

Code No: R15A0201-162S

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

B.Tech. II Semester supplementary Examinations, November 2016

**ELECTRICAL CIRCUITS**

(Common to ECE, CSE)

Roll No	1	5	N	3					
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**Time: 3 hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART – A**

**(25 Marks)**

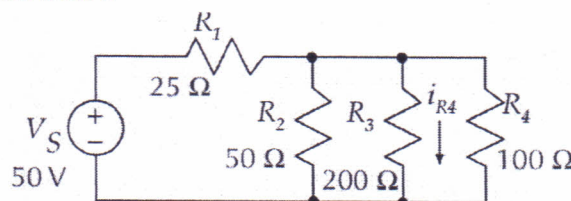
1. (a) State, explain Kirchoff's voltage law. (3)
- (b) State the concept of Network and Circuit (2)
- (c) Write the equations of Delta-to-Star Transformation (3)
- (d) Define Phase and Phase difference (2)
- (e) Define power factor, real power and reactive power (2)
- (f) Compute the form factor of a half wave rectified sinusoidal wave form. (3)
- (g) Define Reactance and Impedance (2)
- (h) State Norton's theorem. (3)
- (i) Explain the importance of OC and SC tests for transformer. (3)
- (j) What is the importance of transformer voltage transformation ratio? (2)

**PART – B**

**(50 Marks)**

**SECTION – I**

2. Find  $i_{R4}$  in the circuit below

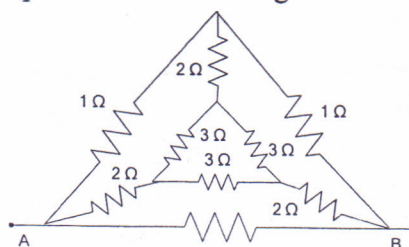


(OR)

3. Show the Voltage–Current relationship for Passive Elements for Square wave and ramp signal

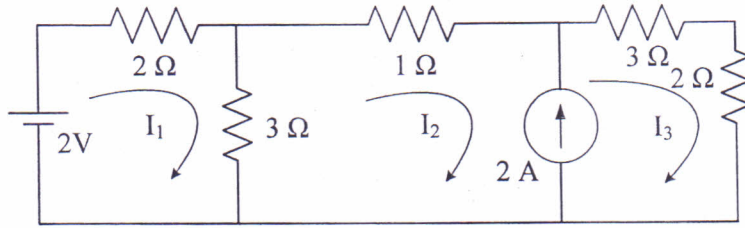
**SECTION – II**

4. Find the resistance between points A and B in figure shown below



(OR)

5. Determine the three mesh currents in the network shown in figure

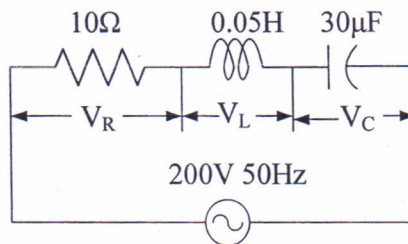


**SECTION - III**

6. A circuit consists of a series connected resistance of 10 ohms a capacitance of  $150\mu\text{F}$  and an inductance of  $16\text{mH}$  connected across a supply of  $100\text{V}$  at  $50\text{Hz}$ . Evaluate (a) circuit current (b) power factor and (c) power consumed by the circuit. Draw the phasor diagram. (10)

(OR)

7. For the circuit shown above calculate Impedance, current, p-f,  $V_L$ ,  $V_R$ ,  $V_C$ , active power and reactive power. Also draw vector diagram. (10)

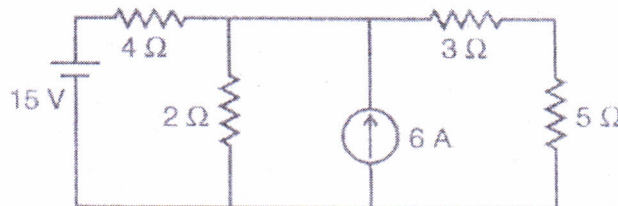


**SECTION - IV**

8. State and explain the following a) Maximum Power Transfer theorem (b) Superposition theorem. (10)

(OR)

9. Determine the current flowing through the  $5\Omega$  resistor in the network shown below using Thevenin's theorem (10)



**SECTION - V**

10. (a) Explain how the efficiency of a transformer may be estimated from the open circuit and short circuit tests. (4)  
(b) A  $10\text{ kVA}$ ,  $200/400\text{ V}$ ,  $50\text{ Hz}$ , single phase transformer has the following test result: OC test –  $200\text{ V}$ ,  $1.3\text{ A}$ ,  $120\text{ W}$  on LV side  
SC test –  $22\text{ V}$ ,  $30\text{ A}$ ,  $200\text{ W}$  on HV side  
Calculate the Regulation at full load at  $0.8\text{ pf}$  lagging. (6)

(OR)

11. a) What are the various losses in a transformer? (3)  
b) Derive the EMF equation of a single phase transformer (7)

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**B.Tech. II Semester supplementary Examinations, November 2016****ENGINEERING CHEMISTRY**

(Common to ME, AE)

Roll No	1	5	N	3						
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**Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART – A****(25 Marks)**

1. (a) What is concentration cell? [ 2M]
- (b) Define conductance, specific, molar Conductance. Give their units. [3M]
- (c) Explain Electroless Plating [3M]
- (d) Give the main causes of corrosion. [2M]
- (e) What are flash and fire points? What is their significance [3M]
- (f) What are Conducting Polymers? {2M}
- (g) Write a note on Caustic Embrittlement {3M}
- (h) What is disinfection of water by ozonisation? {2M}
- (i) Define Calorific Value, HCV and LCV [3M]
- (j) What is a Fuel? What are the characteristics of a good fuel. [2M]

**PART – B****(50 Marks)****SECTION – I**

2. (a) Explain the construction and working of Calomel Electrode .
  - (b) Explain Potentiometric titrations with suitable examples.
- (OR)
3. ((a) What is an Electrochemical Cell? Explain Galvanic cell with a neat sketch.
  - (b) Explain Charging and discharging of Lead-Acid cell with chemical reactions.

**SECTION – II**

4. (a) Describe how the following factors affect the rate of corrosion.
    - (i) Nature of the metal
    - (ii) Nature of the Environment
  - (b) Explain Galvanization and Tinning
- (OR)
5. (a) Explain Electrochemical Corrosion with suitable example.
  - (b) Write short note on Sacrificial anodic protection and impressed current cathodic protection.

**SECTION – III**

6. (a) Give the preparation, properties and engineering applications of Teflon, Nylon 6.6 and Butyl Rubber
  - (b) What are Biodegradable polymers? Explain the preparation, Properties and applications of polyvinyl acetate and Poly Lactic Acid
- (OR)
7. (a) Write the differences between Thermoplastics and Thermosets.
  - (b) Explain the important applications of Nano Materials.

#### SECTION – IV

8. (a) Discuss the Zeolite process for softening of hard water. Give merits and demerits of the Zeolite process.  
(b) Write short notes on Break point chlorination and its significance.  
(OR)
9. (a) How the hardness of water is determined by EDTA method.  
(b) Write a nbrief note on Scales and Sludges.

#### SECTION – V

10. (a) Explain Ultimate analysis and its significance  
(b) What is synthetic petrol and how is it synthesized by Fischer-Tropsch's Process.  
(OR)
11. (a) Explain the determination of Calorific Value of gaseous fuel by Junker's gas calorimeter.  
(b) Explain the process of refining of Petroleum in detail.

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**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

**B.Tech. II Semester supplementary Examinations, November 2016****ENGINEERING DRAWING**

(Common to ME, AE)

Roll No	1	5	N	3						
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**Time: 3 hours****Max. Marks: 75**

**Note:** Answer any one question from each section and each Question carries 15 marks.

**SECTION – I**

1. Construct a hypocycloid taking the diameter of the generating circle and radius of directing circle as 60 mm.

(OR)

2. Construct a vernier scale of 1: 40 to read metres, decimeters and centimeters and long enough to measure up to 6m. Mark a distance of 5.76 m on it.

**SECTION – II**

3. Draw the orthographic projections of the following points on a common reference line keeping the distance between their projectors 25 mm apart.
  - (a.) Point A is 40 mm. above H.P and 25 mm. in front of VP
  - (b.) Point B is 40 mm. above H.P and in the VP
  - (c.) Point C is 25 mm. in front of the V.P and in the H.P.
  - (d.) Point D is 25 mm. above the H.P and 30 mm behind the VP
  - (e.) Point E is 40 mm below the H.P and 30 mm behind the VP

(OR)

4. An 80 mm long line AB is inclined at  $30^\circ$  to the H.P. and  $45^\circ$  to the V.P. The end A is 20 mm above the H.P. and lying in the V.P. Draw the projections of the line.

**SECTION – III**

6. A circle of 50 mm diameter is resting on HP on end A of its diameter AC which is  $30^\circ$  inclined to HP while it's TV is  $45^\circ$  inclined to VP. Draw its Projections?

(OR)

7. Hexagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the VP Such that the axis is inclined at  $30^\circ$  to the VP and Parallel to the HP. Draw its Projections?

**SECTION – IV**

8. Draw an isometric view of Cone with a base diameter is 40 mm side and 60mm long axis (a) when the base is On the HP (b) when the base is On the VP?

(OR)

9. A square pyramid resting centrally over a cylindrical block which is resting centrally on top of the Square block . Draw an isometric projection of the arrangement .consider the pyramid has a base of 25mm side and a 40 mm long axis, the cylinder block has a 50mm base diameter and 20mm thickness and the square block has a 70mm base side and 15mm thickness.?

SECTION - V

10. Draw the front view, top view and side view for the picture shown in figure 1. All dimensions are in mm.

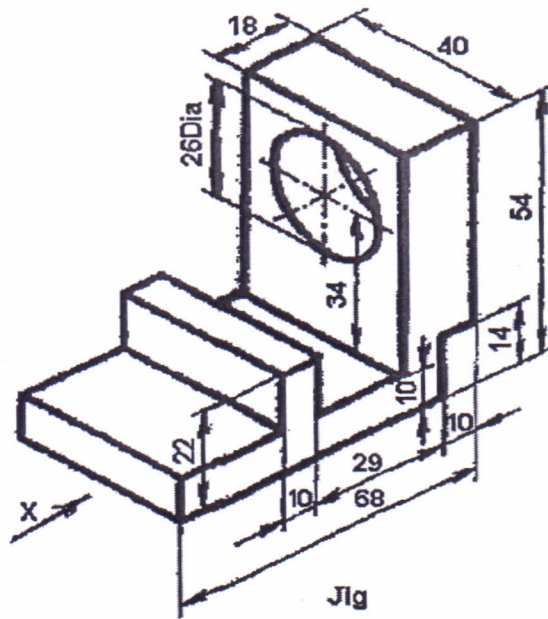


Fig. 1.

(OR)

11. Draw the isometric view of the given orthographic projection of the object shown in fig.2.

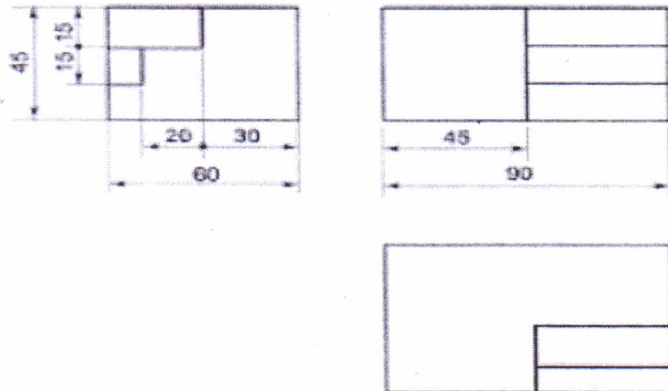


Fig.2.

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

B.Tech. II Semester supplementary Examinations, November 2016

**ENGINEERING PHYSICS-II**

(Common to ME, ECE, CSE, AE)

Roll No	1	5	N	3						
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**Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART – A****(25 Marks)**

1. (a) Write short notes on properties of ionic crystals [2M]
- (b) Explain the terms (i) basis (ii) space lattice (iii) unit cell [3M]
- (c) What are the applications of X-ray diffraction studies [2M]
- (d) Write notes on “point defects” in crystals [3M]
- (e) What is piezoelectricity? [2M]
- (f) Explain properties of ultrasonic waves [3M]
- (g) Define magnetic permeability & susceptibility [2M]
- (h) Describe the effect of Magnetic field on superconductors [3M]
- (i) What are nano materials? How they are classified [2M]
- (j) Explain the significance of surface to volume ratio in nanotechnology [3M]

**PART – B****(50 Marks)****SECTION – I**

2. a) Derive an expression for cohesive energy of molecule
  - b) Explain the formation of covalent bond in a solid
- (OR)
3. a) Prove that FCC is closely packed when compared to simple cube and bcc structures
  - b) Find the Miller indices of the following intercepts (1a, 1b, 1c), (1a 2b 2c), (2a 1b 3c)

**SECTION – II**

4. a) Derive Bragg’s law of X-ray diffraction
- b) Calculate the glancing angle of (111) plane of a cubic crystal having axial length 0.19 nm corresponding to the second order diffraction maximum for the X-rays of wavelength 0.058 nm

(OR)

5. a) Explain Edge dislocation & Screw dislocation
- b) What is Burger’s vector? Explain

**SECTION – III**

6. a) Obtain an expression for the internal field of Cubic structure ( Lorentz Field)
- b) Find the electric susceptibility of a dielectric gas having dielectric constant of 1.000041

(OR)

7. a) Explain properties of ultrasonic waves
- b) Explain with a neat sketch the construction and production of ultrasonic waves using piezoelectric oscillator

**SECTION – IV**

8. a) In hydrogen atom an electron ‘e’ revolves around the nucleus at a distance of ‘r’ meter with an angular velocity ‘ $\omega$ ’ radians. Obtain expression for magnetic moment associated with it due to its orbital motion
- b) Explain about soft and hard magnetic materials

(OR)

9. a) What is Meissner effect ? Explain
- b) Distinguish between soft and hard superconductors

**SECTION – V**

10. a) Explain the preparation of Sol gel Method
- b) Explain the characterization of nano particles by SEM, and X-ray diffraction

(OR)

11. a) Why the properties of nano particles differ from bulk explain
- b) Explain the following terms (i) Nano science (ii) Nano technology (iii) classification of nano particles

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**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

B.Tech. II Semester supplementary Examinations, November 2016

**ENVIRONMENTAL STUDIES**

(Common to ECE,CSE)

Roll No	1	5	N	3						
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**Time: 3 hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART – A**

**(25 Marks)**

1. (a) Define the term Ecological Pyramid (2)
- (b) What is Ecosystem? (3)
- (c) Write the significance of Natural Resources (2)
- (d) Give examples for renewable & non renewable energy (3)
- (e) Why you need to conserve Biodiversity? (2)
- (f) Briefly explain the value of Biodiversity (3)
- (g) How does Acid Rain occurs? (2)
- (h) What is e-waste? (3)
- (i) What is Environmental impact assessment? (2)
- (j) What do you mean “Endangered species”? (3)

**PART – B**

**(50 Marks)**

**SECTION – I**

2. What are biogeochemical cycles? Explain any one cycle.

(OR)

3. Write a detailed account of Bioaccumulation and biomagnification

**SECTION – II**

4. Classify and explain Natural resources. What are the effects of overuse of water?

(OR)

5. Describe various energy resources? Explain the need for alternate energy resources.

**SECTION – III**

6. Describe (a) Hot spots of biodiversity & (b) man-wildlife conflicts.

(OR)

7. What is Biodiversity? Explain various threats associated to biodiversity.

**SECTION – IV**

8. Explain (a) Ozone depletion & its effects and (b) Disaster management

(OR)

9. Explain various sources and types of Water Pollution. What is their impact on mankind?

**SECTION – V**

10. What is Sustainable development? Explain the concept of green building.

(OR)

11. Explain (a) Biomedical and (b) Municipal solid waste management

**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

B.Tech. II Semester supplementary Examinations, November 2016

**MATHEMATICS-II**

(Common to ME, ECE, CSE, AE)

Roll No	1	5	N	3						
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Time: 3 hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART –A**

1. (a). Define Merits and Demerits of Newton Rapson Method. (2M)
- (b). Prove that,  $E\nabla = \Delta = \nabla E$ . (3M)
- (c). Write the normal equations for second degree polynomial. (2M)
- (d). Evaluate  $\int_0^1 x^3 dx$  with five sub intervals by Trapezoidal rule. (3M)
- (e). Define Fourier series. (2M)
- (f). Find Half Range Sine series for  $f(x) = 1$ , in  $0 < x < \pi$ . (3M),
- (g). Form partial differential equation by eliminating a and b from  $z = ax + by + a^2 + b^2$ . (2M)
- (h). Solve  $px + y = z$ . (3M)
- (i). If  $a = x + y + z$ ,  $b = x^2 + y^2 + z^2$ ,  $c = xy + yz + zx$ , prove that  $[\text{grad } a, \text{grad } b, \text{grad } c] = 0$ . (2M)
- (j). State Greens theorem. (3M)

**PART –B**

(50 Marks)

2. (a). Find a positive root of  $x^3 - x - 1 = 0$  correct to two decimal places by Bisection Method.
- (b). Find the root of the equation  $x \log(x) = 1.2$  using False Position Method

**OR**

- 3.(a). Use Gauss Backward Interpolation formula to find  $f(32)$ , given that  $f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794$
  - (b). If  $u_1 = 22, u_2 = 30, u_4 = 82, u_7 = 106, u_8 = 206$ , then find  $u_6$ , using Lagrange's Interpolation formula.
4. (a). Evaluate  $\int_0^6 \frac{1}{1+x} dx$  using (i) Simpson's  $\frac{1}{8}$  Rule (ii) Simpson's  $\frac{3}{8}$  Rule and compare the result with its actual value.
  - (b). Evaluate  $y(0.1)$ ,  $y(0.2)$  and  $y(0.3)$  using Taylor's series method, given that  $y^1 = y^2 + x$  and  $y(0) = 1$ .

OR

5. Find the solution of  $\frac{dy}{dx} = x - y, y(0) = 1$  at  $x = 0.1, 0.2, & 0.3$  using Modified Euler's method.

6. Expand the function  $f(x) = x^2$  as a Fourier series in  $[-\pi, \pi]$  and hence deduce that

(i).  $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots = \frac{\pi^2}{12}$

(ii).  $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots = \frac{\pi^2}{6}$

(iii).  $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \dots = \frac{\pi^2}{8}$

OR

7. (a). Find the Half Range Sine and Cosine Series  $f(x) = \frac{\pi x}{8}(\pi - x)$ , in  $0 \leq x \leq \pi$ .

(b). Express  $f(x) = x$  as a Fourier series in  $(-\pi, \pi)$ .

8.(a). Solve partial differential equation  $p\sqrt{x} + q\sqrt{y} = \sqrt{z}$ .

(b). Solve  $x(y - z)p + y(z - x)q = z(x - y)$ .

OR

9.(a). Solve  $x^2p^2 + y^2q^2 = z^2$ .

(b). Use separation of variables to solve  $4u_x + u_y = 3u$  with  $u(0, y) = 3e^{-y} - 5e^{-5y}$ .

10. State and verify Stokes theorem for  $\vec{F} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$  over the upper half surface of the sphere  $x^2 + y^2 + z^2 = 1$  bounded by the projection of the  $xy$ -plane.

OR

11.(a). Find directional derivative of  $2xy + z^2$  at  $(1, -1, 3)$  in the direction  $\vec{i} + 2\vec{j} + 3\vec{k}$ .

(b). Find Unit normal vector to the surface  $x^2 + y^2 + z^2 = 26$  at the point  $(2, 2, 3)$ .

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**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

B.Tech. II Semester supplementary Examinations, November 2016

**OBJECT ORIENTED PROGRAMMING**

(Common to ME, ECE, CSE, AE)

Roll No	1	5	N	3					
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Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

**PART – A****(25 Marks)**

1. (a) Distinguish between Object Model and Functional Model 2M
- (b) What is type casting? 2M
- (c) What is name space? 2M
- (d) What are default arguments? 3M
- (e) What is inline function? What is the use of it? 2M
- (f) Name the operators that cannot be overloaded. 2M
- (g) What is Hybrid Inheritance? 3M
- (h) What are the various file accessing modes? 3M
- (i) Differentiate between concrete and abstract data types. 2M
- (j) What is class template? 2M

**PART – B****(50 Marks)****SECTION – I**

2. A. Discuss the merits and demerits of Procedural Languages.
- B. What is modularity and how can it be achieved?

(OR)

3. Explain the following terms related to Object Oriented Paradigm.
- a. Abstract Data types    b. Polymorphism    c. Virtual function    d. Encapsulation

**SECTION – II**

4. A. Write a Program to sort numbers in Ascending Order.
- B. Discuss about Dynamic allocation

(OR)

5. A. In which order Constructors and destructors are executed? Explain with examples.
- B. Write a Program to implement friend class.

**SECTION – III**

6. Explain various parameter passing mechanisms with examples.

(OR)

7. What are the various types of constructors? Give an example for each. Whether a constructor could be overloaded?

**SECTION – IV**

8. What is Exception handling? List down the keywords used in Exception handling and their usage?

(OR)

9. Define inheritance? And Explain different types of inheritance .

**SECTION – V**

10. Discuss about Stream classes Hierarchy and Explain Stream I/O with examples?

(OR)

11. Explain error handling during file operations?

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