Roll No. | 2 | 2 | B | T | C | S | 0 | 2 | 4 | 9 | | | |

SHAMBHUNATH INSTITUTEOF ENGINEERING AND TECHNOLOGY

Subject Code : BAS104 **Subject: Environment and Ecology**

Course : B.Tech **SEMESTER:** 1st semester

FIRST SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

(For Sec C and D)

Time –1hr 30 min **Maximum Marks – 30**

SECTION – A

1. Attempt all questions/ short notes in brief.

Q N	QUESTION	*Marks*	*CO*	*BL*
a.	What is environment?	2	CO1	L1
b.	Write need of public awareness to study EVS.	2	CO1	L1
c.	Define biosphere.	2	CO1	L1
d.	Balanced ecosystem.	2	CO1	L1

SECTION - B

2. Attempt any *ONE* of the following.

Q N	QUESTION	*Marks*	*CO*	*BL*
a.	Write scope and importance of environmental studies.	5	CO1	L1
b.	Draw the structure of atmosphere on the basis of classification with brief description.	5	CO1	L2

3. Attempt any *ONE* of the following.

a.	What do you know about food chain and food web? Write at least 5 examples of food chain and food web.	5	CO1	L1
b.	What changes do the agricultural activities cause in environment? Discuss the effect of fertilizers and pesticides on environment.	5	CO1	L2

SECTION - C

4. Attempt any *ONE* part of the following:

Q N	QUESTION	*Marks*	*CO*	*BL*
a.	Explain the three ecological pyramids. What data is propagated by each pyramid in association with function, structure and energy in the ecosystem?	6	CO1	L2
b.	What is environmental impact assessment ? Discuss the importance of environmental impact assessment.	6	CO1	L2

5. Attempt any ONE part of the following :

Q N	QUESTION	Marks	CO	BL
a.	(i) Discuss ill effects of transportation on environment. (ii) What is effect of mining on human environment?	3 3	CO1	L2 L1
b.	Write the measures of sustainable development? Also discuss about the goals. Almost write two example of sustainable development.	6	CO1	L1

Bloom's Taxonomy Level (BL) :-

Remember (L1), Understanding (L2), Apply (L3), Analyze (L4), Evaluating (L5), Creating (L6)

Roll No. | 2 | 2 | B | T | C | S | 0 | 2 | 4 | 9 |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code: BAS 104 **Subject: Environment And Ecology**

Course: B. Tech. **Semester: 1st**

Sections: C,D **Branch: ALL**

SECOND SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

Time – 2 hrs. **Maximum Marks – 45**

SECTION – A

1. Attempt *ALL* questions in brief.

Q N	QUESTION	Marks	CO	BL
a.	Enumerate few water borne diseases and water induced diseases.	2	CO3	L1
b.	What is water logging?	2	CO3	L1
c.	Write effect of burning of paddy straw.	2	CO4	L2
d.	Write difference between noise and sound.	2	CO4	L2
e.	What is the objective of value education?	2	CO5	L1
f.	Write various programs for family planning by government.	2	CO5	L1

SECTION - B

2. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	What are major sources of soil pollutions? How does soil pollution affect soil productivity? What measures can be taken to prevent soil pollution.	5	CO3	L2
b.	Discuss in detail solid waste management including the treatment and disposal methods	5	CO3	L2

3. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Why acid rain occurs. Discuss the various effects of acid rain on surroundings. Suggest remedial measures to control acid rain.	5	CO4	L2
b.	How is population growth related to automobile pollution?	5	CO4	L2

4. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Explain how the initiatives taken by non-government organization are helpful in creating the public awareness and implementation of environment protection programs.	5	CO5	L2
b.	Write short notes on: (i) population growth (ii) environmental education.	5	CO5	L2

SECTION - C

5. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Explain the factors which cause air pollution. Discuss the impacts of air pollution on plants, human being and materials.	6	CO3	L2
b.	Enumerate with examples the major sources of water pollution and give its control measures.	6	CO3	L2

6. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	What is ozone hole? What are the causes of ozone hole formation. Discuss the effects of ozone layer depletion and its remedial measures.	6	CO4	L2
b.	Write the impact of greenhouse gases in global warming and climate change. Discuss the national and International efforts in curbing the climate change threats.	6	CO4	L2

7. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	How women education help the protection of environment. Discuss the policy of Indian government for development of women education.	6	CO5	L2
b.	Discuss the salient features of the environment protection Act 1986. Why it is necessary for our planet earth?	6	CO5	L2

Roll No. | | | | | | | | | | |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code:BEC101 **Subject:Fundamentals of Electronics Engineering**

Course: B.Tech. **SEMESTER: Ist**

SECOND SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

Branch: EC, CSE, EE, ME, CE

Time –2 Hrs **Maximum Marks – 45**

SECTION – A

1. Attempt all questions in brief.

Q N	QUESTION	Marks	CO	BL
a.	A 400 watt carrier is modulated to a depth of 75 percent. Calculate the total power in the modulated wave.	2	CO5	2
b.	Why BJT is called current controlled device?	2	CO2	2
c.	What is PIV for half-wave and full-wave centre-tapped transformer rectifier?	2	CO1	3
d.	State two differences between FET and BJT.	2	CO2	1
e.	What is the need for modulation?	2	CO5	1
f.	Draw the V-I characteristics of an ideal diode in forward and reverse bias conditions.	2	CO1	6

SECTION – B

2. Attempt any *ONE* part of the following :

Q N	QUESTION	Marks	CO	BL
a.	Draw and explain the working of a bridge rectifier with input and output waveforms. Calculate efficiency and ripple factor.	5	CO1	5
b.	Draw the block diagram of a communication system and explain each block in brief.	5	CO5	6

3. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	What is voltage multiplier? Draw and explain the voltage doubler circuit.	5	CO1	3
b.	Describe the construction and working of a NPN transistor in CE configuration with respect to size and doping.	5	CO2	6

P.T.O.

4. Attempt any *ONE* part of the following:

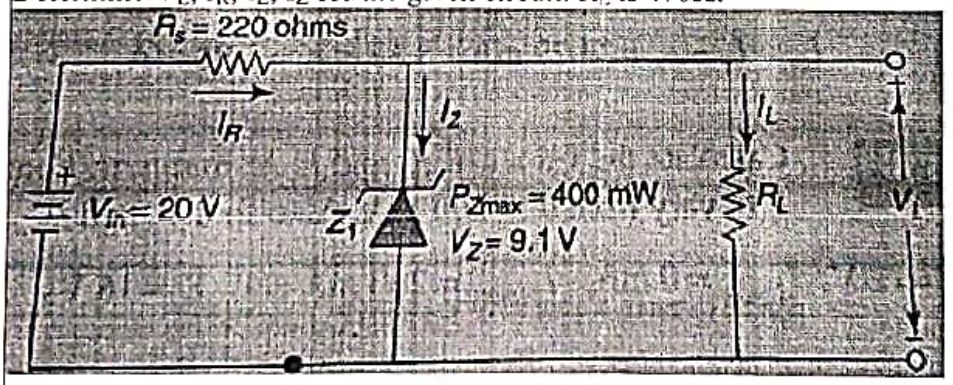
	QUESTION	Marks	CO	BL
a.	Describe working of n-channel JFET with help of constructional diagram and draw its drain and transfer characteristics.	5	CO2	4
b.	Explain the input and output characteristics of a BJT in the CE configuration.	5	CO5	1

SECTION - C

5. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Explain the V-I characteristics of PN junction diode.	6	CO1	2
b.	For a JFET given I_{DSS} = 6 mA and V_P = -4.5 V: a. Determine I_D at V_{GS} = -2V and -3.6 V. b. Determine V_{GS} at I_D = 3mA and 5.5 mA.	6	CO2	1

6. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	(i) Prove the following relation between total power and carrier power in AM wave. $P_t = P_c(1+\frac{m^2}{2})$ (ii) The antenna current of an AM transmitter is 8 ampere when only the carrier is sent, but it increases to 8.93 ampere when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.	6	CO5	3
b.	Determine V_L, I_R, I_L, I_Z for the given circuit. R_L is 470Ω. 	6	CO1	5

7. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Write short notes on (a) LED (b) Tunnel Diode	6	CO1	1
b.	Define Amplitude Modulation. Derive the expression for AM modulated waveform.	6	CO5	2

Roll No. 22BT0S0260

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code: BEC 101 Subject: Fundamentals of Electronics Engineering

Course: B.Tech. SEMESTER: 1st

FIRST SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

Branch: (CE/EC/EE/ME/CS)

Time –1hr 30 min Maximum Marks – 30

NOTE: Attempt all sections

SECTION – A

1. Attempt all questions in brief. (4*2 = 8)

Q N	QUESTION	Marks	CO	BL
a.	Define the terms: (i) Minterm (ii) Maxterm	2	4	L1
b.	Write the characteristics of an ideal op-amp.	2	3	L1
c.	For a given op-amp, CMRR=10^4 and A_d=10^5, find its common mode gain.	2	3	L3
d.	Simplify the Boolean function using Boolean Algebra theorems: A'B'C'+A'B C'+A B'C'+A B C'	2	4	L5

SECTION - B

2. Attempt any ONE part of the following: (1*5 = 5)

Q N	QUESTION	Marks	CO	BL
a.	Draw the circuit diagram of noninverting amplifier using op-amp; derive the expression for voltage gain.	5	3	L5
b.	Simplify the following logical expression using K-map $Y(A,B,C,D) = \Sigma m(1,3,4,6,8,9,11,13,15) + d(0,2,14)$. Realize the minimized expression using the basic gates.	5	4	L5

SECTION - C

3. Attempt any ONE part of the following: (1*5 = 5)

Q N	QUESTION	Marks	CO	BL
a.	Write technical short notes on the following: (i) Inverting comparator (ii) Differential and Common-Mode Operation	5	3	L1
b.	Minimize using K-map and realize using basic gates only. F (A, B, C, D) = ΠM (3, 4, 5, 7, 9, 13, 14, 15). d (0, 2, 8).	5	4	L3

4. Attempt any ONE part of the following: (1*6 = 6)

Q N	QUESTION	Marks	CO	BL
a.	Explain how the basic gates can be realized using NAND gates only.	6	4	L2
b.	Draw a differential amplifier circuit using op-amp and find the output voltage in terms of different input voltage.	6	3	L5

5. Attempt any ONE part of the following: (1*6 = 6)

Q N	QUESTION	Marks	CO	BL
a.	Convert the following :- i) $(1101.00101)_2 = (\ )_8$ ii) $(457)_8 = (\ )_{10}$ iii) $(101110.0101)_2 = (\ )_{16}$ iv) $(82.35)_{10} = (\ )_8$ v) $(ABC.75)_{16} = (\ )_{10}$	6	4	L5
b.	Draw the circuit diagram of integrator and differentiator using op-amps, derive the expression its output voltage.	6	3	L5

Roll No. | 2 | 2 | B | T | C | S | 0 | 2 | 4 | 9 |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject: ENGG. CHEMISTRY

Subject Code: BAS102

SEMESTER: I

Course: B. TECH

SECOND SESSIONAL EXAMINATION, ODDSEMESTER, (2022-2023)

Branch: ALL

Maximum Marks –45

Time –2Hr

SECTION – A

1. Attempt ALL questions in brief.

Q N	QUESTION	Marks	CO	BL
a.	What is the formula of gypsum and POP.	2	CO3	L1
b.	Write the function of salt bridge.	2	CO3	L1
c.	100 ml of water sample has a hardness equivalent of 12.5ml of 0.08 N MgSO4. What is its hardness in ppm.	2	CO4	L3
d.	Calculate the GCV and NCV of coal having the following compositions: C=85%, H=7%, S=1%, N=2%, ash=4% and heat capacity of steam=587 cal/gm	2	CO4	L5
e.	Write two examples of optical isomerism in compounds without chiral carbon.	2	CO2	L2
f.	Calculate absorbance if percentage transmittance of a solution(%T) is 80.	2	CO2	L1

SECTION – B

2. Attempt any ONE part of the following:

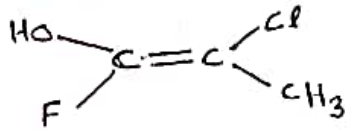
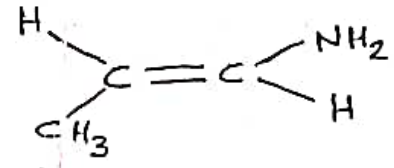
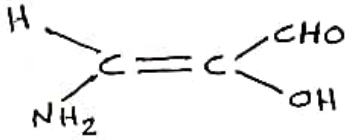
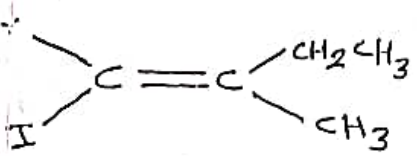
Q N	QUESTION	Marks	CO	BL
a.	Define the term corrosion. Describe the mechanism of electrochemical corrosion.	5	CO3	L1
b.	What is Nernst equation? The emf of a cell measured by means of a hydrogen electrode against a saturated calomel electrode at 298K is 0.4188 V. If the pressure of the H2 (g) was maintained at 1atm, calculate the pH of the unknown solution, given potential of reference calomel electrode is 0.2415 V.	5	CO3	L5

3. Attempt any ONE part of the following:

a.	4.2 g of a sample of coal was Kjeldahalized and evolved ammonia gas was absorbed in 30 ml of 0.1 N H2SO4. After absorption excess acid required 5 ml of 0.1N NaOH for neutralization. Calculate % of nitrogen in coal sample.	5	CO4	L1
b.	A zeolite softener was regenerated by passing 50 liters of NaCl solution having strength of 14.625 g/l of NaCl. Calculate the hardness of water if 10000 lrs of hard water was softened by using this zeolite.	5	CO4	L2

4. Attempt any ONE part of the following :

a.	What is the basic concept of NMR? How many signals in following molecule, (i) CH3COCH3 (ii) C6H5Cl	5	CO2	L3

b.	What is geometrical isomerism? Assign E and Z system in following molecule, (i)  (ii)  (iii)  (iv) 	5	CO2	L4

SECTION - C

Attempt All Questions.

5. Attempt any ONE part of the following .

Q N	QUESTION	Marks	CO	BL
a.	Write the composition of Portland cement. Explain to settling and hardening of Portland cement.	6	CO3	L5
b.	Define the term batteries. Explain the construction of Lead acid battery. Write all the chemical reactions taking place during charging and discharging of lead acid battery.	6	CO3	L2

6. Attempt any ONE part of the following :

Q N	QUESTION	Marks	CO	BL
a.	Outline demineralization process of water softening. Compare the merits and demerits of zeolite process with demineralization process.	6	CO4	L3
b.	Explain the construction and working principle of Bomb calorimeter. A sample of coal contains 80% C, 15% H, and 5% Ash. The following data were obtained when the above coal sample was tested in bomb calorimeter Weight of coal burnt =0.98 g Weight of water taken = 1000 g Water equivalent of bomb calorimeter = 2500 g Observed rise in temperature = 2.5 °C Fuse wire correction= 8 cal Acid correction = 50 cal Cooling correction= 0.02 °C Calculate gross and net calorific value of coal if the latent heat of condensation of water is 580 cal/g.	6	CO4	L5

7. Attempt any ONE part of the following :

Q N	QUESTION	Marks	CO	BL
a.	What type of electronic transition is involved in UV-visible spectroscopy? Explain the absorption and intensity shift in the UV spectroscopy.	6	CO2	L1
b.	For XY2 bent molecule show various types of Stretching and Bending vibrations in IR Spectroscopy.	6	CO2	L1

Roll No. | 2 | 2 | B | T | C | S | 0 | 2 | 4 | 9 |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code: BAS 102 Subject: ENGG. CHEMISTRY
Course: B. TECH SEMESTER: I
FIRST SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)
Time –1hr 30 min Maximum Marks – 30

SECTION – A

1. Attempt all questions in brief.

Q N	QUESTION	Marks	CO	BL
a.	Arrange the following molecules or ions in order of their increasing bond length (a) O_2 , O_2^- , O_2^{2-} , O_2^+ (b) NO , NO^- , NO^+	2	CO1	L3
b.	What are nano materials? How they are different from bulk materials?	2	CO1	L1
c.	What are Bio-degradable polymers?	2	CO5	L2
d.	What do you understand by the polymer blends?	2	CO5	L1

SECTION - B

2. Attempt any *ONE* of the following.

Q N	QUESTION	Marks	CO	BL
a.	Write the properties and application of Carbon Nano Tubes(CNT)	5	CO1	L1
b.	Write molecular orbital diagram of O_2 and CO molecule. Calculate their bond order and predict their magnetic behavior.	5	CO1	L3

3. Attempt any *ONE* of the following.

a.	What are conducting polymers? Discuss the classification and application of conducting polymers.	5	CO5	L1
b.	Give preparation, properties and uses of NYLON 6,6 and Buna -S rubber.	5	CO5	L1

SECTION - C

4. Attempt any *ONE* part of the following :

Q N	QUESTION	Marks	CO	BL
a.	What is liquid crystal? Briefly describe the different types of liquid crystals. Give their applications.	6	CO1	L1
b.	Give the structure properties and application of an allotrope of carbon having truncated icosahedron's structure.(fullerene)	6	CO1	L2

5. Attempt any *ONE* part of the following :

Q N	QUESTION	Marks	CO	BL
a.	What are Grignard reagents? Write at least five application of Grignard reagent.	6	CO5	L1
b.	What are polymer composite? Discus its classification.	6	CO5	L1

Roll No. | 2 | 2 | B | T | C | S | 0 | 2 | 4 | 9 | | | |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTAL OF MECHANICAL ENGINEERING (BME101)

B. Tech. (I-SEMESTER)

FIRST SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)
Branch: ME, EC, CIVIL, EE, CS

Time –1hr 30 min **Maximum Marks – 30**

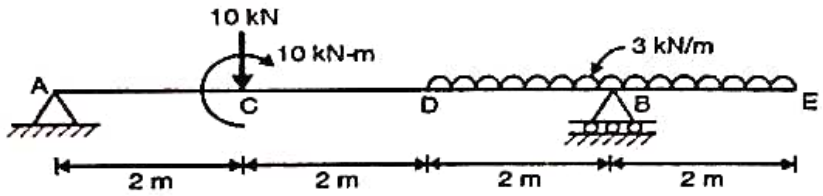
SECTION – A

1. Attempt all questions in brief.

Q.No.	QUESTION	Marks	CO	BL
a.	Define Poisson's ratio.	2	CO1	L1
b.	State polygon law of forces.	2	CO1	L1
c.	Discuss the terms used in IC engine- TDC, BDC, stroke and Bore.	2	CO2	L1
d.	Write any six components of IC Engine.	2	CO2	L1

SECTION – B

2. Attempt any one part of the following:

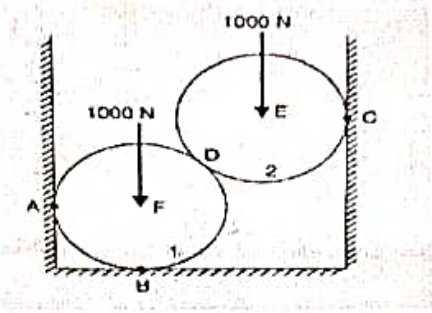
Q.No.	QUESTION	Marks	CO	BL
a.	Derive the following expression for the elastic constant $E = 2G(1+\mu)$.	5	CO1	L3
b.	An overhanging beam carries the loads as shown in Fig (1). Calculate the reaction at the supports.  Fig(1)	5	CO1	L3

3. Attempt any one part of the following:

Q.No.	QUESTION	Marks	CO	BL
a.	Compare the following- (a) 4 stroke Engine and 2 strokes Engine. (b) SI Engine and CI Engine	5	CO2	L2
b.	With a neat sketch explain the working of 4-stroke SI Engine.	5	CO2	L2

SECTION - C

4. Attempt any one part of the following:

Q.No.	QUESTION	Marks	CO	BL
a.	State the varignon's principle. Also give the proof of varignon's principle.	6	CO1	L1
b.	Two spheres, each of weight 1000 N and of radius 25 cm rest in a horizontal channel of width 90 cm as shown in Fig (2). Find the reactions on the points of contact A, B and C.  Fig (2).	6	CO1	L3

5. Attempt any one part of the following:

Q.No.	QUESTION	Marks	CO	BL
a.	What do you understand by hybrid electric vehicle (HEV)? What are the components of HEV? Also state its advantages.	6	CO2	L2
b.	Write short notes on electric vehicles.	6	CO2	L2

Bloom's Taxonomy Level (BL) :-

Remember (L1), Understanding(L2), Apply (L3), Analyze (L4), Evaluating(L5), Creating(L6)

Roll No. | 2 | 2 | B | T | C | S | 0 | 2 | 4 | 9 |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTALS OF MECHANICAL ENGINEERING (BME 101)

B. Tech. (I-SEMESTER)

SECOND SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

Branch: ME, EC, CIVIL, EE, CS

Time –2hr **Maximum Marks – 45**

SECTION – A

1.Attempt all questions in brief. **(6*2 = 12)**

Q.No.	QUESTION	Marks	CO	BL
a.	Derive a relation between COP of a heat pump and refrigerator.	2	3	LI
b.	Explain ton of refrigeration.	2	3	L1
c.	Write any four properties of fluid.	2	4	L1
d.	Define specific gravity of a fluid.	2	4	L1
e.	What is Prony Brake Dynamometer?	2	5	L1
f.	Define circular pitch, module in relation to toothed gears.	2	5	L2

SECTION - B

2. Attempt any one part of the following. **(1*5 = 05)**

Q.No.	QUESTION	Marks	CO	BL
a.	Explain the working of a domestic refrigerator with a neat sketch	5	3	L2
b.	Explain the following terms— (a) Dew point temperature (b) Comfort condition (c) Humidity ratio (d) Relative humidity (e) Wet bulb temperature	5	3	L2

3. Attempt any one part of the following. **(1*5 = 05)**

Q.No.	QUESTION	Marks	CO	BL
a.	Derive an expression for continuity equation for a three dimensional flow.	5	4	L6
b.	What is turbine? Explain the working of Francis turbine with diagram.	5	4	L2

4. Attempt any one part of the following. **(1*5 = 05)**

Q.No.	QUESTION	Marks	CO	BL
a.	Explain the construction and working of optical pyrometer.	5	5	L3
b.	Define mechatronics .What are the evolution levels of mechatronics and its Application?	5	5	L2

SECTION – C

5. Attempt any ONE part of the following: **(1*6 = 6)**

Q.No.	QUESTION	Marks	CO	BL
a.	Explain the construction and working of window air conditioner.	6	3	L2
b.	Name any four psychometric processes and represent them on the psychometric chart.	6	3	L1

6. Attempt any ONE part of the following: **(1*6 = 6)**

Q.No.	QUESTION	Marks	CO	BL
a.	Explain the construction and working of a reciprocating pump with a neat sketch.	6	4	L4
b.	Explain the principle and working of suspended hydraulic lift with the help of a neat sketch.	6	4	L4

7. Attempt any ONE part of the following: **(1*6 = 6)**

Q.No.	QUESTION	Marks	CO	BL
a.	Explain the various errors in measurement and the practices which are needed to minimize them.	6	5	L2
b.	Explain the working of bourdon tube pressure gauge with neat sketch.	6	5	L2

Bloom's Taxonomy Level (BL):-

Remember (L1), Understanding (L2), Apply (L3), Analyze (L4), Evaluating (L5), Creating (L6)