R20

I B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024

Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda(P.O), Narasaraopet – 522601, Gunturn District, A.P.

Subject Code: **R20CC1101** Title: **Technical and Communicative English-I** Max.Marks:**70**.

Time: 3 Hours Program: B.Tech. Branch: Common to all Branches.

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) I) What is the central theme of "A drawer full of happiness'? How does the writer justify the title? (11 M)

II) Write ***antonyms*** for the following words. (3 M)

i. Terrible
ii. Mammoth
iii. Pamper

OR

B) I) **Arrange the following *jumbled sentences*** to make a meaningful paragraph. (6 M)

i. Even today in many countries,
ii. neglected and there are far
iii. women continue to be
iv. who have had the benefit of
v. fewer women than men
vi. education and vocational training.

(II) Write a paragraph on "***Will Power is Well Power***". (8 M)

2. A) I) a) "My presents cannot be very material or solid. They can be of the mind and spirit." Explain the above lines with the reference to the text. (11 M)

II) Fill in the blanks with suitable ***articles***. (3 M)

(i) English is .....interesting subject.

(ii) I went to.....temple to attend a marriage.

(iii) Love is as important as ----------air we breathe.

OR

B) I) ***Correct the following sentences*** if necessary (2 X 5 M = 10 M)

i. Myself and Roshini will take care of the event on Friday.
ii. I was shocked to hear that her husband died of an accident.
iii. The CEO only discussed the new venture with his manager.
iv. She was so near achieving her goal.
v. What are you doing by here?

II) Fill in the blanks with suitable ***prepositions***. (4 x 1 M = 4 M)

i. Associate .....a group.
ii. Argue with a person .....or against a point.
iii. Congratulate somebody ..... his success.
iv. Care ..... somebody's safety.

3. A)

I) Explain some ideal lessons that one can learn from the life of from Prof. Hawking. (7 M)

II) ***Write a letter*** of complaint to the inspector of police about the theft of your bike. (7 M)

OR

B) I) ***Draft an E-mail cover letter and resume*** applying for the post of a trainee Engineer in CSS Corp. Chennai, India. (14 M)

A) 4. I) Many women wondered decades ago why Dr. Maathai was so devoted to saving trees-Explain the brief biographical note of the views with reference to the above statement. (11 M)

II) ***Transform the following sentences*** as directed. (3 x 1M = 3 M)

i. Varsha is not the tallest girl in the class. (Change into positive degree)
ii. Very few cities in India are as big as Hyderabad (Change into superlative)
iii. Tenali is not so hot as Vijayawada (Change into comparative degree)

OR

B) I) Choose the word or phrase which is nearest to the meaning to the key word Attempt **all.** **(14 x 1M = 14M)**

i.	Lethargy	A. Serenity	B. Listless	C. Impassivity	D. Laxity
ii.	Prognosis	A. Scheme	B. Forecast	C. Preface	D. Identification
iii.	Compendium	A. Summary	B. Index	C. Reference	D. Glossary
iv.	Sadistic	A. Smart	B. Malicious	C. Given to deriving pleasure from inflicting pain on others	D. Depressed
v.	Enigmatic	A. Displeased	B. Puzzling	C. Learned	D. Short sighted
vi.	Aromatic	A. Crippled	B. Fragrant	C. Sentimental	D. Stinking
vii.	Contract	A. Tract	B. Expand	C. Give	D. Abridge
viii.	Apparent	A. Narrow	B. Clear	C. Confuse	D. Stop
ix.	Divine	A. Wine	B. Godly	C. True	D. Smart
x.	Atheist	A. Non-believer	B. Sensitive	C. Jealous	D. Kind

xi.	Perplex	A. Confuse	B. Fool	C. Wise	D. Timid
xii.	Companion	A. Friend	B. Enemy	C. Scholar	D. Student
xiii.	Battle	A. War	B. Peace	C. Treat	D. Defeat
xiv.	Futile	A. Waste	B. Value	C. Precious	D. Viral

5 .A) I) Explain the philosophy of life from the view point of Steve Job? (11 M)

II) Change the following sentences into ***reported speech.*** ***(3 x 1M = 3M)***

i. She said, "Is Mr. Rao on leave?" **(Change into Reported speech)**

ii. The old man said to the young player, "Bravo! You have played well". **(Change into Reported)**

iii. He said, "How beautiful the garden is!" **(Change into Reported)**

OR

B) I) Match the following ***words*** with their meanings. (7 x 2 M = 14M)

A	B
i. Chromatics	a) the study of cells, especially their formation, structures and functions
ii. Epigraphy	b) the art of performing acrobatic feats
iii. Acoustics	c) the treatment of diseases by the internal and external use of water
iv. Aesthetics	d) the philosophy of fine arts
v. Hydropathy	e) the study of sound
vi. Gymnastics	f) the study of inscriptions
vii. Cytology	g) the art of making fireworks

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20CC1102**

I B.Tech - I Semester Supple Examinations, April-2024
Linear Algebra & Calculus

Time: 3 Hours | Branch: Common to all Branches. | Max.Marks:**70**.

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

1.

A) I) Find the rank of the following matrix by reducing it to normal form $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 2 & 1 & 2 \end{bmatrix}$.

II) Express the matrix $\begin{bmatrix} 2 & 5 & -7 \\ -9 & 12 & 4 \\ 15 & -13 & 6 \end{bmatrix}$ as the sum of a lower triangular matrix and an upper triangular matrix with zero leading diagonal.

OR

B) I) Find the rank of the matrix $\begin{bmatrix} 2 & 3 & 4 & -1 \\ 5 & 2 & 0 & -1 \\ -4 & 5 & 12 & -1 \end{bmatrix}$.

II) By using Gauss elimination method, solve the following system of equations
$2x - y + 3z = 9$; $x + y + z = 6$; $x - y + z = 2$

2.A) I) Determine the nature, index and signature of the following quadratic form $x_1^2 + 5x_2^2 + x_3^2 + 2x_2x_3 + 6x_3x_1 + 2x_1x_2$.

II) Using Cayley-Hamilton theorem find the inverse of the matrix $\begin{bmatrix} 2 & 3 \\ 3 & 5 \end{bmatrix}$.

OR

B) I) Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} 1 & -2 \\ -5 & 4 \end{bmatrix}$

II) Verify Cayley-Hamilton theorem for $A = \begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$ and evaluate $2A^4 - 5A^3 - 7A + 6I$.

3. A) I) State Rolle's theorem and verify the theorem for the following function $x^3 - 12x$ in $\left[0, 2\sqrt{3}\right]$.

II) Verify Cauchy's mean value theorem for the following functions $f(x) = x^3$ and $g(x) = x^2$ in [1, 2]

OR

B) I) State Lagrange's mean value theorem and verify the theorem for the following function $f(x) = \log x$ in $[1, e]$.

II) If $\frac{dy}{dx} = x(x-1)^2(x-3)^3$, find the maximum and minimum value of y.

4. A) I) If $u(x, y) = \frac{1}{x^2} + \frac{1}{xy} + \frac{\log x - \log y}{x^2}$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + 2u(x, y) = 0$.

II) Show that $f(x, y) = x^3 + y^3 - 3xy + 1$ is minimum at the point (1, 1).

OR

B) I) Find the Jacobian $\frac{\partial(u, v)}{\partial(x, y)}$ of the following functions $u = x \sin y$, $v = y \sin x$.

II) A rectangular box open at the top is to have volume of 32 cubic units. Find the dimensions of the box requiring least material for its construction.

5. A) I) Evaluate $\iint (x^2 - y^2)\,dx\,dy$ over the triangle with vertices (0, 1), (1, 1), (1, 2).

II) Evaluate $\int_0^2 \int_1^z \int_0^{yz} xyz\,dx\,dy\,dz$

OR

B) I) Evaluate $\int_0^1 \int_0^{\frac{\sqrt{1-y^2}}{2}} \frac{1}{\sqrt{1-x^2-y^2}}\,dx\,dy$.

II) Change the order of integration and evaluate $\int_0^\infty \int_0^x x\,e^{-\frac{x^2}{y}}\,dy\,dx$.

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1103

I B.Tech - I Semester Supple Examinations, April-2024

Engineering Chemistry

Time: 3 Hours Max.Marks:**70** Branch: Common to CE, ME, ECE

Note: Answer All **FIVE** Questions All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) I) State the differences between cold lime-soda process and hot lime-soda process for water softening. [8M]
   II) Mention the differences between scale and sludge. [6M]

   OR

   B) I) State the differences between BOD and COD. [6M]
   II) Explain determination of alkalinity of a water sample. [8M]

2. A) I) Discuss the classification of polymers on the basis of structures with suitable examples.
   II) Distinguish between thermosetting plastics and thermoplastics with suitable examples.
   III) Write a short note on condensation polymerization. [5M+ 5M +4M]

   OR

   B) I) Define Calorific value of a fuel and mention the characteristics of a good fuel. [7M+7M]
   II) Mention the differences between the octane number and cetane number of a fuel.

3. A) I) Explain sol-gel method for nanomaterial preparation with suitable example.
   II) Write a short note on preparation, properties and applications of CNT. [7M+7M]

   OR

   B) I) State the differences between thermotropic and lyotropic liquid crystals with examples [5M]
   II) Define composite materials. [2M]
   III) State the characteristics of fiber-reinforced composites. [4M]
   IV) State the applications of fullerenes. [3M]

4. A) I) State the constituents of a lead-acid storage cell. Explain charging and discharging process in lead-acid storage cell with suitable chemical reactions. Write the applications of LEAD acid battery [14M]

   OR

   B) I) Explain the mechanism of galvanic corrosion with a suitable example. [5M]
   II) Write a short note on electroplating process. [4M]
   III) What are the requisites of a good paint? What are the constituents of paints? [5M]

5. A) I) What are Lubricants? How lubricants are classified? Give suitable example in each case
   II) What is boundary lubrication? Mention the characteristics of lubricant molecules to show boundary lubrication? [6M+4M]
   III) Explain Viscosity index and aniline point of a lubricating oil. [4M]

   OR

   B) I) How Portland cement manufactured from raw materials? Explain with a suitable flow-diagram and chemical reactions involved in the process. [8M]
   II) Define refractory materials with suitable examples. Mention any four characteristics of a good refractory material. [6M]

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20CC1104**

I B.Tech - I Semester Supple Examinations, April-2024

Applied physics

Time: 3 Hours | Max.Marks:**70.** | Branch: CSE,IT,AI.

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) Differentiate Fraunhofer and Fresnel diffraction. Derive the expression for maxima and minima of Fraunhofer diffraction due to single slit.

OR

B) Explain the double refraction principle in polarisation. Discuss the construction and working of Nicol's prism. Discuss the applications of Nicol's prism as polariser and analyser.

2. A) I) Differentiate spontaneous and stimulated emission with a neat sketch of energy level diagram. (7M)

II) Discuss the construction and working of Ruby laser. Discuss its demerits. (7M)

OR

B) I) Derive the expression for Numerical aperture of an optical fibre. Discuss its significance.

II) Explain the principle of light propagation through optical fibre. (10M+4M)

3. A) What is atomic packing factor (APF) in crystallography? Deduce APF for SC, BCC and FCC crystal systems.

OR

B) I) State and Explain the Bragg's law. Derive the condition for maximum diffraction intensity from the crystalline atomic plane using Bragg's law. (7M)

II) Derive the relation between Miller indices and inter-planar distance. (7M)

4. A) I) Derive the Maxwell's electromagnetic equations in differential form. (8M)

II) Discuss the properties of superconductors under the influence of magnetic field. (6M)

OR

B) Discuss the classification of magnetic materials based on susceptibility, temperature and influence of external magnetic field. (7M)

5. A) Using Schrödinger wave equations, determine the wave function and energy of a particle enclosed in a potential well of infinite height for ground, first and second excited states.

OR

B) State and explain the Hall Effect. Determine the relation between Hall coefficient and Hall voltage using an experimental setup.

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20CC1105**

I B.Tech - I Semester Supple Examinations, April-2024

Problem Solving Using C

Time: 3 Hours | Branch: Common to ALL | Max.Marks:**70.**

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) I) Write an algorithm and flowchart to find out whether a given number is Prime or not.
   II) Explain various operators in C language.

   OR

   B) I) Write in detail steps for compiling and executing a C program.
   II) Write a program in 'C' to illustrate Type Conversion and type Casting.

2. A) I) Explain different looping statements of C with example code.
   II) Explain the use of Nested Loop Statements in C with an example.

   OR

   B) I) Explain about the 'break', 'continue' statements in 'C' programming.
   II) Explain different storage classes in C.

3. A) I) Write a C program for matrix multiplication covering all necessary conditions.
   II) Explain string manipulation functions available in string.h with example C code.

   OR

   B) I) Write a C Programa to calculate the length of a character array.
   II) How memory allocation takes place for a multidimensional array in C.

4. A) I) How are increment and decrement operations can be implemented with pointers?
   II) Illustratge the difference between call by value and call by reference.

   OR

   B) I) Write a C program to swap two numbers using pointers.
   II) Write a program to illustrate the comparison of structure and union.

5. A) I) Explain File Operations in C.
   II) Define File. What are different types of Files in C programming? Explain.

   OR

   B) I) Illustrate Reading Data from Files and Writing Data to Files in C.
   II) Discuss in details about Error Handling Techniques during File Operations.

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20EE1110**

I B.Tech - I Semester Supple Examinations, April-2024

Engineering Drawing and Design

Time: 3 Hours Max.Marks:**70**. Branch:EEE.

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) The major and minor axes of an ellipse are 120 mm and 80 mm. Draw an ellipse by concentric circles method.

OR

B) Construct a hyperbola with the distance between the focus and the directrix as 50 mm and eccentricity as 3/2. Also draw normal and tangent to the curve at a point 30 from the directrix.

2. A) I) Draw the Front View and Top View of the following points (6M)
   i) Point P lies in the HP and 22 mm behind the VP
   ii) Point Q lies in the VP and 32 mm below the HP
   iii) Point R lies 32 mm below the HP and 22 mm behind the VP

   II) A point A is 20 mm above the HP and 50 mm infront of the VP. Another point B is 40 mm below the HP and 15 mm behinf the VP. The distance between the projectors of the points, measured parallel to XY, is 75mm. Draw the projections of the points. Draw lines joining their FVs and TVs. (8M)

OR

B) A line CD, 90 mm long, measures 72 mm in FV and 65 mm in VP. Draw the FV and TV of the line if it fully lies in first quadrant. Find the true inclinations of the lines. Point C at 20 mm above the HP and 15 mm infront of the VP.

3. A) Draw the projections of a regular pentagon of 50 mm side, having its surface inclined at 45^0 with HP. A side of the pentagon, lies on HP inclined at 30^0 to VP.

OR

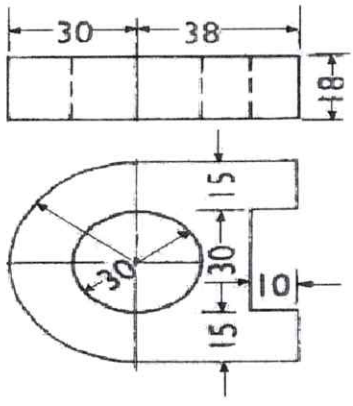
B) Draw the projections of a regular hexagon of 25 mm side, having one of its sides on HP and inclined at 60^0 to VP and its surface making an angle of 45^0 with HP.

4. A) A hexagonal prism of side of base 25 mm and length of axis 70 mm is resting on the HP on one of its rectangular faces. Draw its projections when its axis is inclined to the VP at 45^0.

OR

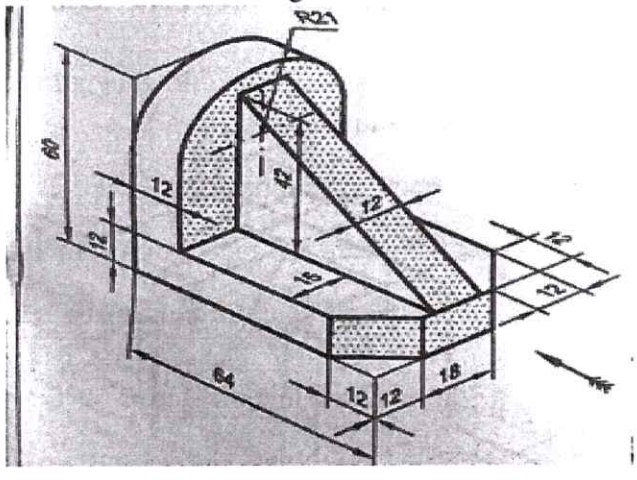
B) Draw the projections of a cylinder of 40 mm diameter and axis 60 mm long when it is lying on HP with its axis inclined at 450 to HP and parallel to the VP.

5. A) Draw the isometric view of the block, two views of which are shown in figure dimensions are in mm



OR

B) Draw the three views of the following isometric view.



NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20ME1106**

I B.Tech - I Semester Supple Examinations, April-2024

Problem Solving using Python

Time: 3 Hours | Branch: ME. | Max.Marks:**70**.

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) I) Explain the concept and features of algorithms.
   II) Discuss the decimal, octal, hexadecimal, and binary systems used for data representation.

   OR

   B) I) Design a flowchart to find the greatest common divisor (GCD) of two numbers. Explain the steps involved in solving this problem using a flowchart.
   II) Differentiate between application software and system software.

2. A) I) Write a Python program to calculate the average of three numbers entered by the user. Ensure that the program handles both integer and float inputs.
   II) Explain the order of evaluation for expressions in Python. Discuss the precedence of different operators and how it affects the evaluation of expressions.

   OR

   B) I) Write a Python program that prompts the user to enter a sentence and counts the number of vowels (a, e, i, o, u) in that sentence.
   II) Explain the concept of conditional statements in Python, specifically if, if-else, and if-elif-else statements.

3. A) I) Implement a recursive function in Python to calculate the factorial of a given number.
   II) Describe the structure of a function in Python. Provide an example of a function that takes two parameters and returns their sum.

   OR

   B) I) Discuss the different types of widgets available in event-driven programming. Explain the purpose and usage of the button and scroll bar widgets.
   II) Write a Python program that uses turtle graphics to draw a bar chart based on a list of data values.

4. A) I) Write a Python program to demonstrate the usage of list methods and functions. Include examples that show how to add elements, remove elements, and perform common operations on lists.
   II) Write a Python program that reads data from a file and performs specific operations on the data. Include the necessary code for opening the file, reading its contents, and closing the file after processing.

   OR

B) I) Describe the characteristics of sets in Python and provide examples of set methods and functions. Include an example that demonstrates set operations such as union, intersection, and difference.

II) What is the difference between list, tuple and set. Compare with an example.

5. A) I) Explain the principles of Object-Oriented Programming (OOP) and how they are implemented in Python. Provide examples to illustrate the concepts of encapsulation, inheritance, and polymorphism.

II) Explain the concept of polymorphism in Python and provide examples that demonstrate polymorphic behaviour through method overriding and method overloading.

OR

B) I) Define an abstract class in Python and explain its purpose. Include examples that demonstrate how abstract classes can be used as a blueprint for creating derived classes.

II) Discuss the concept of exception handling in Python and explain the types of errors and exceptions that can occur.

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20EE1109

I B.Tech - I Semester Supple Examinations, April-2024

Basics in Mechanical and Civil Engineering

Time: 3 Hours | Max.Marks:70. | Branch: EEE.

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) I) What are the advantages of gas turbine power plant over steam turbine power plant. [7M]
   II) What are the factors to be considered for installing a steam power plant. [7M]

   OR

   B) I) Draw the layout of Steam turbine power plant. [10M]
   II) What are the advantages of Diesel power plant over steam power plant. [4M]

2. A) I) Explain open belt drive and cross belt drive in detail. [7M]
   II) What is the advantage of idler pulley in belt drive. [7M]

   OR

   B) I) Explain the concept of external meshing and internal meshing in gear train.[7M]
   II)What are the advantages of chain drive over belt drive. [7M]

3. A) I) Derive the equation for force exerted on a curved vane. [7M]
   II) Explain with neat sketch working of centrifugal pump. [7M]

   OR

   B) I) Explain with neat sketch working of single stage reciprocating pump. [7M]
   II) What is the difference between reciprocating and centrifugal pump. [7M]

4. A) I) Discuss the impact of human activities on environment. [7M]
   II) Explain any three types of structures with neat sketches. [7M]

   OR

   B) I) Classify survey based on nature of filed. [7M]
   II) Draw Conventional Symbol for i) Embankment ii) Cultivated Land [7M]
   iii) Forest iv) River

5. A) I) What are the qualities of good building stones? Discuss them. [7M]
   II) What are bond stones and for what type of stone masonry it is used? [7M]

   OR

   B) I) What are various types of cement. [7M]
   II) Explain the qualities of a good timber. Explain defects due to seasoning. [7M]

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20EC1108**

I B.Tech - I Semester Supple Examinations, April-2024

Engineering Graphics

Time: 3 Hours Max.Marks:**70.** Branch: ECE.

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) i) construct a regular Hexagon of side 40mm by using General and Arc Method
   ii) Draw an Ellipse with major axis 100mm and the minor axis 60mm by using Concentric circles method.

   OR

   B) i) construct a regular pentagon of side 50mm by using General and Arc Method
   ii) Draw an Ellipse with major axis 100 mm and the minor axis 60mm by using Oblong method.

2. A) i) the distance between the two projectors point A and B is 90 mm. Point A is 15 mm above HP and 20 mm In front of VP. Point B is 60 above HP and 50 mm In front of VP. Find the True Length, True and Apparent angles.
   (ii) A line PQ 8 0 mm length is parallel to HP and perpendicular to VP. Its end P is 20 mm above the HP and 15 mm in front of VP. Draw its projections.

   OR

   B) (i) Draw the following Projections.

   Point A is on HP, 60mm In front of VP.

   Point B is 35 mm below HP, 45mm Behind VP.
   Point C is 30 mm below HP, 60mm In front of VP.
   II) Explain the difference between first angle projections with third angle projections.

3. A) i) A 30^0-60^0 set square of longest side 120mm is in VP and 30^0 inclined to HP while Its surface 45^0 inclined to VP. Draw its projections.
   ii) A semicircular plate of 90mm diameter has its straight edge in the VP and Inclined at 45^0 to HP. The surface of the plate makes an angle of 30^0 with the VP. Draw Its projections.

   OR

   B) i) A regular pentagon ABCDE of side 30 mm is parallel to the VP. The side AB is Perpendicular to the HP. Draw the projections of the pentagon
   ii) A rectangle ABCD of size 30 mm and 20 mm is perpendicular to the VP and inclined to the HP at 30°. A longer side of the rectangle is parallel to the VP. Draw the its Projections.

4. A) i) Draw the projections of a cylinder having base radius 25mm and axis 70mm long when it is lying on HP such that its axis makes an angle 45^0 to HP
   ii) A hexagonal pyramid of side of base 30 mm and axis 70 mm long is resting on its Base on HP. such that a triangular face is parallel to V.P. Draw the projection of The pyramid if the axis makes an angle of 60^0 with HP

   OR

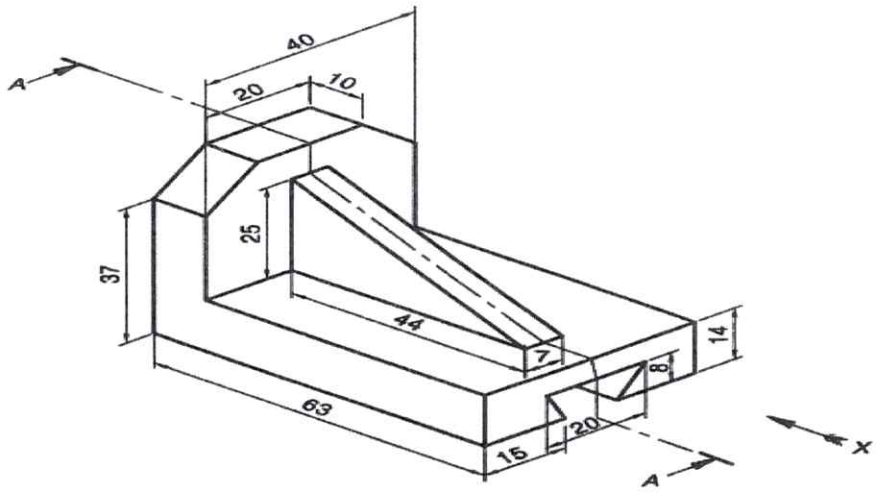
   B) i) A square prism, 40 mm side of base and 60 mm length of axis, has its axis perpendicular to the HP and one of the rectangular faces parallel to the VP. Draw the projections if the base is 10 mm above the HP.

ii) A cone of diameter 60 mm and height 60 mm is resting on the HP on one of its generators. Draw its projections if its axis is parallel to the VP.

5 A) Draw isometric view of a Cone of 30mm diameter and axis 70 long when it is resting on HP on its base.

OR

B) Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure.



NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: **R20CC1107**

I B.Tech - I Semester Supple Examinations, April-2024

Engineering Mechanics

Time: 3 Hours Max.Marks:**70** Branch: Common to CE, ME.

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 =70M)

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1. A) I) Explain the characteristics of force In detail. 7M
   II) Explain Varignon's theorem. 7M

   OR

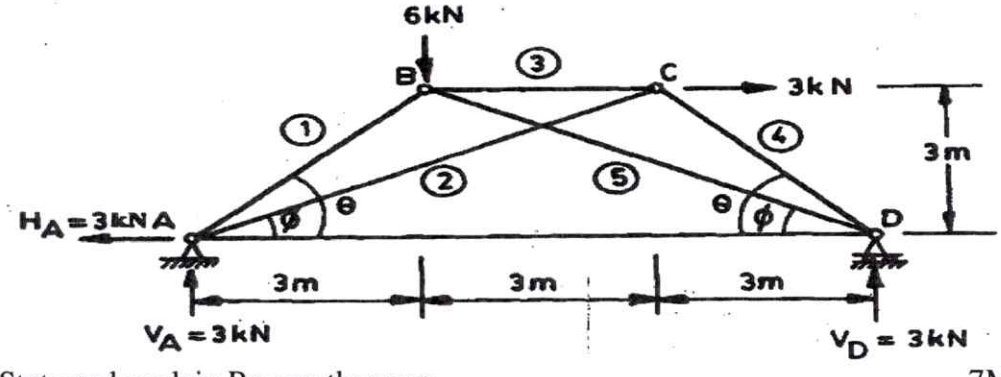
   B) I) Explain the classification of the force system. 7M
   II) Explain Lami's Theorem. 7M

2. A) I) List out the assumptions made in the analysis of plane trusses 7M

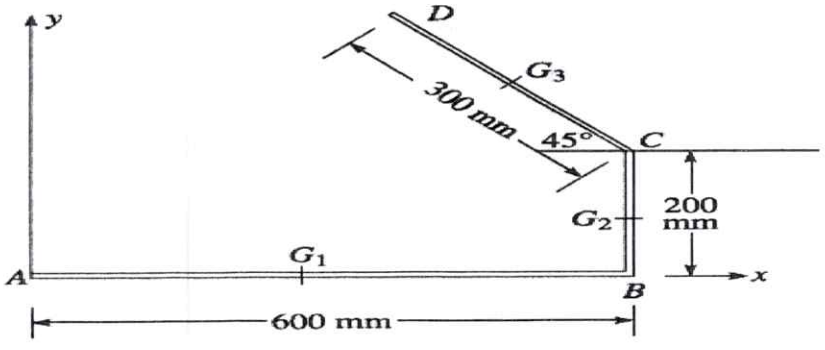
   II) A pull of 180 N applied upward at 30° to a rough horizontal plane was required to just move a body resting on the plane while a push of 220 N applied along the same line of action was required to just move the same body downwards. Determine the weight of the body and the coefficient of friction.

   OR

   B) I) State and explain the laws of friction 7M
   II) For the simply supported mss shown in the below figure, find the nature and magnitude of forces in all the members. 7M



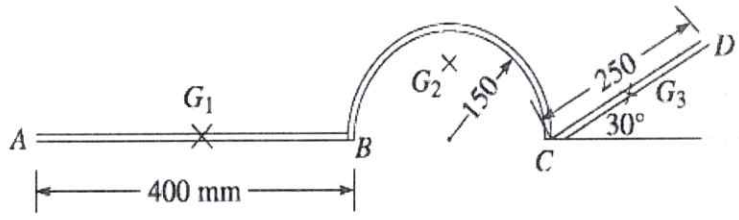
3. A) I) State and explain Pappus theorem 7M
   II) Determine the centroid of the wire shown in the below figure 7M



OR

3 B) I) Explain in detail about Centre of gravity and Centroids 7M

II) Locate the centroid of the uniform wire bent as shown in the below figure. 7M



All dimensions in mm

4. A) I) Explain the Parallel axis theorem 7M

II) Distinguish between area moment of inertia, polar moment of inertia and mass moment of inertia. 7M

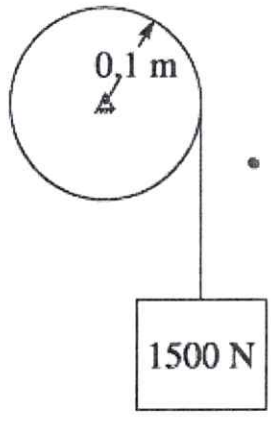
OR

B) I) Explain the perpendicular axis theorem 7M

II) Compute the mass moment of inertia of a circular plate 7M

5 A) I) State and explain Newton's laws of motion. 7M

II) A 1500 N block is held down with an inextensible wire wound around a solid cylinder as shown in the below figure. The radius of the cylinder is 0.1 m. If the frictional moment in the bearing is II) estimated to be 30 N-m, determine the moment of inertia of the cylinder, if the velocity of the block, after a fall of 1 m, is 0.25 m/s 7M



OR

B) I) State and explain D'Alembert's principle 7M

II) A 80 N body moving to the right at a speed of 3 m/s strikes a 10 N body that is moving to the left at a speed of 10 m/s. The final velocity of the 10 N body is 4 m/s to the right. Calculate the coefficient of restitution and the final velocity of the 80 N body 7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

Subject Code: R20CC1111

I B.Tech - I Semester Supple Examinations, April-2024
Electronic Devices and Logic Design
(AIML, CS & AI&DS)

Time: 3 hours **Max. Marks: 70**

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 =70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)Explain the forward bias operation of the PN diode with neat diagrams.	K3	CO1	7M
		ii) Explain how the Zener Diode acts as a Voltage Regulator with neat diagrams.	K3	CO1	7M
		OR			
	b	i) Explain the operation of a Half-wave rectifier with neat diagrams. Compare this with the Full-wave rectifiers.	K3	CO1	7M
		ii) Write a short note on LED.	K3	CO1	7M
2		Unit-II			
	a	i)Draw a neat sketch to illustrate the structure of a P-channel Depletion MOSFET. Explain its operation.	K2	CO2	7M
		ii) How are emitter and collector junctions biased in the active region, saturation region, and Cut-off region? Show all these regions clearly in the output characteristics of a BJT.	K2	CO2	7M
		OR			
	b	i)Draw a collector-to-base bias circuit diagram. How can it improve the stability of the fixed-bias common emitter transistor configuration?	K2	CO2	7M
		ii) Compare MOSFET and JFET with neat diagrams.	K2	CO2	7M
3		Unit-III			
	a	i) Minimize the given function using K-Map. $F = \Sigma m (8,10,12,13,14)$	K3	CO3	7M
		ii) Construct logic diagrams of X-OR and X-NOR gates using the NOR gates.	K3	CO3	7M
		OR			
	b	i) Minimize the following Boolean expression:F(A,B,C)=A'B+BC'+BC+AB'C'	K3	CO3	7M
		ii) Convert the following: (i) $(48.78)_{10}$ to base 2, (ii) $(BECA)_{16}$ to base 2 (iii) $(0110.1100)_2$ to base 10	K3	CO3	7M
4		Unit-IV			
	a	i)Design a Full Adder using universal gates.	K3	CO4	7M
		ii) Design a 16X1 multiplexer and explain its operation.	K3	CO4	7M
		OR			
	b	i) Construct the logic diagram of T-Flip-Flop and explain its operation.	K3	CO4	7M
		ii) Design a 3X8 decoder and explain its operation.	K3	CO4	7M
5		Unit-V			
	a	i) Write a short note on Bidirectional Shift Registers.	K3	CO5	7M
		ii) Construct a mod-8 counter and explain the operation with neat diagrams.	K3	CO5	7M
		OR			
	b	i) Compare Counter and shift registers with proper diagrams.	K3	CO5	7M
		ii) Construct a Ripple counter and explain its working principle with proper diagrams.	K3	CO5	7M