Enrollment No……

# Bachelor of Engineering
## Second Semester Main Examination, June-2021
## Introduction to Surveying [CE112T]
## Branch: Civil

**Time: 3:00 Hrs** **Max Marks 70**

**Note:** **(i) Attempt any five questions. All questions carry equal marks.**
**(ii) Answer should be precise & to be point only.**
**(iii) Assume suitable data if necessary & state them clearly.**

Q.1 (a) Write down basic principles and classification of surveying?.
(b) Differentiate between prismatic & surveyor compass?

Q.2 (a) A flag pole of height 2 m was erected on a top of building. Find the R.L. of top of flag pole if the vertical angle to the top and bottom of flag were 10° and 7°. if the staff reading of 1.245m was taken over a B.M. of R.L. 100m with vertical angle -15°. The distance between instrument and B.M. is 40m.
(b) The magnetic bearing of line AB was N 59°30' W in the year 1967 when the declination was 4°10' east if present declination is 3° west the whole circle line will be what?

Q.3 (a) Explain:-
(i) Leveling (ii) Height of instrument (iii) Rise and Fall (iv) Intermediate sight
(b) Following consecutive reading where taken from dumpy level- 6.52, 4.92, 6.52, 4.80, 3.5, 4.23, 3.52, 2.58, 1.86, 2.4, 1.65 and 3.10 the level was shifted after 4th,6th and 9th reading. The 1st reading on BM of RL is 250.8m. Calculate the RL of other points.

Q.4 (a) Write down basic principles and classification of surveying?
(b) Write down the principles of surveying? Differentiate between plane surveying and geodetic surveying.

Q.5 (a) What is local attraction? What are its causes? What precautions should be taken to avoid local attraction?
(b) Explain:- (A) Bench mark (B) Reduced level (C) Back sight (D) Fore sight

Q.6 (a) What are the various fundamental axes of a dumpy level? What should be the relationship between them?
(b) What is contour? Write various properties of contours.

Q.7 (a) what is planimeter? Explain its working with labeled diagram?

(b) Write short note on height of instrument method and rise and fall method with the help of an example.

Q.8 (a) The following bearings of the lines of the traverse ABCD were taken with a compass in a place where local attraction is suspected:-

| Line | Fore bearing | Back bearing |
|---|---|---|
| AB | 68°20’ | 248°20’ |
| BC | 142°30’ | 320°30’ |
| CD | 195°40’ | 18°40’ |
| DA | 301°30’ | 120°30’ |

Find the correct bearings of the lines.

(b) Convert the following bearings from one system to another system:-
(1) -327°35’ (2) N 63°32’ E (3) N 43°45’ W (4) 182°27’

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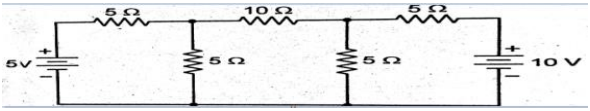
**Bachelor of Engineering**
**Second Semester Main Examination, June-2021**
**Fundamentals of Electrical Engineering [EE110T]**
**Branch-EC/ME**

**Time: 3:00 Hrs** **Max Marks 70**

**Note: (i) Attempt any five questions.(ii) All question carry equal marks.**

Q.1 (a) Explain KCL & KVL.
(b) Write all Loop Equation for the circuit:-




Q.2 (a) Write Statements of Theremin's theorem and Superposition theorem
(b) Define Independent and dependent voltage sources with example.

Q.3 (a) Derive Expression for Star- Delta Transformation.
(b) What is Power factor? Explain causes of low power factor and its application.

Q.4 (a) Write laws of electromagnetic Induction.
(b) Explain with the help of necessary derivation, how torque is developed in D.C. motor.

Q.5 (a) Explain how rotational field is produced in a 3- phase induction motor.
(b) Derive an emf equation for a single phase transformer.

Q.6 (a) Explain open circuit and short circuit test of a single phase Transformer.
(b) Describe in detail the losses in transformer.

Q.7 (a) Compare Magnetic circuit with Electrical circuit in detail.
(b) A single phase transformer has 350 Primary and 1050 secondary turns. The net cross-sectional area of core is 55cm2. If the Primary winding be connected to a 400v, 50 Hz single phase supply,
Calculate: (A) Maximum value of flux density in the core. B) Voltage induced in the secondary winding.

Q.8 (a) Explain Measurement of power and power factor in three phase system with balance load by using two wattmeter methods.
(b) Describe Constructional detail of DC machine with neat sketch.

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**Bachelor of Engineering**
**Second Semester Main Examination, June-2021**
**MATHEMATICS-II [MA111T]**
**CE/CSE/EC/EX/IT/ME**

**Time: 3:00 Hrs** **Max Marks 70**

**Note: (i) Attempt any five questions.(ii) All questions carry equal marks.**

Q.1 (a) Solve $\cos x\, dy = y(\sin x - y)dx$.
(b) Solve $\sqrt{1-y^2}dx = (\sin^{-1} y - x)dx$.

Q.2 (a) Find the particular integral of $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 4\cos^2 x$.
(b) Solve $[(D-1)^2(D-3)^2]y = e^{3x}$.

Q.3 (a) Solve- $\frac{dx}{dt} + 5x + y = e^t$, $\frac{dy}{dt} - x + 3y = e^{2t}$
(b) Solve- $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = x^2e^x$.

Q.4 (a) Solve by the method of variation of parameters - $x^2\frac{d^2y}{dx^2} - 2x(1+x)\frac{dy}{dx} + 2(1+x)y = x^3$.
(b) Solve -$\frac{d^2y}{dx^2} - 2\tan x\frac{dy}{dx} + 5y = \sec x\, e^x$.

Q.5 (a) From the partial differential equation by eliminating the arbitrary function f from the relation $z = y^2 + 2f\left(\frac{1}{x} + \log y\right)$
(b) Solve $x^2p + y^2q = (x+y)z$.

Q.6 (a) Solve $-z(p-q) = z^2 + (x+y)^2$
(b) Solve by Chartpit's Method- $(p^2+q^2)y = qz$.

Q.7 (a) Solve $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x\,\partial y} = \sin x \cos 2y$
(b) Solve by the method of separation of variables: $\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$.

Q.8 (a) Find the surface passing through the two lines $z = x = 0$ and $z - 1 = x - y = 0$ and satisfying the differential equation $r - 4s + 4t = 0$.
(b) Solve- $(r + s - 6t) = ycosx$. or $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6\frac{\partial^2 z}{\partial y^2} = ycosx$.

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**Bachelor of Engineering**
**Second Semester Main Examination, June-2021**
**Concepts in Engineering Design [ME112T]**
**Branch-CE/EE/EC/CS/ME/IT**

**Time: 3:00 Hrs** **Max Marks 70**

**Note: (i) Attempt any five questions. All question carry equal marks.**
**(ii) Answer should be precise & to be point only.**
**(iii) Assume suitable data if necessary & state them clearly**

Q.1 (a) Discuss Asimov's detailed design process.
(b) Explain concurrent engineering. Write a short note on extended product life cycle.

Q.2 (a) Explain QFD with a suitable example.

(b) Explain general form of a contract.

Q.3 (a) Describe optimization in detail. Also explain finite element modeling packages.

(b) Describe the design for environment.

Q.4 (a) Explain the design rules for environment.

(b) Explain material selection methods in detail.

Q.5 (a) Explain in detail Reliability centered maintenance.

(b) Discuss FMEA with a suitable example. Also list the benefits of design of experiments.

Q.6 (a) What are the applications of CAE?

(b) What are the disadvantages of bench marking?

Q.7 (a) What are the benefits of designing to codes and standards?

(b) What do you mean by product liability?

Q.8 (a) Mention the steps to be followed to improve creative thinking.

(b) What are the types of models in engineering design?

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# Bachelor of Engineering
## Second Semester Main Examination, June-2021
## Physics [PH110T]
## Branch: CE/ME

**Time: 3:00 Hrs** **Max Marks 70**

**Note: 1. Attempt any five questions out of eight.**
**2. Answer should be precise & to be point only.**
**3. Assume suitable data if necessary & state them clearly.**

**Q.**1 (a) Define thin film? Explain thin film of interference.
(b) What are coherent? Write the difference between interference and diffraction.

Q.2 (a) Show that formation of interference due to two coherent sources and deduce the expression for fringe width.
(b) Prove that the diameter of dark rings is proportional to the square root of odd natural number.

Q.3 (a) What is meant by diffraction of light? Distinguish between Fresnel and Fraunhoffer classes of diffraction
(b) In Newton's rings experiment the diameter of the 5th and 10th rings are 4.2 mm and 7.0 mm respectively. Radius of curvature of Plano-convex lens is 1m. Calculate the wavelength of light.

Q.4 (a) What are Matter waves? Deduce the expression for wavelength of matter wave.
(b) Define Phase velocity and Group velocity. Derive its relationship between them.

Q.5 (a) What is Compton Effect? Obtain an expression for the shift in the wavelength of X- ray beam?
(b) Derive Schrodinger's time dependent wave equations.

Q.6 (a) Monochromatic X-rays of wavelength 0.7078 A° are scattered by carbon. The X-rays scattered at angle 90° with the direction of the incident beam are observed. What is the wavelength of the scattered X-rays?
(b) What do you meant by nucleus? Also classification of Nuclei.

Q.7 (a) Why do we say that a nucleus behaves like a drop of liquid? What are the essential features which are common to a drop of liquid and a nucleus?
(b) What are Linear Accelerators? Explain the construction and working of linear particle accelerator?

Q.8 (a) What is a PN junction diode? Draw the volt-ampere characteristics of PN junction diode.
(b) Explain three processes occurring when a light wave interacts with matter. Derive the relationship between the Einstein's Co-efficient.