Code No. 5018 / O

FACULTY OF ENGINEERING

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

Subject : Building 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 Draw Sign conventions of European Water closet and Wash basin.
2 Draw Sign conventions of Window with sunshade and R.C.Grill in plan.
3 Draw Sign convention of Wood and Lead.
4 Draw an isometric view of MITRED CLOSER with dimension.
5 Draw elevation of ASHLAR FINE MASONARY.
6 Draw a single line FAN FINK TRUSS.
7 Draw an elevation of a panelled window.
8 Draw a sectional elevation of One Way R.C.C. slab.
9 Draw profiles of any two shell roofs.
10 Sketch a Dog legged staircase and a Bifurcated staircase.

PART – B (50 Marks)

11 (a) Draw Odd and Even courses of one and half brick wall in English Bond.
(b) Draw an isometric view of two brick wall in Flemish Bond.

12 (a) Draw a standard King closer and Queen closer.
(b) Draw plans, section and elevation of caused Rubble 1st sort stone masonry.

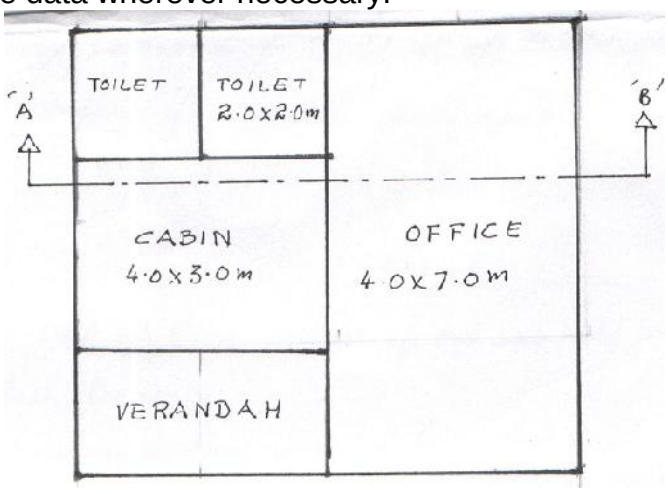
13 Draw plan and elevation of a Glazed and Panelled Door.

14 Draw plan and sectional elevation of a
(a) Quarter turn stairs (b) Doglegged stairs

15 Draw plan and section of a typical R.C. footing.

16 Draw a detailed elevation of a steel compound Fink Roof Truss over a span of 10m, using 'L' angles.

17 Develop a PLAN and SECTION for the given line diagram to a scale of 1 : 50. Assume suitable data wherever necessary.



*****

Code No. 5051 / N

FACULTY OF ENGINEERING

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

Subject : Building Planning and Drawing

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

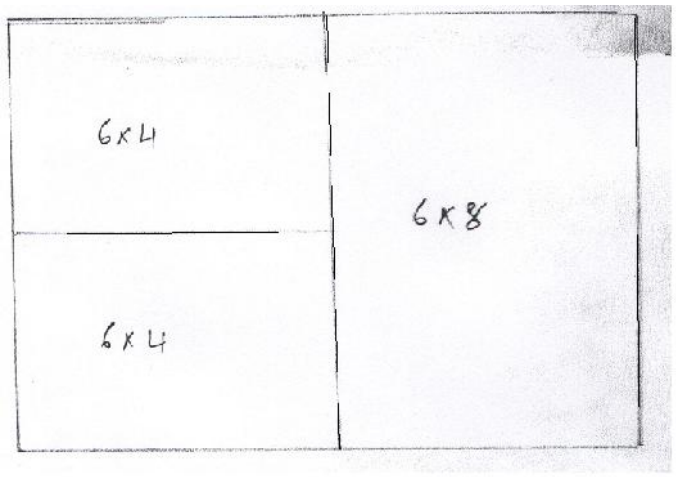
Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Draw the conventional symbol for shower head, rectangular bath, and wash basin. (3)
2 Differentiate between English and Flemish bond. (2)
3 Draw the isometric view of bevelled closer and king closer. (3)
4 Draw the elevation of stone masonry. (3)
5 Draw a line diagram of compound fink truss of 12m span. (3)
6 What is meant by brick bats? (2)
7 What is the importance of foundation drawing? (2)
8 List any three types of stairs. (2)
9 Give the standard sizes of doors and windows. (2)
10 Sketch the cross sectional details of an RCC slab. (3)

PART – B (50 Marks)

11 Draw the plan and isometric view of wall junction for one and a half brick wall in Flemish bond. Draw minimum 3 layers.
12 Draw front elevation and sectional elevation of a fully panelled door of 1.2m x 2.1m to a scale of 1 : 50.
13 Sketch an RCC slab and also show the reinforcement details of 6m x 5m with 150 mm thickness.
14 Draw to a suitable scale sectional elevation of different types of footings.
15 Draw the elevation and details of riveted queen post truss.
16 Draw a plan and sectional elevation of an open well stair case for half turn, floor to floor height is 3m and width of the stairs is 1.2m.
17 The line diagram of a building is shown in the figure below. Draw plan and sectional elevation to a scale of 1 : 50 and locate doors and windows . Take thickness of wall as 300 mm.



*****

Code No. 5031 / O

FACULTY OF ENGINEERING

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

Subject: Electromagnetic Theory

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 Describe the three orthogonal surfaces that define the spherical coordinates of a point. 3

2 State and briefly discuss the basic definition of the curl of a vector. 2

3 Five equal point charges Q = 20nc are located at x = 2, 3, 4, 5, 6m. Find the potential at the origin. 3

4 Find the current crossing the portion of the x = 0 plane defined by $\frac{-®}{4} \le y \le \frac{®}{4} m$ and $-0.01 \le z \le 0.01m$ if $J = 100 \cos 2y\ a_x\ A/m^2$. 2

5 Explain the basis for magnetic scalar potential. 3

6 A conductor 4m long lies along the y-axis with a current of 10A in the ay direction. Find the force on the conductor. If the field in the region is B = 0.05 ax tesla. 2

7 List out the generalized forms of Maxwell's equation in integral form for the time varying field. 4

8 What is the condition for a material to be perfect dielectric? How do the characteristics of wave propagation in a perfect dielectric medium differ from those of wave propagation in free space? 2

9 What is the consequence of a wave incident on a perfect conductor. 2

10 What is the poynting vector? What is the physical interpretation of the poynting vector over a closed surface. 2

PART – B (50 Marks)

11 a) Explain line, surface and volume charge distributions. 4

b) Obtain the expression for the electric field due to an infinite surface charge at any radial distance. 6

12 a) Establish Poissons and Laplace's equations from Gauss law. 3

b) Consider two thin infinitely long concentric conducting cylinders with inner cylinder of radius 'a' and outer cylinder of radius 'b'. Derive the expression for its capacitance with air as dielectric assuming required charge distribution. 7

13 a) An infinitely long straight conducting rod of radius 'a' carries a current of I in +Z direction using Amperes circuital law find 'H' in all regions. 6

b) Determine the magnetic flux for the surface described by $\rho = 1m$, $0 \le \Phi \le \pi/2$, $0 \le z \le 2m$. 4

..2

14 a) Discuss the boundary condition in static electric field at the interface between two perfect dielectric media. 5

b) For a N-turn toroid of circular cross section carrying a current 'I'. Determine the magnetic field inside and outside of the toroid. 5

15 a) Explain the terms conduction current and displacement current deduce the equation of continuity of current $\nabla \cdot \left(J + \frac{\partial D}{rt} \right) = 0$. 5

b) From the Maxwell's curl's equation derive the wave equations for an electromagnetic wave in conducting media. 5

16 a) State and prove poynting theorem. 5

b) Discuss the determination of the reflected and transmitted wave fields of a uniform plane wave incident normally on to a plane boundary between two material media. 5

17 a) In a medium $E = 16\ \bar{e}^{x/20} \sin(2x10^8 t - 2x)\ i_z$ v/m. Find the direction of propagation, the propagation constant, wave length, speed of the wave and skin depth. 5

b) Write short notes on different types of polarization. 5

******

Code No. 5064 / N

FACULTY OF ENGINEERING

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

Subject : Electromagnetic 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 Describe three orthogonal surfaces that define the spherical co-ordinates of a point. (2)

2 State Divergence Theorem. (2)

3 Given a vector function $F = a_x(3y - c_1z)+a_y(c_2x-2z)-a_z(c_3y+z)$, determine the constants c_1, c_2, and c_3 if 'F' is irrotational. (2)

4 State Uniqueness Theorem. (2)

5 State Bio-Savart's law. (2)

6 In Cylindrical coordinates $B = (2.0/r)a_\phi$ Tesla. Determine the Magnetic flux 'Φ' Crossing the plane surface defined by $0.5 \leq r \leq 2.5$ m and $0 \leq z \leq 2.0$ m. (3)

7 What is the inconsistency in Ampere's Law? How it is rectified by Maxwell? (3)

8 What is the Poynting Vector? What is the Physical interpretation of the Poynting Vector over a closed surface? (3)

9 What will be the reflected wave for an elliptically polarized wave incident on the interface of a dielectric at the Brewster angle? (3)

10 What is a boundary condition? How do boundary conditions arise and how are they derived? (3)

PART – B (50 Marks)

11 (a) Determine the Electric field intensity of an infinitely long straight line charge of uniform density ρ_L in air. (5)

(b) Point charges 1mC and -2mC are located at (3, 2, -1) and (-1, -1, 4), respectively. Calculate the electric force on a 10nC charge located at (0, 3, 1) and the electric field intensity at that point. (5)

12 (a) Derive the expression for the Electro-Static energy stored in a capacitor of value 'C' in terms of the total charge 'Q' as well as the Voltage 'V'. (5)

(b) State and prove Uniqueness Theorem. (5)

13 (a) Explain the nature of line, surface and volume current distribution as applicable to static magnetic fields. List out the expressions for the magnetic field intensity in these three cases. (5)

(b) An infinitely long straight conducting rod of radius 'a' carries a current of 'I' in +z direction. Use Ampere's circuital law and find 'H' in all regions. (5)

14 (a) Determine the magnetic field intensity inside an infinitely long solenoid with air core having 'n' closely wound turns per unit length and carrying a current 'I'. (5)

(b) Discuss the Electromagnetic boundary conditions between two lossless media. (5)

..2

15 (a) From the Maxwell's curl's equation derive the wave equations for an Electromagnetic wave in free space. (6)

(b) A sinusoidal electric intensity of amplitude 250 (V/m) and frequency 1(GHz) exists in a lossy dielectric medium that has a relative permittivity of 2.5 and a loss tangent of 0.001. Find the average power dissipated in the medium per cubic meter. (4)

16 (a) State and prove Poynting Theorem. (5)

(b) Discuss the determination of the reflected and transmitted wave fields of a uniform plane wave incident normally onto a plane boundary between two material media. (5)

17 (a) What is Lorentz's condition and show that time varying Electric scalar potential and magnetic vector potential satisfy wave equations in Lorentz's condition is assumed? (6)

(b) Write short notes on EM wave Polarization. (4)

*****

Code No. 5037 / O

FACULTY OF ENGINEERING

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

Subject: Mechanics of Materials

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 Define hardness and toughness of a material. 2

2 Define aspect ratio and axial rigidity. 2

3 What is the maximum bending moment of a simply supported beam of span 4m subjected to UDL of intensity 20 KN/m throughout the span? 2

4 Difference between flexural rigidity and torsional rigidity. 2

5 Find Max slope and max deflection of a cantilever beam subjected to point load at the free end. Take ℓ =20 M, W = 200 KN, EI = $200x10^4$ KN M^2. 2

6 What is the torsional sectional modulus of a circular section of diameter 800 mm? 3

7 Write down the assumptions made in the theory of pure bending. 3

8 Explain principle stress and strains. 3

9 What is core of the section of a circular section D=600 mm? 3

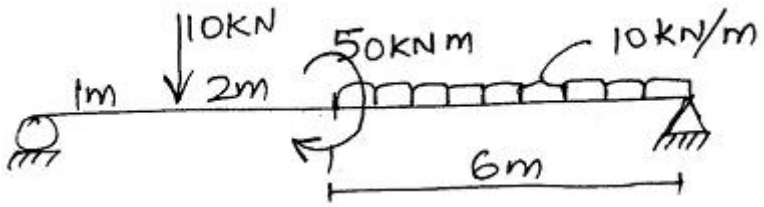
10 Write short notes on equivalent force couple system. 3

PART – B (5x10 = 50 Marks)

11 A reinforced concrete column 500 mm x 500 mm in section is reinforced with 4 steel bars of 25 mm dia, one in each corner. The column is carrying a load of 200 kN. Find the stresses in the concrete and steel bar. Take E_s=200 GPa, E_c=140 GPa.

12 Derive the relation between E, C and ¬ from the fundamentals of the given elastic constants.

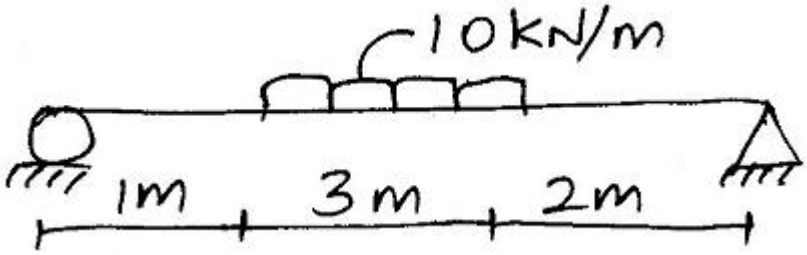
13 Draw SFD and BMD.



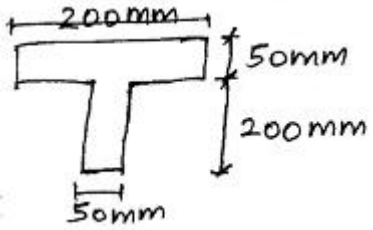
14 A timber beam of rectangular section is to support 20 kN UDL over a span of 3.6 m if the depth of the section is twice the breadth and the stress in the timber is not to exceed 7 MPa. Find the dimensions of the cross section. How do you modify the cross section of the beam if it had a concentrated load placed at the centre with the same ratio of breadth to depth?

…2.

15 A beam AB 6 m is subjected to UDL of 10 kN/m. Determine the deflection of the beam at mid span in terms of EI.



16 A T shaped cross section of a beam shown in fig is subjected to a vertical shear force of 100 kN. Calculate the shear stress at the neutral axis and at the function of the web and the flange. I_{NA} = 11340x10^4 mm^4.



17 A cast iron Hollow column 80 mm external diameter and 60 mm internal diameter is used as a column of 2 m long in Rankin's formula. Determine the crippling load when both the ends are fixed. Take f_c=600 MPa.

****

Code No. 5070 / N

FACULTY OF ENGINEERING

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

Subject : Mechanics of Materials

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 meant by ductility of a steel rod? How it is measured by conducting a tension test? (3)

2 A bar 4m long is acted upon by a load of 100 kN. It is found to extent 25 mm. Find the stress developed, if E = 200 GPa. (2)

3 State the relation between BM, Slope and Deflection of beams. (3)

4 Define Flexural Rigidity and Torsional rigidity. (2)

5 A Cantilever Beam of 3m span in subjected to a UDL of 10kN/m throughout the span. Find maximum slope and deflection.

6 Draw the shear stress distribution for beams of cross section of following shapes. (2)
(i) Circular section (ii) I – Section

7 Write down the expression for stiffness of a closely coiled helical spring. (3)

8 State the condition under which Mohr's circle becomes a point. (2)

9 IF the diameter of a long column is reduced by 20%, the percentage reduction in Euler's buckling load for both ends hinged is _____. (3)

10 Differentiate between thick and thin cylinders. (2)

PART – B (50 Marks)

11 (a) State and explain Hooke's law. (3)

(b) A 12 mm dia steel rod passes centrally through a copper tube 48 mm external and 36 mm internal diameter and 2.5 m long. The tube is closed at each end by 24 mm thick and steel plates which are secured by nuts. The nuts are tightened until the copper tube is reduced in length in length by 0.508 mm. The whole assembly is then raised in temp by 60^{o}C. Calculate the stress in copper and steel before and after the rise of temperature assuming that the thickness of the plates remains unchanged. $E_s = 2.1 \times 10^6$ N /mm^2, $E_c = 1.05 \times 10^5$ N/mm^2, $\alpha_s = 1.2 \times 10^{-5}$ / ^{o}C, $\alpha_c = 1.75 \times 10^{-5}$ / ^{o}C. (7)

12 Draw SFD and BMD for the following beam and mention the SF and BM values at salient points and calculate the distance of point of contra flexure from the support A if any. Ref. Fig. 1. (10)

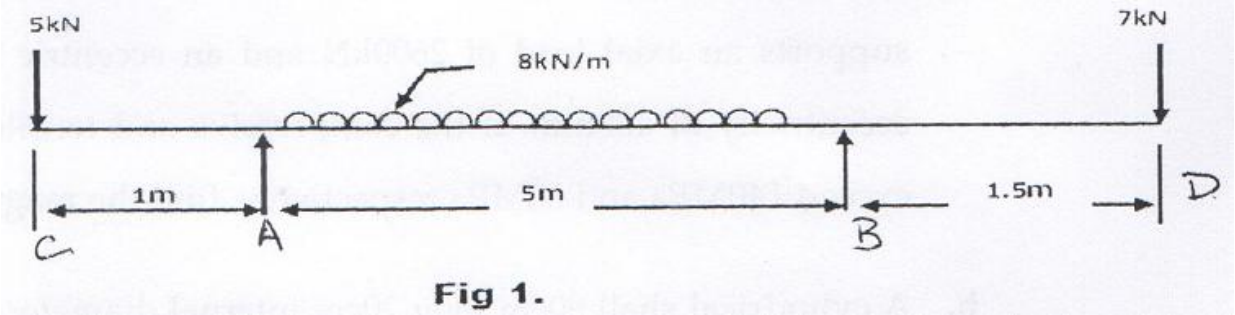


Fig 1.

13 (a) Define section modulus. Find an expression for section modulus for a rectangular, circular and hollow circular section. (5)

(b) Find the slope at the ends and the central deflection for a beam simply supported span 'L' subjected to UDL of w kN/ m over the whole span (5)

14 A solid shaft is to transmit 75 KW at 200 rpm. The allowable shear stress is 70 MPa. The twist in a length of 2m is not to exceed 1 degree. Find the suitable diameter for the shaft. Modulus of rigidity of the shaft is 1×10^5 MPa. If this shaft is replaced by a hollow shaft of same weight with outer diameter to inner diameter ratio of 0.6. What will be percentage increase in the power transmitted by this hollow shaft? (10)

15 (a) Show that the ratio of maximum shear stress to mean shear stress in a rectangular cross section is equal to 1.5 when it is subjected to al transverse shear force F. (5)

(b) Using graphical method or otherwise find: (5)
The principal stresses and principal planes, the maximum shear stress and associated normal stress and also find the normal and tangential stress on an inclined plane of 20^o for the element shown in figure 2.

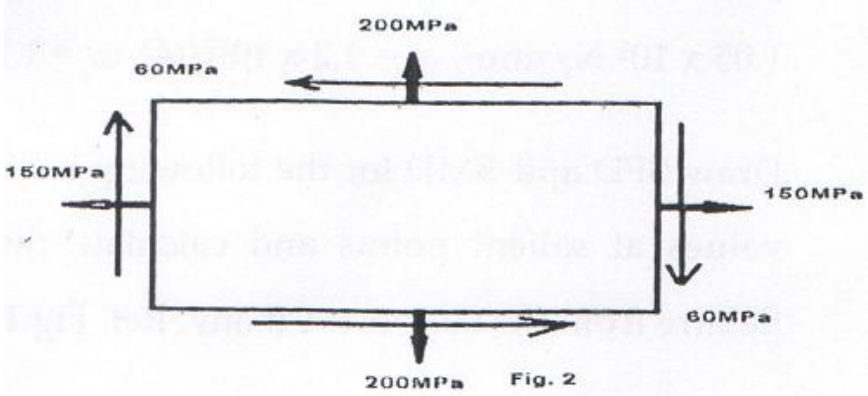


Fig. 2

16 (a) A column section 300 mm external diameter and 150 mm internal diameter supports an axial load of 2600 kN and an eccentric load of 'P' N at an eccentricity of 400 mm. If the compressive and tensile stresses are not be exceed 140 MPa and 60 MPa respectively,
find the magnitude of load 'P'. (5)

(b) A cylindrical shell 90 cm long 20 cm diameter having thickness of metal as 8mm is filled with fluid at atmospheric pressure. If an additional $20cm^3$ of fluid is pumped into the cylinder, find the pressure exerted by the fluid on the cylinder and hoop stress induced. Take E = 200 GPa and 1 / m = 0.3. (5)

17 (a) Determine the external diameter and internal diameter of a hollow circular cast iron column, which carries a load of 1000 kN. The length of the column is 6m. The internal diameter is to be one half that of outer diameter. Use Rankine's formula with f = 560 MPa and a = 1 / 1600. Take factor of safety as 4. One end is fixed and the other end is free. (5)

(b) Find the thickness of metal necessary for a cylindrical shell of internal diameter 150 mm to withstand an internal pressure of 50 MPa. The maximum hoop stress in the section is not to exceed 150 MPa. (5)

*****

Code No. 5040 / O

FACULTY OF ENGINEERING

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

Subject : Data Structures using C++

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 output of the following code? 2

```
# include <iostream.h>
# include <string.h>
Void main ( )
 {
   Count << strlen (“Hello, World \ n”) << “\n” ;
 }
```

2 Define abstract data type. 2

3 Write a function to count the number of nodes in a linked list. 3

4 What is the advantage of circular linked list as singly linked list? 2

5 How do you test for an empty queue? 2

6 What is the maximum number of leaf nodes in a binary tree with 9 nodes? 3

7 For in system sort, what arrangement of input data will cause the with case performance? The best case performance. 3

8 Does the minimum spanning tree of a graph give the shortest distance between any two specified nodes. 2

9 Construct the AVL tree for the following numbers : 3
1, 2, 3, 4, 5, 6, 7, 8, 9, 8, 5, 14

10 Name the different ways of representing a graph. 3

PART – B (50 Marks)

11 Write an algorithm to add two polynomials when the polynomials are represented using singly linked list. 10

12 a) Implant stack ADT using C++ templet. 5
b) Write a recursive function to reverse elements of queue using operators of queue. 5

13 a) Convert the given infix expression into post fix expression
E = A|B∧C+D∗E-A∗C and explain the conversion of the expression using stacks. 5
b) Write a function to delete the elements in doubly linked list. 5

14 Write a program to implements BFS and DFS. 10

15 What is linear search, binary search? Write algorithms for both and comment on the complexity. 10

16 a) Explain about the procedure for heap sort. 5
b) Sort the following numbers using heat sort.
5, 23, 7, 18, 2, 1, 9, 15, 6, 4, 8, 3, 13 5

17 Write short notes for the following : 5+5
a) Binary-Tree traversals
b) Red-Black trees

******

Code No. 5073 / N

FACULTY OF ENGINEERING

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

Subject : Data Structures Using C++

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	Define space and time complexity. Write the metrics needed for calculation.	(3)
2	Differentiate single linked list and double linked list.	(3)
3	What is a template? Give an example.	(3)
4	Why hashing is needed? What is its advantage over others?	(3)
5	Write down the time complexities of all sorting algorithms.	(3)
6	What are the balanced search tress? How are they better?	(2)
7	Write ADT for graphs.	(2)
8	List out the stack applications.	(2)
9	What are the traversal techniques of binary tree?	(2)
10	How do you represent polynomials using linked list?	(2)

PART – B (50 Marks)

11	(a) Define ADT. Write ADT for String data type.	(3)
	(b) What is a sparse matrix? Write the different ways to represent it.	(7)
12	(a) How to you represent chains in C++?	(3)
	(b) Explain the operations of DLL with example.	(7)
13	(a) What is static hashing? When is it preferred over others.	(3)
	(b) Write a program to implement stack using Template concept.	(7)
14	(a) What is DIVIDE AND CONQUER strategy?	(2)
	(b) Write a program for merge sort.	(8)
15	(a) Define Mazing problem.	(2)
	(b) What are the ways to build Minimum cost spanning tree? Explain any one.	(8)
16	(a) What is a RED BLACK tree?	(2)
	(b) Build the following red-black. Explain the process 6 8 7 4 5 2 1 9 10	(8)
17	Write short notes on the following:	
	(a) Sub typing and Inheritance	(4)
	(b) Equivalence classes	(3)
	(c) Algorithm specification	(3)

*****

Code No. 5079 / N

FACULTY OF INFORMATICS

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

Subject : Micro Electronics

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	Draw the characteristic of PN Junction diode is forward and reverse bias condition.	(3)
2	Briefly explain the operation of Schott of diode.	(3)
3	Draw the circuit symbol of JFET and MOSFET.	(2)
4	How a transistor can be used as a switch?	(3)
5	Define Loop gain of feedback amplifier.	(2)
6	Define Bark-harsen criteria.	(2)
7	Draw the collector current waveform for class – C amplifier.	(2)
8	Draw the circuit for substractor using Op-amp.	(3)
9	Define CMRR and slewrate.	(2)
10	Briefly explain about cmoslogic.	(3)

PART – B (50 Marks)

11	(a) Explain about clipping and clamping circuit.	(6)
	(b) Explain about conduction in semi-conductors.	(4)
12	Explain CB and EE output characteristics of BJT and compare them.	(10)
13	(a) Analyze current series feedback circuit G_{mf}, R_{if} and R_{of}.	(5)
	(b) Explain the operation of Hartley Oscillator.	(5)
14	Explain the operation of a class-A and class-B Amplifier.	(10)
15	(a) What are the characteristics of an ideal operational amplifier?	(5)
	(b) Explain the working of a triangular wave generator.	(5)
16	(a) Explain the working of an MOSFET.	(5)
	(b) Explain working of CRO.	(5)
17	Write short notes on the following:	
	(a) Half-wave Rectifier	(5)
	(b) Op-Amp and VCCS	(5)

*****

Code No. 5046 / O

FACULTY OF INFORMATICS

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

Subject : Micro Electronics

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 cut in voltage of a diode? Plot the volt ampere characteristics of germanium and silicon on the same scale showing the cut in voltage value of each. 3
2 What is Zener effect? 2
3 Differentiate between BJT and FET? 3
4 What are different modes of operation of BJT? 2
5 What are four possible topologies of a feedback amplifier? 3
6 Show the circuit of a collpitts oscillator. 2
7 List the properties an ideal operational amplifier. 3
8 Define LTP and UTP in a Schmitt trigger. 3
9 What is a clipper (Limiter)? Show a positive voltage clipper. 2
10 Define total harmonic distortion. 2

PART – B (50 Marks)

11 a) Explain the operation of a full wave bridge rectifier. 6
b) Explain the operation of zener diode in reverse bias condition. 4

12 a) Explain different biasing techniques of a BJT with circuits. 6
b) Define i) Trans conductance ii) Drain resistance and iii) amplification factor of a FET. 4

13 a) Explain the operation of an RC phase shift oscillator. 6
b) Show that the gain is reduced by negative feedback. 4

14 a) Define class A, class B, class AB amplifiers. 5
b) Explain the cross over distortion in a power amplifier. 5

15 Design an adder using oxuational amplifier and derive the equation for V_0? 10

16 Explain the operation of square wave generation using operational amplifier. 10

17 Write short notes on any two of the following : 10
i) OP-Amp as differentiation
ii) Diode in a clamper
iii) Small signal parameter model of BJT

******