Lumbini Engineering College

Bhalwari, Rupandehi

Internal Examination-2080

B.E. Computer, 2nd Semester — Full Marks: 100

Course: Instrumentation — Pass Marks: 45

Time: 3 hrs.

Attempt all questions.

1a. Define instrumentation system. Draw and explain their functions with example. [8]

1b. For Quality factor Q>10, which bridge circuit; you would use "Maxwell" or "Hay"? Justify your answer for the chosen one with valid reasons. [8]

2a. Design an Ayrton shunt to provide an ammeter with current ranges of 1A, 5A and 10A. The movement with internal resistance of 50Ω and full scale deflection current of 1mA is used in the configuration. [8]

2b. In a balanced network, AB is a resistance of 100Ω in series with an inductor of 0.16H, BC and DA are non-inductive resistance of 500Ω each and CD consists of a resistance R in series with a capacity C. A potential difference of 3V at a frequency 5000/2∏ is applied between points A and C. Determine the values of R and C. [8]

3a. The output of an LVDT is connected to a 5V voltmeter through an amplifier whose amplification factor is 150. An output of 1mV appears across the terminals of LVDT, when the core moves through a distance of 0.6mm. Calculate the sensitivity of LVDT and that of whose set up. The milli-voltmeter scale has 100 divisions. The scale can be read to 1/3 of a division. Calculate the resolution of the instrument in mm. [8]

3b. Define strain gauge? Prove that G=1+2μ for strain gauge where constants has their usual meaning. [8]

4a. What is instrumentation amplifier? Derive the relation for the gain of Instrumentation amplifier.[8]

4b. Find the digital output of 8.217 volts input from a 4-bits Successive Approximation ADC with the reference voltage of 10V. [8]

5a. Write in brief about signal channel data acquisition system and multi-channel data acquisition system with suitable block diagram for each. [8]

5b. Explain in brief about working of cathode ray oscilloscope with suitable block diagram. [8]

6a. Draw suitable schematic diagram for 4*4 dot matrix display. Also explain the operation of strip chart recorder with suitable diagram. [8]

6b. Write short notes on (any three): [12]

a. R-2R ladder network DAC

b. Two wattmeter method

c. recent trend for DAS d. LCD

LUMBINI ENGINEERING COLLEGE (LEC)

Final Internal Exam

Level: Bachelors Degree | **Year: 2023**
Program: Computer 2nd sem. | **Full Mark:100**
Course: Applied Chemistry | **Pass Mark: 45**
Time:- 3 hrs

1.a) What is Galvanic cell? Construct a galvanic. Calculate the e.m.f of the cell at 30^0C. (7)

$Sn/sn^{++}(0.2M)$ // $Ag^{+}(0.1M)$ Ag

where k^0 $Sn/sn^{++}=+0.14V$

E^0 $Ag/Ag^{+}=-0.80V$

$R= 83.14\ Jmol^{-1}k^{-1}$ $F= 96500C$

b) What is electrochemical series? Give its significances. Explain about the electrochemical mechanism of corrosion. (8)

2.a) What is air pollution? Explain about the causes, effects and suitable remedies of air pollution. (7).

b) How can you determine the hardness of water present in water in your lab by complexometric titration method. (8)

3.a) Give reasons for the followings (i) $TiCl_3$ is coloured but $TiCl_4$ is colourless.
ii) Transition elements show variable oxidation state.
iii) Transition elements are generally paramagnetic in nature.
iv) Cadmium is not considered as transition elements. (8)

b) Differentiate between E_1 and E_2 reaction. (7)

4.a) Explain the manufacture method of Portland cement. (8)

b) What are the characteristics of good paint. Explain the constituents of paint. (7)

5.a) How can you determine free chlorine present in water in your lab. 7)

b) What is lead storage battery? Give its principle and applications? (8)
Differentiate between Li-ion battery and sodium in battery,

6.a) Differentiate between addition and condensation polymerization. What are conducting polymers. Explain its types. (8)

b) Give the preparation metho, properties and uses of Telfon and Neoprene. (7)

7. Write short notes on (any two) **(2*5=10)**

a) Dissolved oxygen
b) Sensors
c) Photovoltaic cell
d) Biodegradable polymers.

LUMBINI ENGINEERING COLLEGE

Second Internal Exam (2023)

Level : Bachelor | Semester: Spring | Full Marks : 100

Programme : B.E. | Pass Marks :45

Course : Algebra and Geometry | Time :3hrs.

Attempt all the questions.

1. a) Check the consistency of the given system of equations and solve it: (7)

$5x + 3y + 7z = 4;\quad 3x + 26y + 2z = 9;\quad 7x + 2y + 10z = 5$

b) Define basis of a vector space over the field. Show that the vectors $(1,2,1),\ (2,1,0),\ (1,-1,2)$ form a basis of R^3. (8)

2. a) Find the eigen value and eigen vector of the matrix: $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$. (8)

b) Use simplex method to find the minimize value of $Z = -x_1 + x_2 - 3x_3$ subject to the constraints:

$x_1 + x_2 + x_3 \le 10,\quad -2x_1 + x_3 \ge -2,\quad 2x_1 - 2x_2 + 3x_3 \le 0,\quad x_1, x_2, x_3 \ge 0$. (7)

3. a) Show that the four points with position vectors $(4,5,1), (0,-1,-1), (3,9,4)$ and $(-4,4,4)$ are coplanar. (7)

b) If $\vec{a'}, \vec{b'}, \vec{c'}$ is a reciprocal system to $\vec{a}, \vec{b}, \vec{c}$ then show that $\vec{a}, \vec{b}, \vec{c}$ is also reciprocal system to $\vec{a'}, \vec{b'}, \vec{c'}$ (8)

OR

If $\vec{a}, \vec{b}, \vec{c}$ are coplanar and $\vec{a}$ is not parallel to $\vec{b}$, prove that

$$\begin{vmatrix} \vec{a}.\vec{a} & \vec{a}.\vec{b} \\ \vec{a}.\vec{b} & \vec{b}.\vec{b} \end{vmatrix} \vec{c} = \begin{vmatrix} \vec{c}.\vec{a} & \vec{a}.\vec{b} \\ \vec{c}.\vec{b} & \vec{b}.\vec{b} \end{vmatrix} \vec{a} + \begin{vmatrix} \vec{a}.\vec{a} & \vec{c}.\vec{a} \\ \vec{a}.\vec{b} & \vec{c}.\vec{b} \end{vmatrix} \vec{b}.$$

4. a) Find the condition that the line $lx + my + n = 0$ may be a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. Also find the point of contact. (8)

b) Find the equation of the tangents to the hyperbola $3x^2 - 4y^2 = 12$ which are perpendicular to the line $y = x + 2$. Also find the point of contact. (7)

5. a) Find the magnitude and equation of the shortest distance between the lines $\frac{x-5}{3} = \frac{7-y}{16} = \frac{z-3}{7}$ and $\frac{x-9}{3} = \frac{y-13}{8} = \frac{15-z}{5}$. (8)

b) Find the equation of the tangent planes to the sphere $x^2 + y^2 + z^2 + 6x - 2z + 1 = 0$ which passes through $\frac{16-x}{1} = z = \frac{2y+30}{3}$. (7)

OR

Show that the equation to a right circular cone whose vertex is O, axis OX and semi - vertical angle α is $y^2 + z^2 = x^2 tan^2\alpha$ (7)

6. a) Test the convergence or divergence of series : $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \dots\dots\dots$

b) Prove that for infinite series $\sum a_n$ to be convergent it is necessary that $\lim_{n\to\infty}(a_n) = 0$. (8)

By taking suitable example show that the converse may not be true. (4 × 2.5 = 10)

7. Attempt all the questions.

a) Find the rank of matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 4 & -3 & 4 \\ -2 & 4 & -4 \end{bmatrix}$.

b) Show that the plane $2x - 2y + z + 12 = 0$ touches the sphere $x^2 + y^2 + z^2 - 2x - 4y + 2z - 3 = 0$.

c) Show that the mapping $T: R^3 \to R^2$ defined by $T(x,y,z) = (x + y - z,\ 0)$ is linear.

d) Find the equation of hyperbola with vertex at $(\pm 2,\ 0)$ and foci at $(\pm 5,\ 0)$.

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LUMBINI ENGINEERING COLLEGE

Final Internal Examination

Subject- Engineering Drawing F.M = 100

Faculty- Computer P.M = 45

Level- 2nd semester Time = 3 Hrs.

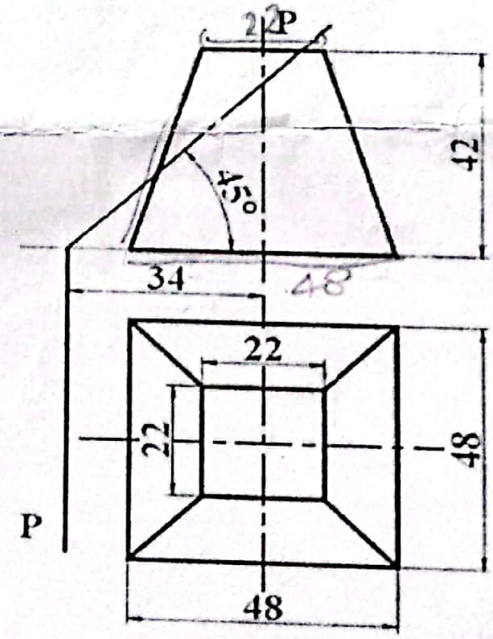
- Attempt all questions

1. Draw a helix for a cone of radius 25mm and axis height of 90mm and show its top view. [20]

   OR

   Draw a cycloid for a circle of diameter 45mm.

2. Draw surface development of following figure. [15]

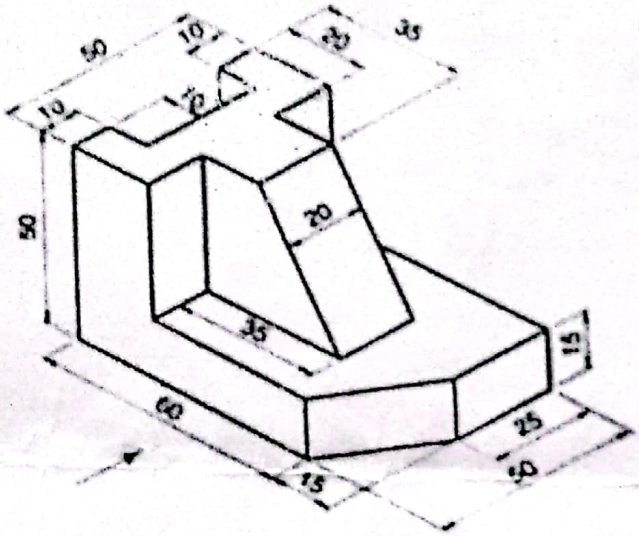


3. Draw the symbol for any ten of the following items: [10]

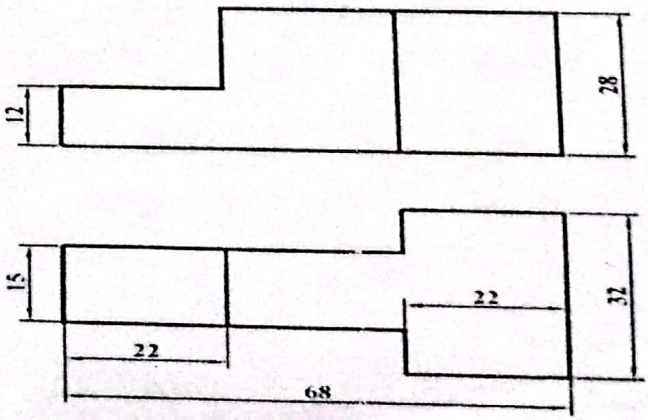
   Amplifier, capacitor, ac generator, voltmeter, resistor, switch, receiver, fault, three phase motor, three pole switch.

   for autocad items: circle, polyline, fillet, dimension style and rectangle.

4. Draw orthographic projection for the figure given below. [35]



5. Draw oblique drawing of the following orthographic drawings. [20]



OR

An object of sides 25x45x65 is given whose front face is parallel to PP. The station point lies 50mm right of the axis line. Draw the perspective view if vanishing point is 55mm below PP and 75 mm above of GP.

.....All the Best .....

LUMBINI ENGINEERING COLLEGE (LEC)

Final Internal Exam

Level: Bachelor
Program: BE Computer 2nd Semester
Course: Object oriented in C++
Attempt all the questions.

Year: 2080
Full marks: 100
Pass marks: 45
Time: 3 hrs.

Candidates are required to give their answer in their own words as far as practicable.

1.a) How can you say that OOP is a new paradigm in Software development? Explain with features of OOP. (7)
b) Briefly explain about the abstraction mechanism used OOP. (8)

2. a) When will you make a function inline? How does an inline function differ from a preprocessor macro? Explain with suitable example. (7)
b) Can you overload the constructor? If yes explain with an example program. (8)

3.a) Explain dynamic memory mgt. with memory map diagram? Write a C++ program demonstrating the usage of new and delete operators for single variable as well as array. (7)
b) Design three classes student, test and result, where result is inherited from test and test is inherited from student. Write possible functions to initialize the values. Also write a main function for execution by creating objects. (8)

4. a) How a constructor varies from normal member function? In what order are class constructor and destructor called when a derived class object is created? Illustrate with an example.(8)
b) What do you mean by RDD? What are the uses of CRC card? (7)

5. a) "Overloading is a type of polymorphism". Elaborate the given statement with the help of suitable example using the concept of function overloading. (8)
b) Do you agree that Generics is multi-Purpose programming? Give your opinion. Also explain function template and class template with appropriate example. (7)

6. a) Explain the role of a default constructor? When is it considered equivalent to a parameterized constructor? Support your answer with examples.. (8)
b) Briefly explain about the file handling mechanism used in C++. (7)

7. Write short notes on any two (2X5)
a. Role of Static members in oops.
b. Message Passing
c. Access Specifiers

LUMBINI ENGINEERING COLLEGE (LEC)

Final Internal Exam

Level: Bachelors Degree — **Year: 2023**
Program: Computer 2nd. sem. — **Full Mark:100**
Course: Applied Physics — **Pass Mark: 45**
Time:- 3 hrs

Attempt all questions

1.a) What is damped harmonic oscillator? Write down the equation for damped oscillation. Using the equation explain what are underdamped, overdamped and critically damped oscillations.

OR

What is a compound pendulum? Show that there are four collinear points in a bar pendulum where time period of oscillation is same. Also find the situation when the time period will be minimum. **(10)**

b) A solid sphere of radius 0.3m executes torsional oscillation of time period $2\pi\sqrt{12}$ sec at the end of suspension wire where upper end is fixed in a rigid support. Of the torque constant of the wire be $6*10^{-3}$ Nm/ rd, calculate the mass of sphere. **(5)**

2.a) What is wave. Derive a relation for speed of transverse wave in a stretched string and show that the overage rate of transfer of energy is $\frac{1}{2}\mu v w^2 A^2$ where symbols carry their usual meaning. **(10)**

b) The equation of the transverse wave on a string is y=(2.0mm) sin $[(20m^{-1})x-(600S^{-1}t]$. The tension of the string is 15N (i) what is wave speed (ii) Find the linear density of the string in grams per meter. **(5)**

3.a) What is capacitor? Write circuit equation for a charging RC circuit solve it to find charge and current. Explain the meaning of time constant by sketching the graph for charge and current varying with time. **(10)**

b) Derive Clausius- Massoti equation. **(5)**

$$\frac{\epsilon_r - 1}{\epsilon_r + 2} = \frac{N_\alpha}{3\epsilon_0}$$

4.a) Write down Maxwell's equation in integral form. Convert them into differential form. Explain the physical significance of each equation. **(10)**

b) Derive continuity equation **(5)**

$$\nabla.\vec{J} + \frac{d\rho}{dt} = 0$$

5.a) What is wave function? Describe be it's significance. An electron is trapped in one dimensional infinite potential well of width a such that V=∞ for x≤0 and x≥a. **(10)**

V= 0 for 0<x<a

using boundary condition, prove that total PE of system is $E=\frac{n^2h^2\pi^2}{2ml^2}$. Where symbols have their usual meaning.

b) AN electron moving is a wave has wave function Ψ(x)= 2 sin2πx. Find the probability of find the electron in the region x=0.25m to 0.5m. **(5)**

6.a) State the first law of thermodynamics and also write the limitation of the law Define refrigerator and its coeff. of performance (COP). Explain how first law is applied to analyze the performance of refrigerator. **(10)**

OR

What is radiation mode of heat transfer. State ane explain stefan's Botzmann law for two particle bodies at different temperature. What is bloack body. Write the properties of black body.

b) An ideal engine has a efficiency of 25%. If the source temperature is increased by 200^0C it efficiency gets double. Determine its source and sink temperature. **(5)**

7. Write short notes on (any two) **(5*2=10)**

a. Laser
b. Reverberation
c. Optical fibre