Enrollment No…….

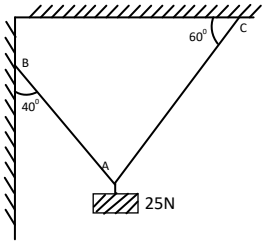
Bachelor of Engineering
First Semester Main Examination, Dec-2020
Engineering Mechanics (CE110T)
CE/EX/EC/ME

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

Note : 1. Attempt any Five questions out of Eight.
2. All questions carry equal marks.
3. Assume suitable data if necessary & state them clearly

Q.1 **(a)** Discuss in brief triangle law of forces for finding resultant of two concurrent forces.
(b) Define the following.
(i) Body
(ii) Rigid body
(iii) Particle
(iv) Engineering Mechanics

Q.2 **(a)** An object weighing 25N hangs form a point 'A' with the help of two strings "BA" & "CA" as shown in fig "BA" is inclined at 40^0 to the vertical while "CA" is inclined at 60^0 to the horizontal determine the forces in the strings "BA & CA"

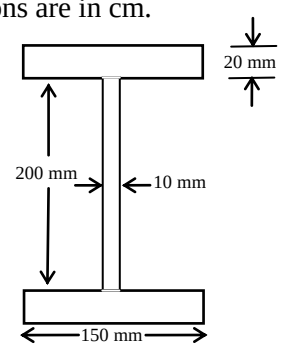


(b) State & prove the varignon's principle of moments.

Q.3 **(a)** With neat sketehes define
(i) Cantilever Beam
(ii) Simply Supported
(iii) Overhanging Beam
(iv) Fixed & Continuous Beam

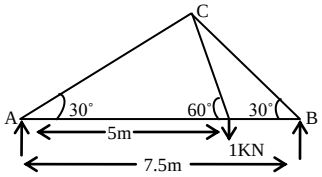
(b) A beam of 6 m long is simply supported at the end and carries a uniformly distributed load of 1.5 KN/M & three Concentrated loads 1 KN, 2 KN, 3 KN acting respectively at a distance of 1.5m, 3m & 4.5m from the left end. Determine the reaction at both ends.

Q.4 **(a)** Determine moment of inertia of the "I" section about the Centroidal axes xx & yy. All dimensions are in cm.



(b) For a circular pipe of 150 mm external diameter & 120 mm internal diameter, determine,
(i) Moment of inertia about it's diameter
(ii) The radius of gyration
(iii) The polar moment of inertia.

Q.5 **(a)** How many equations are used in the method of sections explain?
(b) Find the sections and forces in members of the Truses as shown in fig, truses carries a point load of 1 KN at the joint "D"

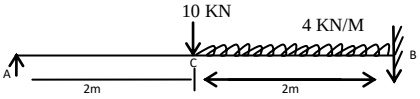


Q.6 **(a)** Write short note on:-
(i) Kinematics & Kinetics
(ii) Velocity & Acceleration
(iii) Displacement & Angular Displacement
(b) Derive equation of motion for a particle having rectilinear motion under uniform acceleration.

Q.7 **(a)** A motorist is driving h is car at 80 km/h when he observes that a traffic light 240 m ahead turn red. The traffic light is to remain red for 1.5 seconds. If the motorist wisher to pass the light without stopping just as it turns green. find - (1) The required uniform retardation

(2) Speed of the car as it passes the traffic light.

(b) Drown S.I. & B.M. diagram for cantilever beam loaded as shown in figure below.



Q.8 **(a)** Write short notes on: - (Any Two)

(i) Fundamental laws of Mechanics

(ii) Boris notation

(iii) Types of loading on beam.

(b) Write short note on: - (Any Two)

(i) Parallel axis Theorem

(ii) Types of Motion

(iii) Newton's first law of Motion.

Enrollment No……

Bachelor of Engineering

First Semester Main Examination, Dec-2020

Chemistry [CY110T]

Branch: CE/ME

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

Note: Attempt any five questions out of eight.
All questions carry equal marks.

Q.1 (a) Define Vulcanization? Explain with proper reaction. Mention the advantages of vulcanized rubber.
(b) Explain the Poly Vinyl Chloride (PVC) on the basis of Its Properties, Preparation and Uses.

Q.2 (a) What is the valence-shell electron-pair repulsion (VSEPR) model? Give the hybridization of CO_2, SO_2, CH_4 SF_4, and SF_6 molecules.
(b) Define Electrochemistry? Explain Arrhenius theory of electrolytic dissociation.

Q.3 (a) 0.5g of $CaCo_3$ was dissolved in dilute HCL and diluted to 500 ml with distilled water ,50 ml of this solution required 48 ml of EDTA solution for titration.50ml of hard water sample required 15 ml of EDTA solution for titration.50 ml of same water sample on boiling and filtering requires 10 ml of EDTA solution . Calculate temporary, permanent and total hardness in ppm.
(b) Write a short not on following:
(i) Transport Number
(ii) Kohlrausch's Law
(iii) Solubility Product
(iv) Redox Reaction
(v) Electrochemical Cells

Q.4 (a) What is the molecular orbital theory? With the help of MO diagram calculate the bond order of the following: CO, NO, O_2, O_2^-, O_2^{2-}.
(b) Explain the detailed procedure for determining the flash & fire point of lubricating oil.

Q.5 Discuss the differences between order of the reaction and molecularity of a reaction.

(b) Define the Order of reaction. Explain the Methods of determining order of reaction (Ist & 2nd Order).

Q.6 (a) Define the following terms:

(i) Component (ii) Phase

(ii) Degree of freedom (iv) Corrosion

(b) What are polymers? Classify them on the basis of structure and heat stability with suitable examples

Q.7 Write short note on:

(i) Nylon 66 (ii) Poly Vinyl Chloride

(iii) Teflon (iv) Phenol formaldehyde resin

(v) Nylon 6 (vi) Urea-formaldehyde resin

Q.8 (a) Differentiates phosphorence and florescence using Jablonski's diagram.

(b) What are the photosensitizers? Explain photosensitized reaction with suitable examples.

Enrollment No……

Bachelor of Engineering
First Semester Main Examination, Dec-2020
Fundamentals of Electronics Engineering (EC110T)
Branch-CSE/IT

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

Note : Attempt any five questions. All questions carry equal marks.

Q.1 **(a) Explain conductor, insulator and semiconductor with their energy band gap diagram.**
(b) Describe N-Type and P-type semiconductor with energy Band gap diagram.

Q.2 **(a) Explain even signal and odd signal with example.**
(b) Define continuous and discrete time signal with example.

Q.3 **(a) Describe binary, octal, decimal and hexadecimal number system with their radix.**
(b) Describe the conversion process of Binary to other system and octal to other system.

Q.4 **(a) Describe half wave and full wave rectifier with suitable circuit diagram.**
(b) write shot notes on :-
(i) Clipping circuit
(ii) Clamper circuit

Q.5 **(a) Define positive and negative logic in Binary number system.**
(b) Describe Boolean algebra and its related all types of law?

Q.6 **(a) Define energy & power signal with example.**
(b) Explain unit step, parabolic, and impulse function with example.

Q.7 (a) Realization of all logic grates using universal NAND GATE.
(b) Realization of all logic gate using universal NOR GATE.

Q.8 (a) What are complements? Define 1S, 2S, 7S, 8S, 9S, 10S, 15S, and 16S complement.
(b) Describe the conversion process of decimal to other system and hexadecimal to other number system.

Enrollment No……

Bachelor of Engineering
First Semester Main Examination, Dec-2020
English [HU110T]
Branch: CE/EX/EC/CSE/IT/ME

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

Note : 1. Attempt any five questions.
2. Each question carries equal marks.

Q.1 (a) Define parts of speech? Explain with suitable examples.
(b) Write a short note on Articles with suitable examples.

Q.2 (a) Define active and passive voice?
(b) Explain barriers to communication.

Q.3 (a) Why do need to enrich vocabulary during communication?
(b) How to develop strategic reading?

Q.4 (a) Give the basic concepts relating to a grammar.
(b) Write a short note on active and passive reading.

Q.5 (a) What is note making & note taking?
(b) What is planning, drafting and editing?

Q.6 (a) Write a detailed note on technical descriptions and technical definition.
(b) Write a technical description of Lathe Machine.

Q.7 (a) "Reading is a complex communicative process of receiving and interpreting the written word"- Elaborate.
(b) Write the points to be kept in mind while answering comprehension passages.

Q.8 (a) Explain SQ3R reading techniques.
(b) How to read textbook more efficiently?

Enrollment No……

Bachelor of Engineering
First Semester Main Examination, Dec-2020
MATHEMATICS-I (MA110T)
ME/CE/EX/EC/CSE/IT

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

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

Q.1 (a) If $u = \sin^{-1}\frac{x^2+y^2}{x+y}$ then show that 7

$$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$$

(b) Discuss the maximum and minimum values of 7

$u = x^3 + y^3 - 3axy$

Q.2 (a) Evaluate $\int_0^{\frac{\pi}{2}} log sin x dx$ 7

(b) Prove the relation between Beta and Gamma function. 7

Q.3 (a) Solve $\frac{d^3y}{dx^3} + 2\frac{d^2y}{dx^2} + \frac{dy}{dx} = e^{2x}$ 7

(b) Solve $(D^2 + 4)y = \cos 2x$ 7

Q.4 (a) If $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ then find A^{-1} ? 7

(b) Investigate the value of λ and μ so that the equations- 7

$2x + 3y + 5z = 9$

$7x + 3y - 2z = 8$

$2x + 3y + \lambda z = \mu$ have

i) No Solution

ii) ii) A Unique Solution

iii) An Infinite Number of Solutions

Q.5 (a) Show that P∧Q logically implies P⇔Q. 7

(b) Prove that in a graph the number of vertices of odd degree is always even. 7

Q.6 (a) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, shat that 7

$$\left[\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right]^2 u = \frac{-9}{(x+y+z)^2}$$

(b) The period T of a simple pendulum is given by 7

$T = 2\pi\sqrt{L}/g$ find the minimum error in T due to possible errors upto 1% in L and 2.5% in g.

Q.7 (a) Evaluate $\int_0^\infty \sqrt{x}\, e^{-3\sqrt{x}} dx$ 7

(b) Prove that B (ℓ, m) = $\frac{\lceil l \lceil m}{\lceil l+m}$

Q.8 (a) Find the eigen value of the matrix 3.5

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

(b) Define sentence with suitable example. 3.5

(c) Expand log $(1+e^x)$ upto the term containing x^4 by Maclaurins theorem. 3.5

(d) Prove that $\lceil \frac{1}{2} = \sqrt{\pi}$ 3.5

Enrollment No……..

Bachelor of Engineering
First Semester Main Examination, Dec-2020
Engineering Graphics (ME111T)
Branch - ME/CE/EE/EC/CSE/IT

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

Note : 1. Attempt any five questions out of eight.
2. Drawing should contain line-work and dimensioning as per standard convention.
3. Draw in first angle projection unless stated otherwise.

Q.1 **(a) The top-view of a 75 mm long line measures 65 mm while the length of its elevation is 50 mm. Its one end A is in the H.P. and 12 mm in front of V.P. Draw the projection of the line and determine its there length. Also locate the traces of the line.**

(b) The distance between the end-projectors of a straight line AB is 55 mm. one of the ends of the lie is 15 mm above the H.P. and 10 mm from the V.P. while the other end is 60 mm above the H.P. & 55 mm in front of V.P.
(i) Draw the projections of the straight-line.
(ii) Locate the traces. And
(iii) Find the inclinations of the line with both planes.

Q.2 **A cone of base diameter 60 mm and height 75 mm is resting an the ground on its base. It is cut by auxiliary inclined plane perpendicular to the V.P. and intersecting the axis of the cone 25 mm plane the open and inclined at 40^0 to the H.P. Draw its shape of the section. Also draw the development of its lateral surfaces.**

Q.3 **(a) A right circular cone of base diameter 65 mm and axis 80 mm long is resting on one of its generator on the H.P. & its axis make an angle of 45^0 with the V.P. draw the projections of the solid keeping its open to wards the V.P.**
(b) A pentagonal pyramid of 30 mm side of base and axis 70 mm long is resting on the H.P. on its base with one side of the base parallel to the V.P. It is cut by a sectional plane inclined at 45^0 to the H.P. and perpendicular to the V.P. Draw the sectional top view of the pyramid and draw the development of its lateral surfaces.

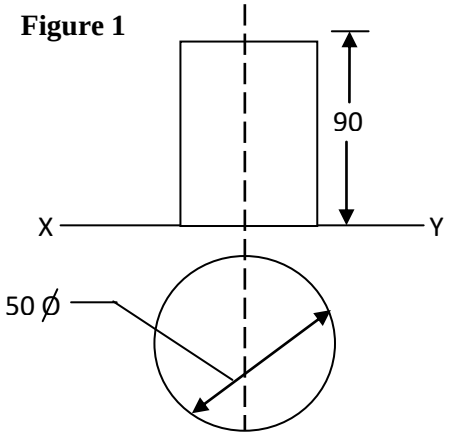
Q.4 **(a) What are two different conversations of dimensions?**
(b) State the position of a point in its path views if it is 20 mm below H.P. & 30 mm behind V.P.
(c) Differentiate between first angle and third angle projection system.

Q.5 **(a) Draw the projection of a regular hexagon 35 mm long sides. Having one of the corner on the ground. Its surface is inclined at 45^0 with the H.P and the diagonal of the hexagon contained by the resting corner is inclined at 30^0 with the V.P.**
(b) A circle of 50 mm diameter appears as an ellipse in its plan, having major-axis 50 mm & minor-axis 30 mm. Draw the projections of the circle if the major-axis of the ellipse in the plan is horizontal.

Q.6 **(a) Explain in details the Constructional solid geometry approach for creation of solid models.**
(b) Enlist various uses of solid-modeling.

Q.7 **(a) Draw the isometric view of a right circular-cylinder of base diameter 50 mm and axis 90 mm long haling its axis vertical.**

Figure 1



(b) A right circular cone of base diameter 40 mm and height 60 mm is placed centrally on a square block of 70 mm side and 20 mm thick. Draw the isometric-view of the solid.

Q.8 **(a) Mention any three methods by which a circle can be drawn using CAD.**
(b) State and explain any five significant edit-commands used in CAD software.
(c) State and explain five utility-commands used is Auto CAD.

Enrollment No……

Bachelor of Engineering
First Semester Main Examination, Dec-2020
Physics (PH110T)
Branch: CS/EX/EC/IT

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) Describe and explain the formation of Newton's rings in reflected monochromatic light.**

(b) Give the theory of interference due to coherent sources and deduce the expression for fringe with.

Q.2 **(a) Describe a PN Junction diode? Draw the volt-ampere characteristics of PN Junction diode.**

(b) An n-type Ge sample has a donor density of $10^{21}/m^3$. It is arranged in Hall effect experiment having magnetic field of 0.5 tesla and current density 500 A/m^2, Find the Hall voltage if the sample is 3 mm wide.

Q.3 **(a) Describe and explain thin film of interference.**

(b) Newton's rings are observed normally in reflected light of wavelength 5.89×10^{-5} cm. the diameter of the 10^{th} dark ring is 0.50 cm. Find the radius of curvature of the lens and the thickness of the film.

Q.4 **(a) Explain three processes occurring when a light wave interacts with matter.**

(b) Describe the relationship between the Einstein's co-efficient.

Q.5 **(a) What is Compton effect? Obtain an expression for the shift in the wavelength of X-ray beam?**

(b) An electron is bound in one dimensional infinite well of with 200 A^0. Find the difference in energy values of first excited and second excited states in electron volts.

Q.6 **(a) What are particle accelerators? Explain the construction and working of LINAC?**

(b) Write short notes on mass defect and binding energy.

Q.7 **(a) What are matter waves? Show that** $\lambda = \frac{h}{p}$

(b) Derive Schrödinger's time dependent and time independent wave equations.

Q.8 **Write short notes on: (Any two)**
(a) G.M. Counter
(b) Population Inversion
(c) Hall Effect
(d) Coherent Sources