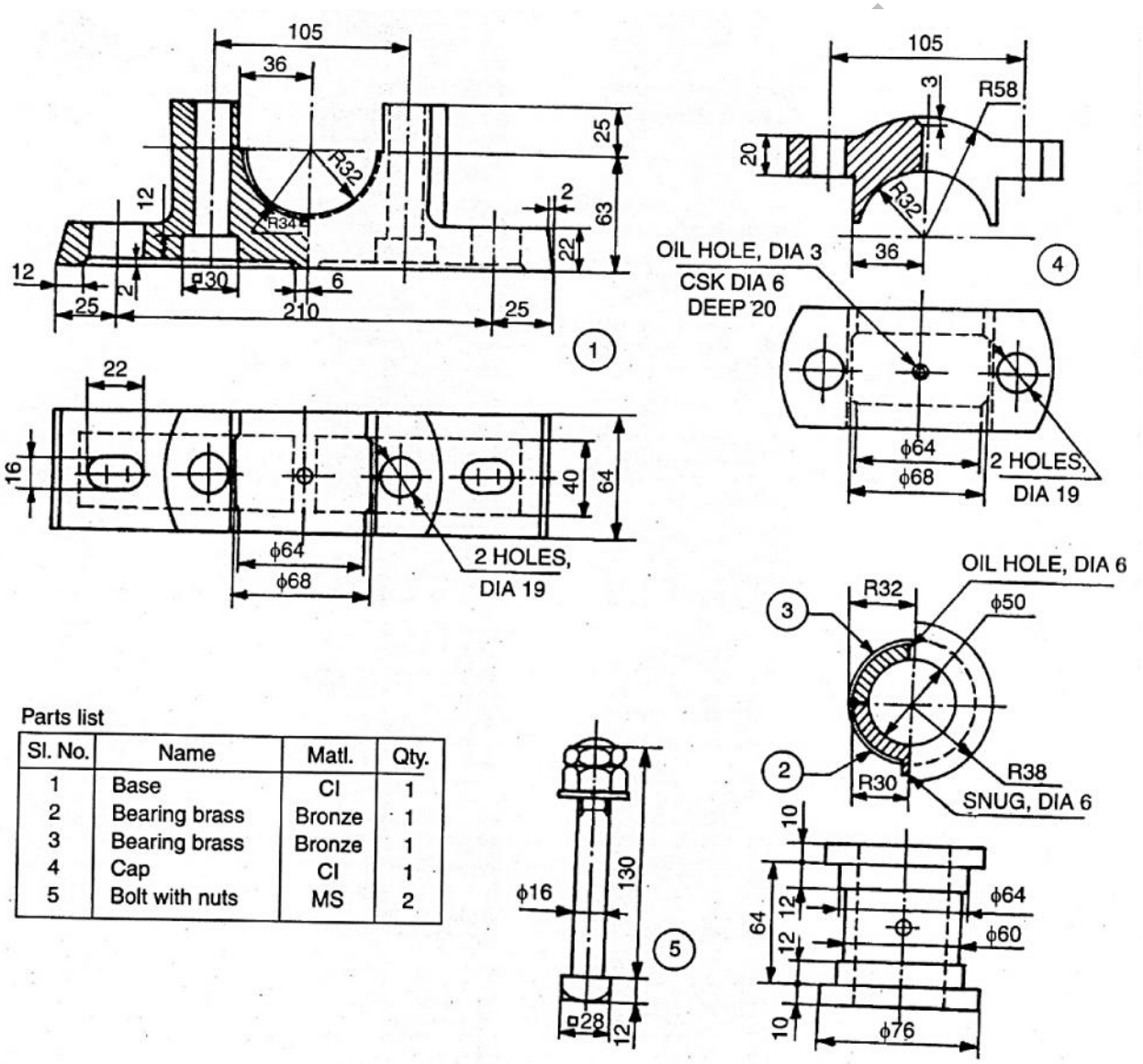


Fig. 1

PART - B (50 Marks)

5. Draw Half-sectional front view and top view of a Plummer block is assembled state shown in figure .2.



Parts list

Sl. No.	Name	Matl.	Qty.
1	Base	CI	1
2	Bearing brass	Bronze	1
3	Bearing brass	Bronze	1
4	Cap	CI	1
5	Bolt with nuts	MS	2

Fig. 2

*****

Code No. 50

FACULTY OF ENGINEERING

B.E. 2/4 (AE) I - Semester (Backlog) Examination, December 2017

Subject: Automotive Engineering Drawing

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)

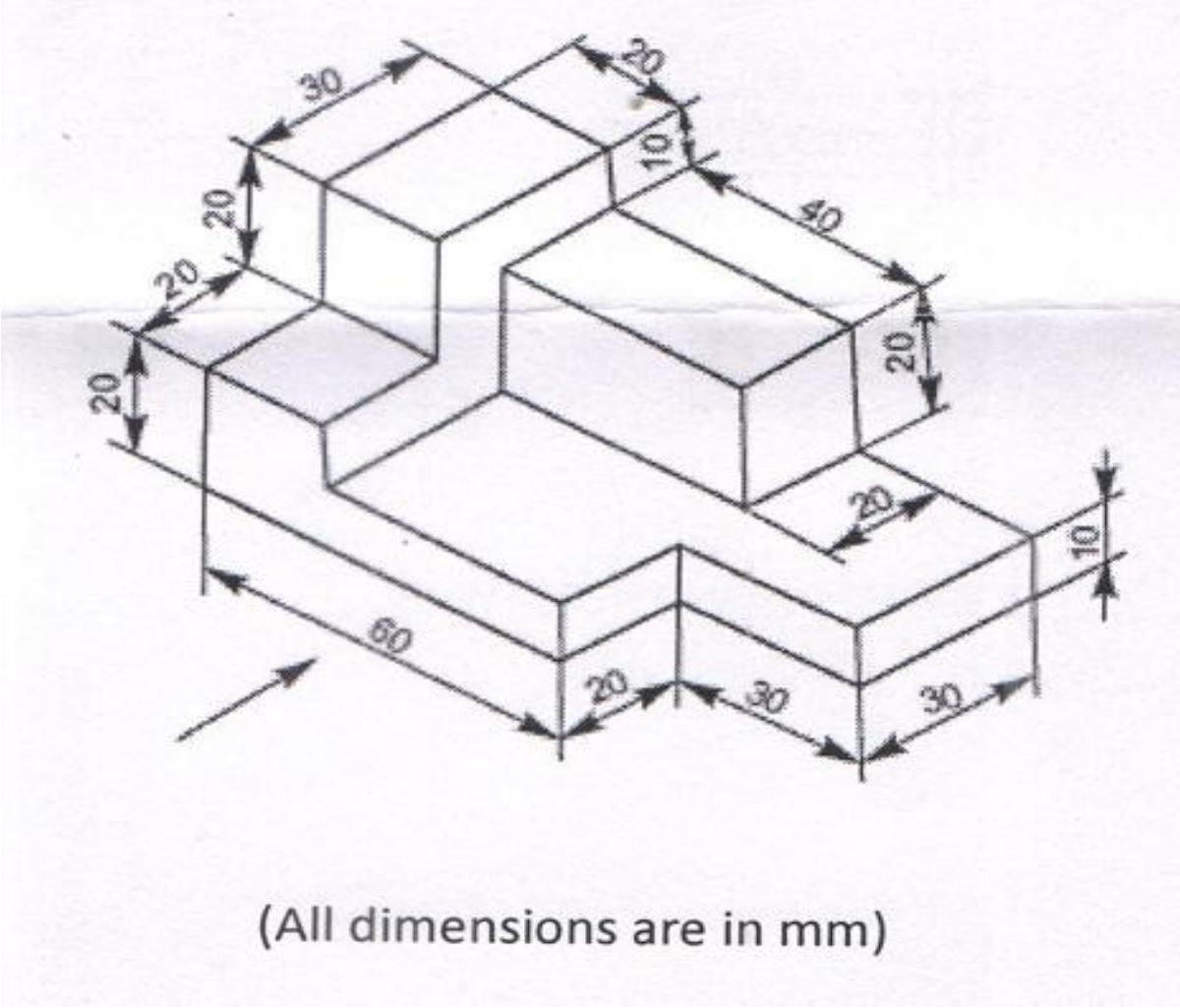
1 Sketch a socket and spigot joint to connect two rods of 25mm diameter.

2 Sketch a double riveted chain lap joint for 9mm plates. (5)

3 Sketch the conventions for different engineering materials (any 3). (5)

4 Sketch feather key and woodruff key using suitable dimensions. (5)

5 Draw the front view and top view for the figure shown below. (5)

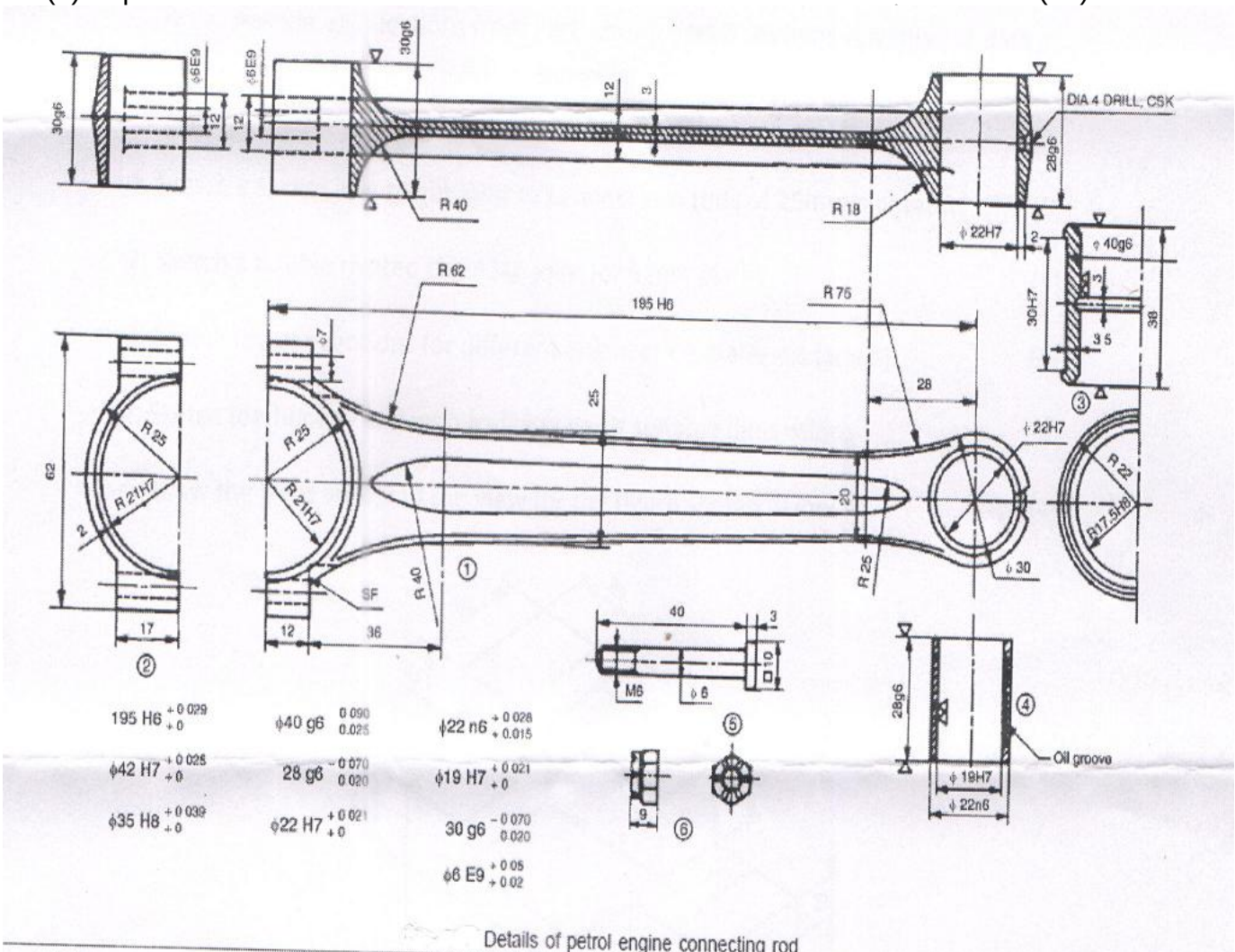


PART – B (50 Marks)

6 Assemble all the components shown in figure 2 to form connecting rod assembly and draw

(a) Full sectional Front views (30)

(b) Top view (20)



Details of petrol engine connecting rod

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

Petrol engine connecting rod

All dimensions are in mm)

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Code No. 52

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I – Semester (Backlog) Examination, December 2017
Subject: Discrete Structures

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 Define the law of duality. Obtain the dual for $(P \cap -Q) \cap (R \rightarrow Q)$. 3

2 Convert "All apples are not red" to a symbolic form. 2

3 Find the no. of derangements for 1,2,3,4. List all derangements of 1,2,3,4. 3

4 In how many ways can four letters of alphabets "BETTER" be arranged? 2

5 Find the co-efficient of x^{15} in $(x^3+x^4+x^5+\ldots)^5$. 3

6 Find a sequence for the generating function $1/(1-2X)^n$. 2

7 Define lattice. Give an example. 3

8 What is semi group homomorphism? 2

9 What is a Hamiltonian graph? Give an example. 3

10 Find the degree of a complete graph (k_4). 2

PART – B (5x10 = 50 Marks)

11 a) Show the validity of the statement 5

$(\sim p \vee q) \rightarrow r$
$r \rightarrow (s \vee t)$
$\sim s \wedge \sim u$
$\sim u \rightarrow \sim t$
$\therefore p$

b) Prove that for any propositions p, q, r the compound statement 5
$[(p \rightarrow q) \wedge (q \rightarrow r) \rightarrow [p \rightarrow r]$ is a tautology.

12 Let f: $R \rightarrow R$ be defined by 10

f(x) = 3x-5, x > 0
= -3x+1, x < = 0

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

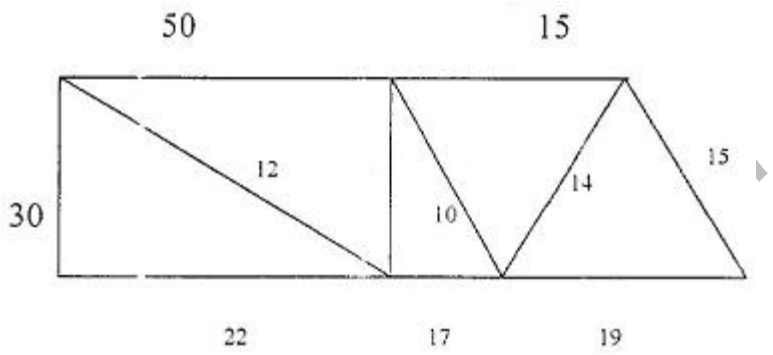
ii) Determine $f^1(0)$, $f^1(3)$, $f^1(-6)$, $f^1[-5,5]$

13 Solve the recurrence relation $T(k) – 7T(k-1) + 10T(k-2) = k^2+1$ and T(0)=4, T(1)=17? 10

14 If $<G, *>$ is an Abelian group then prove that $(a*b)^n = a^n*b^n$ for all $n \in N$. 10

…2

15 Explain and apply Prim's algorithm for the figure given below and find minimal cost. 10



16 a) Find the rook polynomial for shaded board. 5

b) For any n ϵ Z+, prove that the integers 8n +3 and 5n+2 are relatively prime. 5

17 a) Prove the following statement by using mathematical induction. 5

$1^2 + 3^2+5^2+ \ldots. (2n-1)^2 = (n)(2n-1)(2n+1)/3.$

b) If $<G,*>$ is an abelian group then prove that $(a*b)^n = a^n*b^n$ for all n ϵ N. 5

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Code No. 58

FACULTY OF INFORMATICS

B.E. 2/4 (I.T) I – Semester (Back log) Examination, December 2017
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. Simplify using Demorgan's theorem f = a (b+c') 2
2. Implement XOR gate using four NAND gates only 3
3. What is the advantage of LUT? Give one example 3
4. Write a VHDL code for a 2:1 MUX using behavioral modeling 3
5. Write the truth table and excitation table of a JK flip – flop 3
6. Write a VHDL code for a D flip – flop 2
7. Draw the state diagram for detecting the sequence '01' 3
8. Define PLD. Distinguish between PAL and PLA 2
9. Define clock skew 2
10. Define dynamic hazard 2

Part – B (50 Marks)

11. Minimize the following expression using K – map method
    a. F (a, b, c, d) = $\sum$ m (0,1,3,5,8,10,12) + D (7,11,14) 4
    b. Implement the above logic using logic gates 3
    c. Write a VHDL code for implementing the above circuit by instantiating logic gates. 3
12. Prove the following equations using the Boolean algebraic theorems:
    a. A + A'B + AB' = A + B 2
    b. A'BC + AB'C + ABC'+ ABC = AB + BC + AC 2
    c. Implement the above simplified logic functions using 2-input LUT and draw the internal structure of a 2 – input LUT 6

13. a) Draw the circuit of a 3-bit up / down counter and explain its operation along with the waveforms at the output of each flip – flop 5
    b) Draw a 2 – bit ring counter and explain its operation with the help of waveforms 5

14. a) Design an FSM circuit detecting the sequence '111'. It has one input and one output. The output should become '1' whenever the above sequence is detected. 6
    b) Write the VHDL code to implement the above FSM circuit 4

15. a) Explain the design of a counter using sequential circuit approach 7
    b) Write the VHDL code for a D Flip – flop 3

..2

16. a) Draw the internal architecture of FPGA and Explain. 5
    b) Construct a 4 – bit right shift register with parallel load facility 5

17. Write short notes on the following
    a) Master – slave flip – flop 5
    b) ASM chart for sort operation 5

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