| O.P.Code: 20ME0301 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
**(AUTONOMOUS)**

B.Tech I Year II Semester Supplementary Examinations June-2025

**ENGINEERING GRAPHICS**

(Common to CE, AGE, CAD, CSIT, CAI, CIC, CSE, CCC & CSM)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Construct an ellipse having major axis is equal to 100 mm and the minor axis is equal to 70 mm. Use the concentric circle method | CO1 | L3 | 6M |
| | b | Construct a parabola in a parallelogram of sides 100 x 60 with anincluded angle of 75° | CO1 | L3 | 6M |
| | | **OR** | | | |
| 2 | | Draw an ellipse(half ellipse by concentric circle method and half by rectangle method) having major axis is equal to 100 mm and the minor axis is equal to 70 mm. | CO1 | L3 | 12M |
| | | **UNIT-II** | | | |
| 3 | | A point A is 20mm above the HP and 50mm in front of the VP. Another point B is 40mm below the HP and 15mm behind 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 | CO2 | L3 | 12M |
| | | **OR** | | | |
| 4 | | A line NS 80mm long has its end N 10mm above HP and 15mm In front of VP. The other end S is 65mm above HP and 50mm in front of VP. Draw the projections of the line and Find its true inclinations with HP & VP. | CO2 | L3 | 12M |
| | | **UNIT-III** | | | |
| 5 | | A thin $30_0 - 60_0$ set-square has its longest edge (diagonal) on HP and inclined at $30_0$ to VP. Its surface makes an angle of 45° with HP. Draw the projections, choosing suitable size for the set-square. | CO3 | L3 | 12M |
| | | **OR** | | | |
| 6 | | A cylinder of base diameter 5omm and axis 70 mm has a generator in the VP and inclined at $45_0$ to the HP. Draw its projections. | CO3 | L3 | 12M |
| | | **UNIT-IV** | | | |
| 7 | | Square pyramid of base 40 mm and axis 60 mm long, Its base lies on VP with its axis parallel to HP. A cut sectional plane, 60° to VP and it pass 10mm away from the axis. Draw the projections sectional front view. | CO4 | L3 | 12M |
| | | **OR** | | | |
| 8 | | A cone of base 50 mm diameter and height 65 mm rests with its base on HP. A section plane perpendicular to VP and inclined at 30° to HP bisects the axis of the cone. Draw the development of the lateral surface of the truncated cone. | CO6 | L3 | 12M |
| | | **UNIT-V** | | | |
| 9 | | Draw the isometric projection of a pentagonal prism of base side 35 mm and axis 60mm. The prism rests on its base on the HP with an edge of the base parallel to the VP. | CO5 | L3 | 12M |
| | | **OR** | | | |
| 10 | | Draw the isometric projection of the frustum of a hexagonal pyramid of base side 40 mm ,top side 25mm,and height 70mm. The frustum rests on the HP | CO5 | L3 | 12M |

*** END ***

| O.P.Code: 20EC0401 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)

B.Tech. II Year II Semester Supplementary Examinations June-2025

**FUNDAMENTALS OF DIGITAL COMPUTING SYSTEMS**

(Electronics & Communications Engineering)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12** = **60** Marks)

| | | | | | |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1 | | Briefly explain the different elements that are made of a computer-based information system. | CO1 | L2 | 12M |
| | | **OR** | | | |
| 2 | a | Briefly explain the communication components of a computer system | CO1 | L2 | 6M |
| | b | List the types of computers and write short notes on each computer. | CO1 | L1 | 6M |
| | | **UNIT-II** | | | |
| 3 | a | Explain general concept of system with an example. | CO2 | L5 | 8M |
| | b | Sketch the partial view of business application architecture. | CO2 | L6 | 4M |
| | | **OR** | | | |
| 4 | a | Write short notes on cloud computing | CO2 | L3 | 4M |
| | b | Classify the services provided by cloud computing and explain them briefly. | CO2 | L4 | 8M |
| | | **UNIT-III** | | | |
| 5 | a | calculate the value for the following addition: $(25A84)_{12} + (70396)_{12}$ | CO3 | L3 | 6M |
| | b | calculate the value for thefollowing multiplication: $(2A6)_{12} \times (B1)_{12}$ | CO3 | L3 | 6M |
| | | **OR** | | | |
| 6 | a | Convert the following numbers from decimal to binary and then to hexadecimal: (i) $(27.625)_{10}$ (ii) $(4192.37761)_{10}$ | CO3 | L4 | 6M |
| | b | Convert the following numbers from their given base to decimal: (i) $(0.1001001)_2$ (ii) $(0.3A2)_{16}$ (iii) $(0.2A1)_{12}$ | CO3 | L4 | 6M |
| | | **UNIT-IV** | | | |
| 7 | a | Summarize various types of common data that is represented in a computer. | CO4 | L2 | 6M |
| | b | Briefly explain the three standards that are used in common for alphanumeric characters. | CO4 | L5 | 6M |
| | | **OR** | | | |
| 8 | | With an example, explain about the object image. | CO4 | L6 | 12M |
| | | **UNIT-V** | | | |
| 9 | a | Describe the exponential notation with an example. | CO5 | L2 | 8M |
| | b | Compute the floating-point representation for 0.0000019557. | CO5 | L3 | 4M |
| | | **OR** | | | |
| 10 | a | The IEEE provides a standard 32-bit format for floating point numbers. The format for a number is specified as $\pm 1.M \times 2E - 127$. Explain each part of this format. | CO5 | L5 | 6M |
| | b | Convert the decimal number, 253.75 to 32-bit IEEE 754 floating-point form. | CO5 | L3 | 6M |

*** END ***

| Q.P.Code: 20HS0804 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
B.Tech. I Year II Semester Supplementary Examinations June-2025
**ENGINEERING CHEMISTRY**
(Common to CE& AGE)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | | Describe the Zeolite or permutit process for softening of water. what are the advantages and disadvantages of zeolite process. | CO1 | L3 | 12M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 2 | a | What is priming and foaming? | CO1 | L1 | 6M |
| | b | Explain the process of scale and sludge formation in boilers. | CO1 | L2 | 6M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | What is primary Battery? Write a note on Zinc-air battery. | CO2 | L1 | 6M |
| | b | Explain the Construction and working of Lead acid battery. | CO2 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | Discuss in detail about electrochemical or wet corrosion? | CO2 | L3 | 12M |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Distinguish between Thermoplastics and thermosetting plastics. | CO3 | L4 | 4M |
| | b | Describe the preparation, properties and uses of Bakelite. | CO3 | L3 | 8M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 6 | | What is polymerization? Explain different types of polymerization with examples. | CO3 | L1 | 12M |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 7 | | What is meant by lubricant? Give the classification and examples of the lubricants. | CO4 | L1 | 12M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 8 | a | What is cement? How do you classify the cement? | CO4 | L1 | 6M |
| | b | Explain in detail about setting and hardening of portland cement. | CO4 | L2 | 6M |

**UNIT-V**

| | | | | | |
|---|---|---|---|---|---|
| 9 | | Explain principle, instrumentation and applications of Scanning Electron microscopy (SEM). | CO5 | L2 | 12M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10 | a | What is colloid? Classify the colloids based on the physical state. | CO5 | L1 | 6M |
| | b | Write a note on Micelle formation. | CO5 | L1 | 6M |

*** END ***

| O.P.Code: 20HS0848 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
B.Tech. I Year II Semester Supplementary Examinations June-2025
**ENGINEERING PHYSICS**
(Mechanical Engineering)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Describe the formation of Newton's rings with necessary theory with relevant diagram and derive the expressions for dark and bright fringes. | CO1 | L3 | 8M |
| | b | In a Newton's rings experiment, the diameter of the 8th ring was 0.35cm and the diameter of the 18th ring was 0.65cm.If the wavelength of the light used is 6000A° then, find the radius of curvature of the plano-covex lens. | CO1 | L4 | 4M |
| | | **OR** | | | |
| 2 | a | Define diffraction. Distinguish between Fraunhoffer and Fresnel diffraction. | CO1 | L1 | 8M |
| | b | Distinguish between Interference and Diffraction. | CO1 | L1 | 4M |
| | | **UNIT-II** | | | |
| 3 | a | Deduce the expression for the inter-planar distances in terms of Miller indices for a cubic system. | CO2 | L4 | 8M |
| | b | Write the important features of Miller indices. | CO2 | L1 | 4M |
| | | **OR** | | | |
| 4 | a | Explain how the X-ray diffraction can be employed to determine the crystal structure. | CO2 | L4 | 8M |
| | b | The Bragg's angle for reflection from the (111) plane in a FCC crystal is 19.2° for an X-ray wavelength of 1.54 A.U. Calculate cube edge of the unit cell. | CO2 | L4 | 4M |
| | | **UNIT-III** | | | |
| 5 | a | Define Reverberation and Reverberation time. | CO3 | L1 | 4M |
| | b | What are the basic requirements of acoustically good hall? | CO3 | L1 | 8M |
| | | **OR** | | | |
| 6 | a | How ultrasonics are produced by using piezoelectric generator? | CO3 | L4 | 8M |
| | b | Discuss the important applications of ultrasonic waves. | CO3 | L4 | 4M |
| | | **UNIT-IV** | | | |
| 7 | a | Define i) Young's modulus ii) Bulk modulus iii) Rigidity modulus iv) Poisson's ratio. | CO4 | L1 | 4M |
| | b | Derive the relation between different elastic moduli. | CO4 | L1 | 8M |
| | | **OR** | | | |
| 8 | a | Classify different types of beams. | CO4 | L4 | 8M |
| | b | Obtain an expression for the internal energy due to strain. | CO4 | L4 | 4M |
| | | **UNIT-V** | | | |
| 9 | a | Explain BCS theory of superconductors. | CO5 | L4 | 6M |
| | b | Distinguish Type-I and Type-II superconductors. | CO5 | L4 | 6M |
| | | **OR** | | | |
| 10 | a | What is nanomaterial? Write the classification of nanomaterials. | CO5 | L1 | 4M |
| | b | Explain ball milling technique for synthesis of nanomaterial. | CO5 | L4 | 8M |

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**END ***

| O.P.Code: 20HS0849 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
B.Tech. I Year II Semester Supplementary Examinations June-2025
**APPLIED PHYSICS**
(Common to ECE & EEE)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

| | | | | | |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1 | a | State and explain principle of superposition. | CO1 | L1 | 6M |
| | b | Summarizing the importance conditions to get interference. | CO1 | L2 | 6M |
| | | **OR** | | | |
| 2 | a | Explain the theory of Fraunhofer diffraction due to single slit. | CO1 | L4 | 6M |
| | b | Obtain conditions for bright and dark fringes in single slit diffraction pattern and draw intensity distribution. | CO1 | L4 | 6M |
| | | **UNIT-II** | | | |
| 3 | a | Write brief note on Fermi Dirac distribution? | CO2 | L1 | 6M |
| | b | What is the effect of temperature on Fermi Dirac distribution function? | CO2 | L1 | 6M |
| | | **OR** | | | |
| 4 | a | Explain the Faraday's law and Ampere's law through the Maxwell equations. | CO2 | L2 | 8M |
| | b | Write the applications of Faraday's law. | CO2 | L2 | 4M |
| | | **UNIT-III** | | | |
| 5 | a | Describe the construction and working principle of He-Ne Laser with the help of a neat diagram. | CO3 | L3 | 8M |
| | b | Write the advantages of He-Ne laser. | CO3 | L1 | 4M |
| | | **OR** | | | |
| 6 | a | Describe optical fiber communication system with block diagram. | CO3 | L3 | 7M |
| | b | Mention the application of optical fiber in sensors. | CO3 | L1 | 5M |
| | | **UNIT-IV** | | | |
| 7 | a | What is intrinsic semiconductor and explain the formation of extrinsic semiconductors through doping? | CO4 | L1 | 6M |
| | b | Derive the expression for intrinsic carrier concentration. | CO4 | L2 | 6M |
| | | **OR** | | | |
| 8 | a | Describe the Hall Effect in semiconductors. | CO4 | L3 | 8M |
| | b | Write the applications of Hall Effect. | CO4 | L2 | 4M |
| | | **UNIT-V** | | | |
| 9 | a | Explain the Type-I and Type-II superconductors. | CO5 | L4 | 7M |
| | b | What is Meissner effect? | CO5 | L1 | 5M |
| | | **OR** | | | |
| 10 | a | Explain Sol-Gel technique for synthesis of nanomaterial. | CO5 | L4 | 8M |
| | b | Write advantages of sol-gel process. | CO5 | L1 | 4M |

***** END *****

| O.P.Code: 20HS0802 | R20 | H.T.No. | | | | | | | | | |
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# SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

## B.Tech. I Year II Semester Supplementary Examinations June-2025

## APPLIED CHEMISTRY

(Common to CAD, CSIT, CAI, CIC, CSE, CCC & CSM)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | | Define Electrode Potential. Derive the Nernst equation for a single electrode potential and write its applications. | CO1 | L1 | 12M |
| | | **OR** | | | |
| 2 | a | Explain the Construction and working of Lead acid battery. | CO1 | L3 | 6M |
| | b | Describe the Construction and Working of Methanol – Oxygen Fuel cell. | CO1 | L3 | 6M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | | Derive Schrodinger wave equation? Explain the significance of the $\Psi$ and $\Psi^2$ | CO2 | L3 | 12M |
| | | **OR** | | | |
| 4 | a | Explain pi- molecular orbital's of Butadiene with a neat sketch. | CO2 | L3 | 6M |
| | b | Explain pi- molecular orbital of Benzene with a neat sketch. | CO2 | L3 | 6M |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Explain the mechanism of Cationic addition polymerization. | CO3 | L3 | 6M |
| | b | Explain the mechanism of Condensation or Step growth polymerization. | CO3 | L3 | 6M |
| | | **OR** | | | |
| 6 | a | Describe the preparation, properties and uses of Bakelite. | CO3 | L3 | 6M |
| | b | Write the preparation, properties and application of Buna-S rubber. | CO3 | L2 | 6M |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 7 | | Explain the working principle of Atomic Absorption pectrometer(AAS) and How will you determine the nickel using by AAS? | CO4 | L2 | 12M |
| | | **OR** | | | |
| 8 | | Describe the various methods for separating the Liquid Mixtures? | CO4 | L3 | 12M |

**UNIT-V**

| | | | | | |
|---|---|---|---|---|---|
| 9 | | Discuss about Super conductors and their applications? | CO5 | L3 | 12M |
| | | **OR** | | | |
| 10 | | Write a brief note on Fullerenes and Carbon nano tubes. | CO5 | L1 | 12M |

***** END *****

| O.P.Code: 20CS0501 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

B.Tech. I Year II Semester Supplementary Examinations June-2025

**C PROGRAMMING AND DATA STRUCTURES**

(Common to ECE,EEE & ME)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Define a variable. Write the variable declaration. What are the rules for declaring a variable? | CO1 | L2 | 6M |
| | b | Explain about data types in C. | CO1 | L2 | 6M |
| | | **OR** | | | |
| 2 | a | Describe the Structure of C Program with an example. | CO1 | L2 | 6M |
| | b | Explain about Input and Output functions with examples | CO1 | L2 | 6M |
| | | **UNIT-II** | | | |
| 3 | a | Distinguish between call by value and call by reference with an example programs. | CO3 | L4 | 6M |
| | b | How to use Array as Function argument? Explain with an example program. | CO3 | L2 | 6M |
| | | **OR** | | | |
| 4 | a | Write a c program for addition of two numbers using function. | CO3 | L2 | 6M |
| | b | Describe about scope and distinguish between local and global Variable. | CO2 | L2 | 6M |
| | | **UNIT-III** | | | |
| 5 | a | Define pointer. Write the syntax for declaring pointer with example. | CO3 | L1 | 6M |
| | b | Describe about pointers and arrays. | CO3 | L2 | 6M |
| | | **OR** | | | |
| 6 | a | Explain the concept of pointer to pointers with examples. | CO3 | L2 | 6M |
| | b | Explain the concept of void pointers with examples. | CO3 | L2 | 6M |
| | | **UNIT-IV** | | | |
| 7 | a | What is data structure? Explain types of data structures. | CO1 | L1 | 6M |
| | b | What is a stack? Write the representation of stacks | CO5 | L1 | 6M |
| | | **OR** | | | |
| 8 | | List the various operations that can be performed on stack? Explain with suitable example. | CO5 | L2 | 12M |
| | | **UNIT-V** | | | |
| 9 | a | Explain about linear search with algorithm. | CO6 | L2 | 6M |
| | b | Explain about binary search with algorithm. | CO6 | L2 | 6M |
| | | **OR** | | | |
| 10 | | What do you mean by Searching? Explain sequential search and binary search with suitable example. | CO6 | L1 | 12M |

***** END *****

| O.P.Code: 20EE0254 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
**B.Tech. I Year II Semester Supplementary Examinations June-2025**
**ELECTRICAL TECHNOLOGY**
(Electronics and Communications Engineering)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Derive the expression for generated EMF of a D.C generator. | CO1 | L1 | 6M |
| | b | The armature of a 4 pole, lap-wound DC shunt generator has 120 slots with 4 conductors per slot.The flux per pole is 0.05 wb. The generator runs at speed 1500 rpm. Find the generated voltage? | CO1 | L3 | 6M |
| | | **OR** | | | |
| 2 | | Explain the basic principle of operation of a DC Generator with a simple loop generator. | CO1 | L2 | 12M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | | Explain the all characteristics of D.C motor. | CO2 | L2 | 12M |
| | | **OR** | | | |
| 4 | | Explain the method used to control the speed of a dc shunt motor above the rated speed. | CO3 | L2 | 12M |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Explain the Working principle of single –phase transformer. | CO4 | L2 | 6M |
| | b | Derive an EMF equation of a single-phase transformer. | CO4 | L3 | 6M |
| | | **OR** | | | |
| 6 | | What is the Procedure for conducting O.C. test and S.C on a single-phase transformer and explain with neat diagram. | CO4 | L2 | 12M |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 7 | a | List the differences between squirrel cage and wound rotor? | CO5 | L1 | 6M |
| | b | A 3 phase 4 pole 50 Hz induction motor runs at 1460 r.p.m. find its (i) synchronous speed (ii) slip speed (iii) percentage slip. | CO5 | L3 | 6M |
| | | **OR** | | | |
| 8 | | Explain the principle of operation of 3-phase induction motor with neat sketch. | CO5 | L2 | 12M |

**UNIT-V**

| | | | | | |
|---|---|---|---|---|---|
| 9 | | Derive an EMF equation of an alternator. | CO6 | L3 | 12M |
| | | **OR** | | | |
| 10 | | Explain the theory of operation of synchronous machine. | CO6 | L2 | 12M |

*** END ***

| O.P.Code: 20CS0503 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

B.Tech. I Year II Semester Supplementary Examinations June-2025

**DIGITAL LOGIC DESIGN**

(Common to CAD, CSIT. CAI, CIC, CSE, CCC & CSM)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Convert the following:<br>i) $(41.6875)_{10}$ to Hexadecimal number<br>ii) $(11001101.0101)_2$ to base-8 and base-4 | CO1 | L1 | 6M |
| | b | Using 2'scomplement, subtract (111001)2 from (101011)2. | CO1 | L2 | 6M |
| | | **OR** | | | |
| 2 | a | Explain any Binary codes with examples. | CO1 | L2 | 6M |
| | b | Describe binary storage and registers. | CO1 | L2 | 6M |
| | | **UNIT-II** | | | |
| 3 | a | Reduce the function, f(x,y,z,w)= πM(0,2,4,5,6,7,8,10,13,15) using K-Map. | CO2 | L6 | 6M |
| | b | Simplify the given Boolean function using K-MAP and Implement using NAND gates.<br>F(W, X,Y,Z)=XYZ+WXY+WYZ+WXZ | CO2 | L6 | 6M |
| | | **OR** | | | |
| 4 | a | Implement EX-OR function with only NAND gates and AND-OR-NOT gates. | CO2 | L6 | 6M |
| | b | Design the circuit using NAND gates for the given function.<br>F= ABC'+DE+AB'D' | CO2 | L6 | 6M |
| | | **UNIT-III** | | | |
| 5 | a | Explain about Binary Half Adder with truth table and logic diagram. | CO3 | L2 | 6M |
| | b | Compare combinational circuits and sequential circuits. | CO3 | L3 | 6M |
| | | **OR** | | | |
| 6 | a | Design a 4-bit adder-subtractor circuit and explain its operation. | CO3 | L6 | 6M |
| | b | Explain about Decimal Adder with a neat diagram. | CO3 | L2 | 6M |
| | | **UNIT-IV** | | | |
| 7 | a | Explain the working principle of SR and JK flip-flops. Also give their characteristic table. | CO4 | L2 | 6M |
| | b | Describe the working principle of T and D flip-flops. Also give their characteristic table. | CO4 | L2 | 6M |
| | | **OR** | | | |
| 8 | a | List the advantages and disadvantages of Flipflops. | CO4 | L2 | 6M |
| | b | What is the difference between Characteristic table and Excitation table? Give the excitation tables of SR, JK, T and D Flip flops. | CO4 | L3 | 6M |
| | | **UNIT-V** | | | |
| 9 | a | Define an Error in digital systems. List the sources of errors. | CO5 | L2 | 6M |
| | b | Explain about Error correction & Detection Codes with examples. | CO5 | L2 | 6M |
| | | **OR** | | | |
| 10 | | Design and implement the following Boolean function using PLA.<br>F1(A,B,C)=Σm(0,1,3,5) and F2(A,B,C)=Σm(0,3,5,7). | CO5 | L6 | 12M |

| O.P.Code: 20EC0402 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)

B.Tech. I Year II Semester Supplementary Examinations June-2025

**ELECTRONIC DEVICES AND CIRCUITS**
(Electrical & Electronics Engineering)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Describe about positive and negative clampers with neat circuit diagram. | CO1 | L2 | 6M |
| | b | Explain and plot the V-I characteristics of Zener Diode. | CO1 | L2 | 6M |
| | | **OR** | | | |
| 2 | a | Derive the expression for transition capacitance of a PN Junction Diode. | CO1 | L4 | 6M |
| | b | A PN junction germanium diode has a reverse saturation current of 0.10 μA at the room temperature of $27^0$C. It is observed to be 30μA, when the room temperature is increased. Calculate the new room temperature. Also determine the current passing through the diode at this new temperature. | CO1 | L3 | 6M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | Draw the circuit diagram of Full Wave Rectifier with Inductor filter and illustrate its operation. Also derive the expression for ripple factor. | CO2 | L4 | 8M |
| | b | Compare different rectifiers. | CO2 | L4 | 4M |
| | | **OR** | | | |
| 4 | a | With a neat circuit diagram and waveforms, illustrate the working of a Bridge rectifier. | CO2 | L2 | 6M |
| | b | Define the following terms:<br>i) Ripple factor ii) Efficiency<br>iii) Peak inverse voltage iv) Transformer utilization factor. | CO2 | L2 | 6M |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Explain the Input and Output characteristics of a BJT in CE Configuration. | CO3 | L3 | 6M |
| | b | Explain the construction and working principle of N-Channel JFET. | CO3 | L2 | 6M |
| | | **OR** | | | |
| 6 | a | Evaluate the relation between α and β of a Transistor. | CO3 | L3 | 6M |
| | b | Explain the operation of N-Channel depletion type MOSFET with diagram. | CO3 | L2 | 6M |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 7 | a | Explain Collector to Base bias of a Transistor with neat circuit diagram and determine Q-point. | CO4 | L2 | 6M |
| | b | Derive the expression for Stability Factor, $S_f$ from Collector current equation. | CO4 | L4 | 6M |
| | | **OR** | | | |
| 8 | a | Explain Diode Compensation Technique for the parameters of $V_{BE}$ and $I_{CO}$. | CO4 | L2 | 6M |
| | b | Calculate the values of Resistors in a fixed bias circuit using the following specifications:$I_{CQ}$=9.2mA, $V_{CEQ}$=4.4.V, $h_{fe}$=1115,$V_{BE}$=0.7V & $V_{CC}$=9V. | CO4 | L3 | 6M |

## UNIT-V

| | | | | | |
|---|---|---|---|---|---|
| 9 | a | With neat diagram, summarize the parameters of CE amplifier using approximate analysis. | CO5 | L2 | 6M |
| | b | Derive expressions for $A_i$, $R_i$, Av and $R_0$ for a Common Collector Amplifier using simplified hybrid model. | CO5 | L4 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10 | a | Draw the hybrid model for a transistor in CE configuration and derive its hybrid parameters. | CO5 | L4 | 6M |
| | b | A CE amplifier is driven by a voltage source of internal resistance $R_s$= 800Ω and the load impedance of $R_L$=1000Ω. The h-parameters are $h_{ie}$=1k, $h_{fe}$=50, $h_{oe}$ = 25μA/V and $h_{re}$ = 2 x $10^{-4}$. Find current gain, voltage gain, input impedance and output impedance using approximate analysis. | CO5 | L4 | 6M |

***** END *****

| O.P.Code: 20CE0163 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)

B.Tech. I Year II Semester Supplementary Examinations June-2025

**BASICS OF ENGINEERING MECHANICS**
(Common to AGE & ME)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | A beam ABCDE hinged at A and supported on rollers at D, is loaded as shown in Fig.1. Find the reactions at A and D. | CO1 | L3 | 9M |

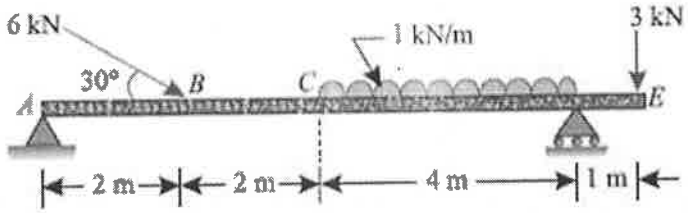
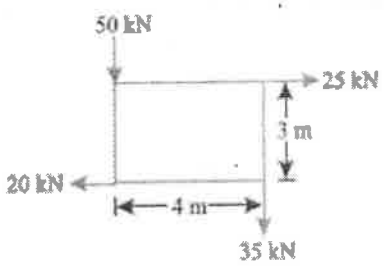



Fig:-1

| | | | | | |
|---|---|---|---|---|---|
| | b | Explain free body diagram with example. | CO1 | L2 | 3M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 2 | a | A system of forces are acting at the corners of a rectangular block as shown in Fig.. Determine the magnitude and direction of the resultant force. | CO1 | L3 | 6M |




Fig

| | | | | | |
|---|---|---|---|---|---|
| | b | The resultant of the two forces, when they act at an angle of 60o is 14 N. If the same forces are acting at right angles, their resultant is √137 N. Determine the magnitude of the two forces. | CO1 | L2 | 6M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | Define frivtion?State laws of friction. | CO2 | L2 | 6M |
| | b | Explain Cone of Friction with a neat sketch. | CO2 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | Find the value of 'Θ' if the block 'A' and 'B' shown in Fig have impending motion. Given block A = 20 kg, block B = 20 kg, μA = μB = 0.25. | CO2 | L4 | 12M |

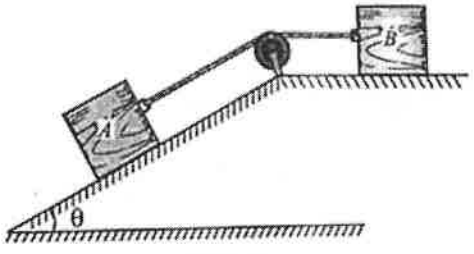



Fig:-3

## UNIT-III

5 A uniform lamina shown in Fig. consists of a rectangle, a circle and a triangle. Determine the centre of gravity of the lamina. All dimensions are in mm **CO3 L4 12M**

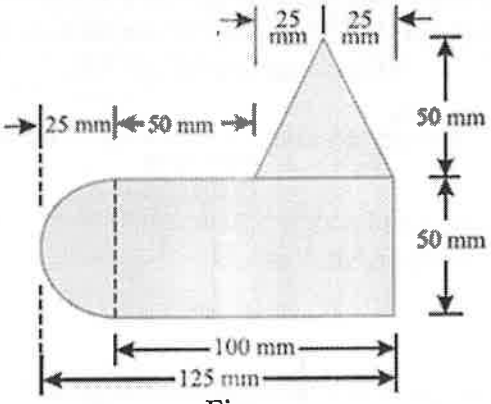
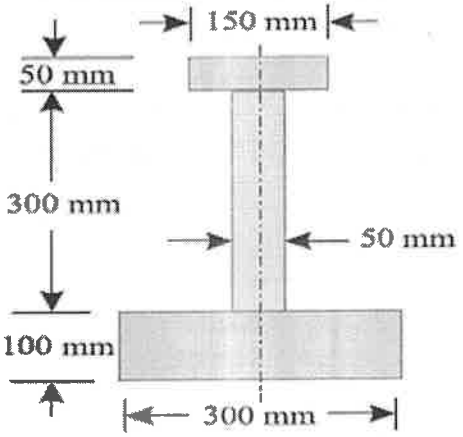



Fig:-

**OR**

6 An I-section as shown in Fig. has the following dimensions in mm units : Bottom flange = 300 mm × 100 mm
Top flange = 150 mm × 50 mm
Web = 300 mm × 50 mm
Determine mathematically the position of centre of gravity of the section. **CO3 L3 12M**




Fig

## UNIT-IV

7 a Find the moment of inertia of the lamina with a circular hole of 30 mm diameter about the axis AB as shown in Fig. **CO4 L3 6M**

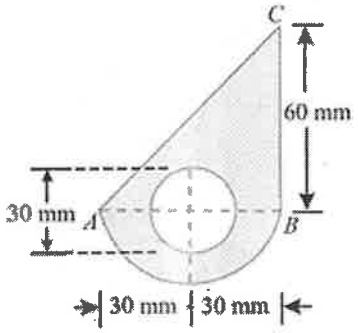
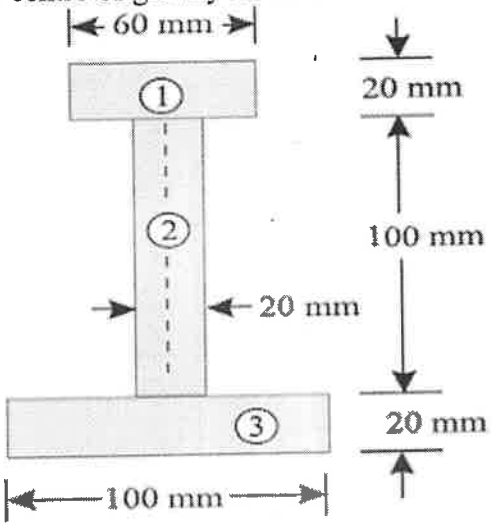



Fig:

b Derive an equation for moment of inertia of the following section about centroidal axis for an rectangular section — CO4 L2 6M

**OR**

8 An I-section is made up of three rectangles as shown in Fig. Find the moment of inertia of the section about the horizontal axis and vertical passing through the centre of gravity of the section. — CO4 L3 12M




Fig

**UNIT-V**

9 a An inclined truss loaded as shown in fig.8 — CO5 L4 10M

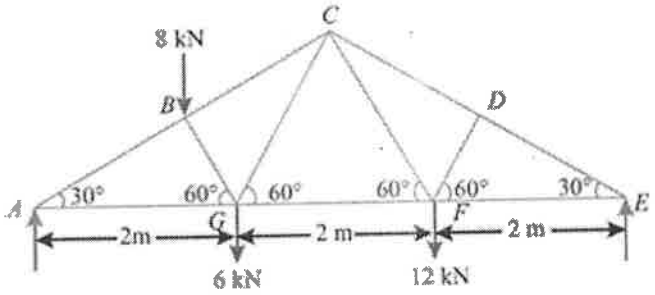



Fig:-8

b What is a cantilever truss? How will you find out its reactions? — CO5 L2 2M

**OR**

10 a A cantilever truss is loaded as shown in Fig.9. Find the value W, which would produce the force of magnitude 15 kN in the member AB. — CO5 L3 10M

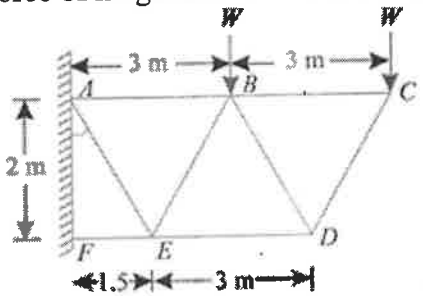



Fig:-9

b How method of joint differs from the method of section in the analysis of pin jointed trusses? — CO5 L2 2M

*** END ***

| O.P.Code: 20HS0835 | R20 | H.T.No. | | | | | | | | | |
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# SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

**B.Tech I Year II Semester Supplementary Examinations December/January-2024/2025**

## PROBABILITY & STATISTICS

**(Common to CAD, CSIT, CAI, CIC, CSE, CCC & CSM)**

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Two cards are selected at random from **10** cards numbered **1** to **10**. Find the probability that the sum is even if (i) The two cards are drawn together. (ii) The two cards are drawn one after the other with replacement. | **CO1** | **L5** | **6M** |
| | b | Two dice are thrown. Let A be the event that the sum of the points on the faces is **9**. Let B be the event that at least one number is **6**. Find $(i)P(A\cup B)$ $(ii)P\left(A^c\cup B^c\right)$. | **CO1** | **L1** | **6M** |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 2 | | A continuous random variable has the probability density function. $f(x)=\begin{cases} k\,x\,e^{-\lambda x}, & for\ x\geq 0,\ \lambda>0 \\ 0, & otherwise \end{cases}$ Evaluate the constant $k$, and find the mean and variance. | **CO1** | **L5** | **12M** |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | Out of **800** families with **5** children each, how many would you expect to have (i) **3** boys (ii) **5** girls (iii) either **2** or **3** boys? Assume equal probabilities for boys and girls. | **CO2** | **L3** | **6M** |
| | b | If $X$ is a Poisson variate such that $3P(X=4)=\frac{1}{2}P(X=2)+P(X=0)$, find (i) the mean (ii) $P(X\leq 2)$ | **CO2** | **L3** | **6M** |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | Suppose 300 students are normally distributed with a mean of **68** kgs and a standard deviation of **3** kgs. How many students have masses **(i)** Greater than **72** kgs **(ii)** Less than or equal to **64** kg **(iii)** Between **65** and **71** kgs inclusive? | **CO2** | **L3** | **12M** |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Find the arithmetic mean to the following data | **CO3** | **L3** | **6M** |

| $X$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $Y$ | 5 | 8 | 10 | 12 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| | b | Find the median to the following data | **CO3** | **L3** | **6M** |

| $X$ | 5 | 8 | 11 | 14 | 17 | 20 | 23 |
|---|---|---|---|---|---|---|---|
| $f$ | 2 | 8 | 12 | 20 | 10 | 6 | 3 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 6 | | The three judges ranked ten competitors in a musical test $A$, $B$, and $C$ in the following order | **CO3** | **L3** | **12M** |

| Ranks by $A$ | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ranks by $B$ | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 |
| Ranks by $C$ | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |

## UNIT-IV

7 **a** Fit a parabola to the data given below **CO4 L3 6M**

| $X$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $Y$ | 10 | 12 | 8 | 10 | 14 |

**b** Find the curve of best fit of the type $y = ae^{bx}$ to the following data by method of least squares **CO4 L1 6M**

| $X$ | 1 | 5 | 7 | 9 | 12 |
|---|---|---|---|---|---|
| $Y$ | 10 | 15 | 12 | 15 | 21 |

**OR**

8 **a** In two large populations, there are **30%**, and **25%** respectively of fair-haired people. Is this difference likely to be hidden in samples of **1200** and **900** respectively from the two populations. **CO4 L4 6M**

**b** A sample of **400** items is taken from a population whose standard deviation is **10**. The mean of the sample is **40**. Test whether the sample has come from a population with a mean of **38**. Also, calculate at a **95%** confidence interval for the population. **CO4 L4 6M**

## UNIT-V

9 **a** The blood pressure of 5 women before and after intake of a certain drug is given below. Test whether the a significant change in blood pressure at a **1%** level of significance. **CO5 L4 6M**

| Before | 110 | 120 | 125 | 132 | 125 |
|---|---|---|---|---|---|
| After | 120 | 118 | 125 | 136 | 121 |

**b** A pair of dice are thrown **360** times and the frequency of each sum is indicated below. Would you say that the dice are fair based on the chi-square test at 0.05 level of significance? **CO5 L5 6M**

| Sum | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 8 | 24 | 35 | 37 | 44 | 65 | 51 | 42 | 26 | 14 | 14 |

**OR**

10 From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees. **CO5 L1 12M**

| Soft Drinks / Employes | Clerks | Teachers | Officers |
|---|---|---|---|
| Pepsi | 10 | 25 | 65 |
| Thums up | 15 | 30 | 65 |
| Fanta | 50 | 60 | 30 |

***** END *****

| O.P.Code: 20HS0831 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

**B.Tech I Year II Semester Supplementary Examinations December/January-2024/2025**

**DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS**

**(Common to CE, AGE, ME, EEE & ECE)**

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Solve $(4xy+3y^2-x)dx+x(x+2y)dy=0$ | CO1 | L1 | 6M |
| | b | Solve the differential equation $x\frac{dy}{dx}+y=x^3y^6$ | CO1 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 2 | a | Solve $(D^2+D+1)y=x^3$ | CO1 | L5 | 6M |
| | b | Solve the following Second order differential equation: $(D^2-4D+3)y=4e^{3x},\ y(0)=-1\ and\ y'(0)=3$ | CO1 | L5 | 6M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | Find a solution of $y''+y=\cos ecx$ using method of variation of parameters. | CO2 | L5 | 6M |
| | b | Solve $(x^2D^2-xD+1)y=\log x$ | CO2 | L3 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | Solve $\frac{dx}{dt}+y=\sin t, \frac{dy}{dt}+x=\cos t, given\ x=2, y=0\ when\ t=0.$ | CO2 | L6 | 12M |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Form the PDE by eliminating the arbitrary constants from $(x-a)^2+(y-b)^2=z^2\cot^2\alpha$ where $\alpha$ is a parameter. | CO3 | L2 | 6M |
| | b | Form the PDE by eliminating the arbitrary functions from $z=f(x)+e^y g(x)$ | CO3 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 6 | a | Using the method of separation of variable, solve $3\frac{\partial u}{\partial x}+2\frac{\partial u}{\partial y}=0$; where $u(x,0)=4e^{-x}$. | CO3 | L4 | 6M |
| | b | Using the method of separation of variable, solve $\frac{\partial u}{\partial x}=4\frac{\partial u}{\partial y}$, where $u(0,y)=8e^{-3y}$. | CO3 | L4 | 6M |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 7 | a | If $w=f(z)$ is analytic function then prove that $(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2})\lvert \mathrm{Re}\, f(z)\rvert^2=2\lvert f'(z)\rvert^2$ | CO4 | L5 | 6M |
| | b | Show that $u(x,y)=e^{2x}(x\cos 2y-y\sin 2y)$ is harmonic and find its harmonic conjugate. | CO4 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 8 | a | Find the bilinear transformation that maps the points $(1,i,-1)$ into the points $(2,i,-2)$ in w-plane. | CO4 | L2 | 6M |
| | b | Prove that the transformation $w=\sin z$ maps the families of lines $x=$ $y=$ constant into two families of confocal central conics. | CO4 | L4 | 6M |

**UNIT-V**

| | | | | | |
|---|---|---|---|---|---|
| 9 | a | Evaluate $\int_C (y-x-3x^2i)dz$ where $C$ consists of the line segments From $z=0$ to $z=i$ and the other form $z=i$ to $z=i+1$ | CO5 | L5 | 6M |
| | b | Expand $f(z)=\log z$ in Taylor series about $z=-2$ | CO5 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10 | | Use Cauchy's Residue theorem to evaluate the integral $\int_C f(z)dz$, for each of these functions $f(z)$ around the circle $\|z\|=3$ in the positive sense. i) $\frac{\exp(-z)}{(z-1)^2}$, ii) $\frac{z+1}{z^2-2z}$ | CO5 | L5 | 12M |

*** **END** ***

| O.P.Code: 20EE0201 | R20 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
B.Tech. I Year II Semester Supplementary Examinations June-2025
**FUNDAMENTALS OF ELECTRICAL CIRCUITS**
(Electrical and Electronics Engineering)

**Time: 3 Hours** **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

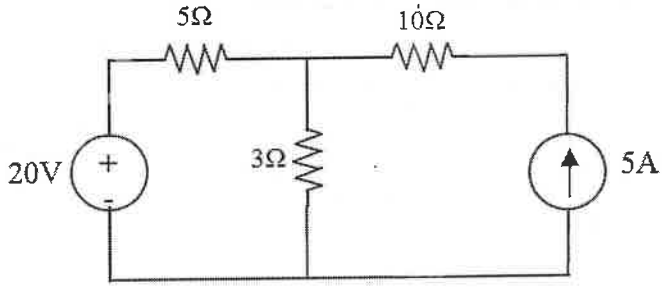
| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Explain in detail about passive elements. | CO1 | L2 | 6M |
| | b | Determine the Equivalent Capacitance when two capacitor are connected in Series & Parallel. | CO1 | L3 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 2 | a | Derive an expression for RMS values of sine wave form. | CO1 | L2 | 6M |
| | b | An alternating current is expressed as I = 14.14 sin 314t. Determine (i)Maximum current (ii)RMS current (iii)Frequency (iv)Instantaneous current when t = 0.02msec. | CO1 | L3 | 6M |

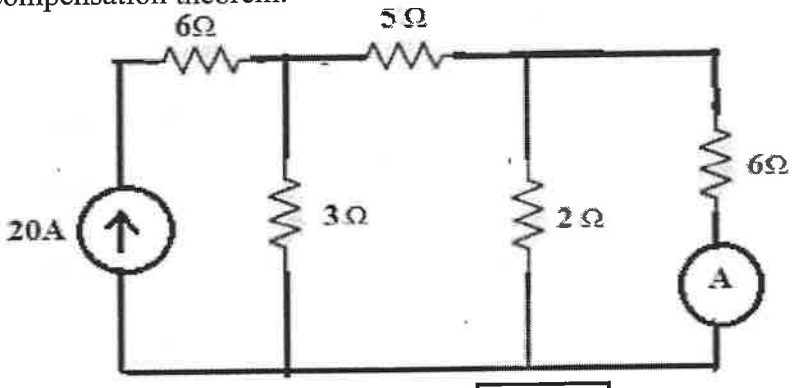
**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | State &explain Thevenin's theorem. | CO2 | L3 | 4M |
| | b | By using superposition theorem find the current flowing through the 3-ohm resistor | CO2 | L2 | 8M |




**OR**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | Determine the ammeter reading where it is connected to 6Ω resistor as shown in below figure. The internal resistance of the ammeter is 2Ω, by using compensation theorem. | CO2 | L4 | 12M |




**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 5 | | Explain resonance for series RLC circuit and derive the equation for resonant frequency. | CO3 | L3 | 12M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 6 | a | Explain about Quality factor of parallel resonance. | CO3 | L2 | 6M |
| | b | Determine the variation of impedance and phase angle of series resonant circuit with frequency. | CO3 | L3 | 6M |

## UNIT-IV

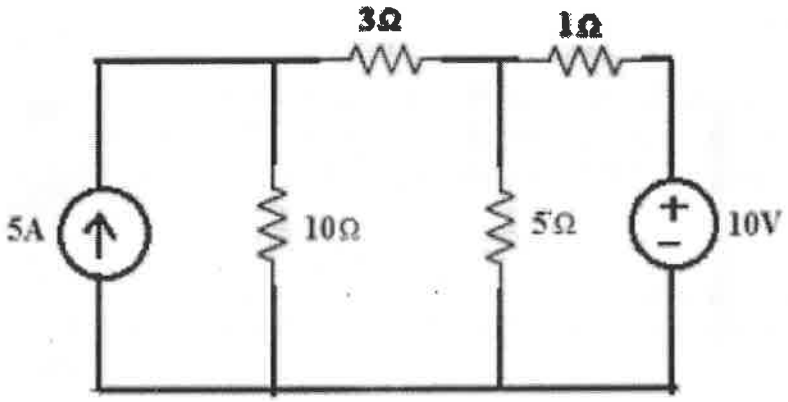
| | | | | | |
|---|---|---|---|---|---|
| 7 | a | Explain self-inductance with expressions. | CO4 | L3 | 6M |
| | b | What is the maximum possible mutual inductance of two inductively coupled coils with self-inductance of 50mH and 200mH? | CO4 | L2 | 6M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 8 | a | What are single and double tuned circuits? Where the tuned coupled circuits are employed? | CO4 | L2 | 6M |
| | b | What is dot convention? Why it is required? | CO4 | L2 | 6M |

## UNIT-V

| | | | | | |
|---|---|---|---|---|---|
| 9 | | Determine current in 10Ω resistor for the following network by using nodal analysis. | CO5 | L3 | 12M |




**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10 | | Write the procedure for constructing tie-set matrix. | CO5 | L2 | 12M |

***** END *****