

FACULTY OF ENGINEERING
B.E. II / IV (Civil) II – Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: SURVEYING - II

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A**Note: Answer all questions.****(25 Marks)**

1. Derive an expression for finding the height of an object when the base is accessible in trigonometric levelling.
2. What are the temporary adjustments of a theodolite?
3. List errors in theodolite survey.
4. State the elements of reverse curve?
5. Define the degree of a curve by chord definition.
6. Write the bisection method of setting out of a simple circular curve.
7. What do you mean by stadia tacheometry?
8. Define (a) transiting of telescope and (b) swinging of telescope
9. State any six components of total stations.
10. Discuss coordinate system in GIS.

PART – B**Note: Answer any five questions.****(5 x 10 = 50 Marks)**

11. a) Draw a sketch showing theodolite with its all-component parts.
 b) Discuss in detail how Trigonometrical levelling is carried out for inaccessible points.
12. a) The following readings were obtained in running a theodolite traverse EFGH. Calculate the length and bearing of EH.

Line	Length	Bearing
EF	48.5	341 ^o 48'
FG	172.5	16 ^o 24'
GH	105.0	142 ^o 06'

- b) In detail write any one the method of adjustment or balancing of closed traverse, with figure?
13. a) A compound curve consists of two simple circular curves of radii 360 m and 470m and the curve is to be laid out between two straights. The angle of intersection between the tangents and the two straights are 25 and 57 degrees, respectively. Calculate the various salient elements of the compound curve?
 b) What are the conditions of closed traverse? Write in detail uses of Gale's Traverse table.

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- 14.a) How do you set a simple curve by offsets from long chord?
b) A -1.0% grade meets a +2.0% grade at station of elevation 328.605 mts. A vertical curve of the length 120m is to be used. The pegs are to be fixed at 10m interval. Calculate the elevations of the points on the curve.
- 15.a) The stadia readings with horizontal sight on a vertical staff held 50 m away from a tacheometer were 1.281 m and 1.784 m. The focal length of object glass was 30cm. The distance between the object glass and trunnion axis of the tacheometer was 15 cm. Calculate the stadia intercept.
b) Explain how area of the given field can be calculated using total stations with a single station setup with a neat sketch.
16. a) Explain the components of GIS with a sketch showing its block diagram
b) How do you compute for setting out data of summit and sag curve in vertical curves?
17. Write short notes on any TWO of the following:
a) Advantages of GIS.
b) Types of Total stations.
c) Repetition method.

FACULTY OF ENGINEERING
B.E II / IV (EEE/EIE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Solid Mechanics

Time: 3 Hours

Max. Marks: 75

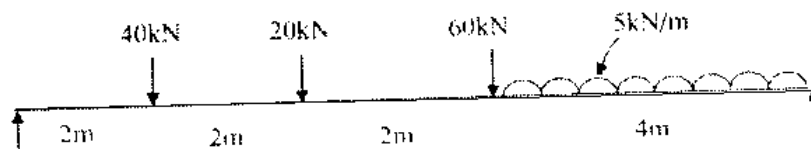
(Missing data, if any, may be suitably assumed)

PART – A**Note: Answer all questions.****(25 Marks)**

- 1 Draw the Shear Force and Bending Moment Diagrams for a Cantilever of length L carrying a uniformly distributed load 'w' kN/m throughout its length.
- 2 Define Modulus of Elasticity and Poisson's ratio.
- 3 Distinguish between different types of strain with illustrations.
- 4 Sketch the bending stress distributions for a rectangular section
- 5 Derive the expression for section modulus of a hollow rectangular section of external dimensions (in mm) B and D , and internal dimensions b and d .
- 6 What are the limitations of Strain energy method?
- 7 Define Moment of resistance of a section
- 8 Mention assumptions made in torsion equation
- 9 A cantilever beam of 6m is subjected to UDL of 10 kN/m throughout the span Find maximum slope and deflection.
- 10 Write the formula for finding deflection in a closely coiled helical spring subjected to an axial load.

PART – B**Note: Answer any five questions.****(5 x 10 = 50 Marks)**

11. a) Draw a neat sketch of stress strain curve for mild steel and explain its critical points.
 b) A steel rod 4 meters long and 20 mm diameter is subjected to an axial tensile load of 45kN. Find the change in length, diameter and the volume of the rod. Take $E_s = 2 \times 10^5 \text{ N/mm}^2$ and Poisson's ratio = $1/4$.
12. Construct S.F. and B.M. diagrams for the simply supported beam as shown in the figure-1.

**Figure 1**

13. Derive the flexure equation and state the various assumptions made in it.

14. Sketch the shear stress distribution across the T-section which is subjected to a shear force of 250 kN. The dimensions of the flange and the web are 120mm x 20mm and 20mm x 180mm, respectively.
- 15 a) Find the maximum torque that can be safely applied to a shaft of 80mm diameter. The permissible angle of twist is 1.5 degree in a length of 5m & shear stress is not to exceed 42MPa. Take Shear modulus = 84 GPa.
- b) A closely coiled helical spring made of 10mm diameter steel wire has 15 coils of 100mm mean diameter. The spring is subjected to an axial load of 100N. Calculate the maximum shear stress induced and the deflection of the spring.
- 16 Derive the expression for the deflection of a simply supported beam when subjected to udl on entire span by double integration method.
- 17 Write short notes on any Two of the following:
- Hooke's law
 - Strain energy in springs
 - Flexural stresses.

FACULTY OF ENGINEERING
B.E. II / IV (ECE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Analog Electronic Circuits

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

- 1 Draw small signal model at high frequency of BJT.
- 2 What is classification of amplifiers based on location of Q point?
- 3 What are the advantages of negative feedback?
- 4 Write about the effect on input and output impedances of trans-resistance amplifier with negative feedback.
- 5 What are the applications of voltage regulators?
- 6 Explain working of a Crystal.
- 7 What is the difference between power amplifier and voltage amplifier?
- 8 How cross-over distortion can be eliminated in power amplifier?
- 9 What are the requirements of RF voltage tuned amplifiers?
- 10 What is staggered tuned amplifier?

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 For a single stage RC coupled BJT amplifier, derive gain at mid and high frequencies.
- 12 Draw circuit of voltage shunt negative feedback amplifier and derive expression for its gain and input resistance.
- 13 Explain briefly working of Colpitts oscillator and derive expressions for frequency of oscillation and condition of oscillation.
- 14 Draw circuit diagram of transformer coupled class B push pull power amplifier and find efficiency. Explain its working.
- 15 For a single tuned RF voltage amplifier, obtain expressions for gain at resonance and bandwidth.
- 16 (a) What is the effect on bandwidth when single tuned stages are connected in cascade?
(b) Write about stability of feedback amplifiers.
- 17 Write short notes on:
 - (a) Harmonic distortion in power amplifiers
 - (b) Miller's theorem
 - (c) Series fed class A power amplifier.

FACULTY OF ENGINEERING
BE II / IV (MECH/PROD) II Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Fluid Dynamics

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

1. Define the terms density, specific weight. Give the relation between them.
2. Differentiate between steady flow & unsteady flow.
3. Differentiate between simple manometer and differential manometer.
4. What are the properties of stream function?
5. List out the engineering applications of Bernoulli's theorem.
6. Name the different forces present in a fluid flow.
7. Express the Hagen-poiseuille's equation and mention its use.
8. A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of diameter 300 mm at the rate of 300 liters/s. Find the head lost due to friction for a length of 50 m of the pipe. Take friction factor $f=0.00591$.
9. What are isothermal and adiabatic processes.
10. Define stagnation point and stagnation pressure.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. a) Define Bulk modulus of elasticity. Derive a relationship between surface tension and pressure inside a soap bubble.
b) A rectangular plate 0.5m x 0.5m dimension weighing 500N slides down an inclined plane making 30° angle with the horizontal at a velocity of 1.75 m/s. If the 2 mm gap between the plate and the inclined surface is filled with lubricating oil, find its viscosity and express it in poise and N-s/m².
12. a) Differentiate between stream function and velocity potential function
b) A 40cm diameter pipe, conveying water, branches into two pipes of diameters 30cm and 20cm respectively. If the average velocity in the 40cm pipe diameter pipe is 3 m/s. determine the discharge in this pipe. Also calculate the velocity in 20cm pipe if the average velocity in 30cm diameter pipe is 2 m/s.
13. a) Derive Bernoulli's equation along a streamline stating the assumptions.
b) A pipe bend tapers in the direction of flow with a diameter of 300mm and carries water at a pressure of 19.6kN/m². The velocity of flow is 3.5m/s. If the axis of the pipe is bent by 45°, find the magnitude and direction of the resultant force on the bend.

14. a) Express the relation and its importance of Reynolds number.
b) A pipe of diameter 20cm and length 10,000 m is laid at a slope of 1 in 200. An oil of specific gravity = 0.9 and $\mu=1.15$ poise is pumped up at the rate of 20 litres per second. Find the head lost due to friction. Also find the power required to pump the oil.
15. a) Explain the concept of boundary layer theory across a flat plate
b) A Small pipe line 10cm in diameter and 1000m long carries water at the rate 7.5 lts/sec. If the kinematic viscosity of water is 0.02 stokes, calculate the head lost wall shearing stress, centerline velocity, shear stress and velocity at 4 cm from centerline and thickness of the laminar sub layer.
16. Find the Mach number when a aeroplane is flying at 1100 km/hr through still air having a pressure of 7 N/Cm² and temperature of -5°C, Wind velocity may be taken as zero. Take $k=1.4$, $R=287$ J/kg o_k. Also calculate the pressure, temperature and density of air at stagnation point on the nose of the plane
17. Write notes on the following
a) Stream line, Streak line and Path line
b) Differential U-tube manometer
c) Rotational and irrotational flow

FACULTY OF ENGINEERING

**B.E. II / IV (AE) II Semester (NON-CBCS) (Backlog) Examination,
March / April 2022**

Subject: Fluid Mechanics and Machinery

Time: 3 hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

- 1 Define Compressibility and Surface tension?
- 2 Differentiate between Forced vortex flow and Free vortex.
- 3 What is Rate of flow?
- 4 A pitot tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 8m and static pressure head is 5m. Calculate the velocity of flow. Take $C_v=0.98$.
- 5 List the assumption made in deriving the Bernoulli's equation?
- 6 Find the loss of head when a pipe of 150mm diameter is suddenly enlarged to a diameter of 300 mm. The rate of flow of water through the pipe is 250lit/s.
- 7 Explain the terms gross head and net head for a Pelton wheel?
- 8 How the model testing of centrifugal pumps is used?
- 9 Give some necessary precautions against cavitation?
- 10 What is the function of air vessel in Reciprocating pumps?

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 A simple U tube manometer containing mercury is connected to a pipe in which an oil of specific gravity 0.8 is flowing. The pressure in the pipe is vacuum. The other end of the manometer is open to the atmosphere. Find the vacuum pressure in the pipe. If the difference of mercury level in the two limbs is 20cm and height of oil in the left limb from the center of the pipe is 15cm below.
- 12 State and Derive Bernoulli's theorem from Euler's equation of motion?
- 13 Derive continuity equation for three dimensions?
- 14 a) For a laminar steady flow prove that the pressure gradient in a direction of motion is equal to the shear gradient normal to the direction of motion.
b) Find the diameter a pipe of length 2000m when the rate of flow of water through the pipe is 200 lit/s and the head lost due to friction is 4m. Take the value of $C=50$ Chezy's formula.
- 15 Explain the working and construction of modern Francis turbine and Draw the inlet and outlet velocity triangles.
- 16 a) The diameter of a centrifugal pump at inlet and outlet are 30cm and 6cm respectively. The velocity of flow at the outlet is 2 m/s and the vanes are set back at an angle of 45° at the outlet. Determine the minimum starting speed of the pump if manometric efficiency is 70%.
b) Draw and discuss operating characteristics of a centrifugal pump?
- 17 a) Explain working of Single acting Reciprocating pumps?
b) Explain the working principles of gear pump with neat sketch?

FACULTY OF ENGINEERING
B.E. II / IV (CSE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: OOPS Using JAVA

Time: 3 hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

- 1 Define a two-dimensional array of different row sizes.
- 2 Explain the significance of each word in public static void main (string args[]).
- 3 Write a simple program for reading a file.
- 4 Explain print writer class with an simple example.
- 5 List the different collection classes and collection interface.
- 6 What is the use of string tokenizer?
- 7 List any 2 methods available in stream class.
- 8 What is event delegation model?
- 9 What are Event listeners?
- 10 Write notes on Serialization.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 a) Explain the dynamic method dispatch with example.
b) Write a program to demonstrate dynamic method dispatch and explain.
- 12 Explain about Exception Handling feature of Java with examples.
- 13 a) Explain the use of Comparator with example.
b) Explain the different iterators used for accessing the elements with example.
- 14 Write a program for all mouse event handling.
- 15 a) Write a program to copy one file content into another file.
b) Explain the different iterators used for accessing the elements with example.
- 16 Explain the concept of Event Handling and Delegation Event model with examples.
- 17 Write short notes on the following:
 - a) Interface
 - b) Hashmap
 - c) Package.

FACULTY OF ENGINEERING
B.E. II / IV (IT) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: OOP Using JAVA

Time: 3 hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

1. Explain the significance of each word in public static void main (String args [])
2. What is the difference between throw and throws keyword?
3. What is the use of super keyword?
4. What are the difference between applet and application?
5. What is unchecked exception? Give an example.
6. What is the purpose of Garbage collection?
7. What is the difference between iterator and enumeration?
8. What are the uses of final keyword?
9. What is a layout manager? What are different layout managers?
10. What is the difference between vector and array list?

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 a) What the benefits are of object oriented development?
b) Why is Java, a strongly typed language?
- 12 a) Write a program to demonstrate dynamic method dispatch and explain?
b) What is the use of final keyword in java.
- 13 Differentiate between thread and process. Write a program for creating three threads using any one method.
- 14 a) What is serialization? Which type of variables cannot be serialized?
b) Write a program to demonstrate the concept of Serialization?
- 15 a) Illustrate the differences between swing and AWT.
b) Explain different layout managers.
- 16 Explain the different iterators used for accessing the elements with example.
- 17 Write short notes on following:
 - a) Packages
 - b) Adapter classes
 - c) String Tokenizer class

FACULTY OF ENGINEERING**B.E. (Civil) IV - Semester (CBCS) (Backlog) Examination, March / April 2022****Subject: FLUID MECHANICS - II****Time: 3 Hours****Max. Marks: 70****(Missing data, if any, may be suitably assumed)****PART – A****Note: Answer all questions.****(10 x 2 = 20 Marks)**

1. What is the significance of Reynolds number?
2. What do you understand water hammer effect?
3. Define the term boundary layer separation.
4. Find the maximum discharge for least excavation of a rectangular channel having 5m width. If $C = 60$ and wet slope is $1/1500$.
5. Give the detailed classification of gradually varied flow profiles.
6. What are the surges in Open channel?
7. Differentiate between Laminar and Turbulent flow.
8. Define the terms: Energy and momentum correction factors.
9. State the main features of uniform flow in a channel.
10. Illustrate the significance of direct step method.

PART – B**Note: Answer any five questions.****(5 x 10 = 50 Marks)**

11. a) Derive Darcy-weisbach equation for flow through circular pipes.
b) A main pipe divides into two parallel pipes of 0.8m and 0.5m diameter with equal lengths. Parallel pipes meet again at the lower end. Find the discharge in each parallel pipe, if the discharge in the main pipe is $2.5 \text{ m}^3/\text{sec}$. The coefficient of friction for each parallel pipe is same.
12. a) In a pipe of 600mm diameter and 3000m length, provided with a valve at the end, water is flowing with a velocity of 2 m/s. Find i) The rise in pressure if the valve is closed in 20 seconds, assuming velocity of pressure wave $C = 1500 \text{ m/s}$ ii) The rise in pressure if the valve is closed in 2.5 seconds. Assume the pipe to be rigid and take bulk modulus of water as 2 GN/M^2 .
b) Classify pipes based on different pipe materials. Also write briefly about pipe leakages.
13. a) A V shaped open channel carries the water at a rate of $0.1 \text{ m}^3/\text{sec}$ when depth of the water is 1.2 m and each side of channel is inclined at 45° to the horizontal. Find the slope of the channel along the flow direction if $C = 50$.
b) Derive the equation for Critical depth and specific energy of an Open channel with neat sketch.
14. a) A smooth flat plate 2.4 m long and 0.9 m wide moves lengthwise at 6 m/s through still atmospheric air of density 1.226 kg/m^3 and kinematic viscosity $1.49 \times 10^{-5} \text{ m}^2/\text{s}$. Assuming the boundary layer to be entirely laminar, calculate the boundary layer thickness at the trailing edge of the plate, the shear stress half-way along the plate and the power required to move the plate.
b) Define boundary layer and explain the fundamental causes of its existence. Also discuss the various methods of controlling the boundary layer?

15. a) A concrete lined circular channel of 3.6m diameter has a bed slope of 1 in 600. Determine the velocity and flow rate for the conditions of maximum velocity and maximum discharge. Take Chezy's constant $C = 50$.
b) Explain in detail the significance of velocity and pressure distribution in open channel flow.
16. a) Describe the classification of gradually varied flow profiles.
b) Explain Froude model law giving examples.
17. Write short notes on any **TWO** of the following:
a) Boundary layer separation.
b) Moody's diagram.
c) Surges in open channel.

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FACULTY OF ENGINEERING

B.E. (EEE/EIE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

SUBJECT: Linear Integrated Circuits

Time: 3 Hours

Max marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

1. Draw the circuit diagram of inverting OP-Amp
2. Distinguish between AC and DC amplifier
3. Write the applications of Zero crossing detector
4. Draw the circuit of voltage limiter.
5. Draw the diagram of PLL
6. Define 'locked' and 'capture in range' for a VCO.
7. What is the function of voltage regulator?
8. Mention three techniques for A/D and D/A convertors.
9. What is meant by frequency response?
10. Draw the circuit diagram for narrow band reject filter.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 With simple schematic of differential amplifier, explain the function of operational Amplifier.
12. a) Draw the circuit of multiplier using Op-Amps and explain its operation.
b) Explain the operation of half wave precision rectifier.
13. Derive the close loop gain for a) an inverter summer b) an integrator with relevant circuit diagrams.
14. a) Explain the operation flash type A/D convertor type with relevant diagrams.
b) Write short notes on R-2R ladder type convertor write the application.
15. a) Explain the working principle of series regulator with Op-Amp.
b) Explain the operation of dual tracking regulator with neat circuit diagram.
16. Write short notes on a) PLL b) Parallel ADC
17. Write short notes on the following with diagrams
a) Positive clipper & Positive clamper
b) Instrumentation amplifier with Op-Amp.

FACULTY OF ENGINEERING
B.E. (ECE) IV Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Pulse, Digital and Integrated Circuits

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

1. How RC low pass circuit works as an Integrator—Explain?
2. Obtain Step response for RC High pass circuit.
3. Obtain transfer characteristics of a one level negative clipper.
4. Define transistor switching times.
5. Define stable state and unstable state of a multivibrator.
6. Explain a basic voltage time base generator?
7. Explain tri-state logic.
8. Compare ECL and TTL logic families?
9. Explain CMOS inverter?
10. What are the differences between MOS and CMOS logic family?

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. Explain response of RC High pass circuit for pulse and square wave inputs .Draw all waveforms?
12. (a) Explain clipping at two different levels, Draw transfer characteristics?
(b) State and explain Clamping theorem?
13. Obtain steady state voltages and currents of a bistable multivibrator using silicon transistors with $R_L = 3.3 K\Omega$, $R_1 = 50 K\Omega$, $R_2 = 4.7 K\Omega$, $V_{CC} = 18 V$, $V_{bb} = 5 V$ and $\beta = 50$?
14. (a) Explain working of a DTL NAND gate with circuit diagram?
(b) Explain CMOS transmission Gate?
15. (a) Draw circuit of an ECL NOR gate and explain?
(b) Draw circuit of PMOS NAND gate and explain?
16. Explain working of a Sweep circuit using UJT with diagram and waveforms?
17. Write short notes on :
 - (a) Response of RLC for STEP input
 - (b) Practical clamping circuit
 - (c) Schmitt trigger.

FACULTY OF ENGINEERING
B.E. (MECH/PROD) IV Semester (CBCS) (Backlog) Examination,
March / April 2022
Subject: Basic Electronics

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 What is the purpose of filter?
- 2 Give the expression for gain of an amplifier with feedback.
- 3 Define breakdown voltage and also mention its types.
- 4 Explain simple inverter circuit.
- 5 Define negative feedback and mention its applications.
- 6 What is meant by Barkhausen criteria?
- 7 Draw symbol and give truth table for X-OR.
- 8 What is thermocouple and how does it work?
- 9 What is R2R ladder DAC?
- 10 Draw the diagram for Integrator and Differentiator.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 (a) A Specimen of Silicon square cross section of 4cm x 4cm has length of 5 cm. It is subjected to voltage of 2 volts across its length and current flowing through it is 6 mA. Determine (i) Concentration of free electrons (ii) Drift velocity of Electrons.
(b) Explain bridge rectifier with its waveform and derive (i) PIV (ii) TUF
- 12 (a) Explain the working characteristics of PNP transistor with its current components.
(b) Explain the working of JFET. Draw the symbol of N channel JFET.
- 13 (a) Explain in detail about LC type Oscillator.
(b) What is the frequency of RC phase shift Oscillator using BJT?
- 14 (a) Explain the applications of Op-Amp with its proper equations.
(b) Explain Instrumentation amplifier in detail.
- 15 (a) Explain the working of UJT with its characteristics.
(b) Explain the working of CRO with neat diagram.
- 16 (a) Explain the operation of full adder with the help of truth table and logic circuit.
(b) Draw the complete logic diagram of half adder using universal gate and with the help of truth table.
- 17 (a) Draw h parameter equivalent circuit of CE configuration. Determine h parameters from CE characteristics.
(b) Write short notes on four topologies of feedback amplifier.
