Q.P. Code: 18HS0831 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester (R18) Supplementary Examinations July-2022

Mathematics-II

(Common To All)

Time: 3 hours Max.Marks: 60

PART-A

(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Find the Integrating Factor (I.F) of xlogx (dy/dx) +y=2logx.	L2	2M
(b)	Write the formula for Bessel's function Jn (x).	L1	2M
(c)	Change the order of integration in $\int_0^1 \int_0^{2\sqrt{x}} f(x,y)dydx$.	L1	2M
(d)	Write Cauchy's Riemann equations in Cartesian form.	L1	2M
(e)	State Cauchy's residue theorem.	L1	2M

PART- B

(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.	(a)	Solve Solve $x\frac{dy}{dx} + y = logx$	L2	5M
	(b)	Solve $x\frac{dy}{dx} + y = x^3y^6$	L2	5M

OR

3.	(a)	Solve $p^2 + 2pycotx = y^2$.	L2	5M
	(b)	Solve $y = psinp + cosp$	L2	5M

UNIT – II

4.	(a)	Solve $((D^2+4)y = e^x + \sin 2x$	L2	5M
	(b)	Solve $(D^2+1)y = \cos x$ by method of variation of parameters.	L2	5M

OR

5.	(a)	Solve $(D^3+2D^2+D)y = x^3$	L2	5M
	(b)	Solve $\frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} = \frac{12\log x}{x^2}$	L2	5M

UNIT – III

6.		Change the order of integration in $I = \int_0^1 \int_{x^2}^{2-x} (xy)dydx$ and hence evaluate the same.	L5	10M

OR

7.		Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dxdydz}{\sqrt{1-x^2-y^2-z^2}}$	L2	10M

UNIT - IV

8.	(a)	Find the image of the infinite strip $0 < y < \frac{1}{2}$ under the transformation $w = \frac{1}{z}$	L2	5M
	(b)	Show that the function $w = \frac{4}{z}$ transforms the straight line $x = c$ in the z-plane, into a circle in the $w - plane$	L2	5M
		OR		
9.	(a)	Find the bilinear transformation which maps the points $(\infty, i, 0)$ *in* to the points $(-1, -i, 1)$ in w-plane.	L2	5M
	(b)	Find the bilinear transformation that maps the point's$(1, i, -1)$ *in* to the points $(2, i, -2)$ in w-plane.	L2	5M

UNIT - V

10.		Show that $\int_0^{2\pi} \frac{d\theta}{1+a^2-2a\cos\theta} = \frac{2\pi}{1-a^2}$, $0 < a < 1$.	L1	10M
		OR		
11.		Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$ if c is the square with vertices at $1 \pm i$ *and* $-1 \pm i$	L2	10M

Q.P. Code: 18HS0801 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July 2022
CHEMISTRY
(CE, EEE & ME)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Give any two difference between Bonding and anti-bonding molecular orbitals	L1	2M
(b)	What is meant by corrosion?	L1	2M
(c)	Define brackish water ? What type of methods used in purification ?	L1	2M
(d)	Why benzene does does not undergo electrophonic substitution reactions?	L1	2M
(e)	What is finger print region? Mention its importance.	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	Explain the energy level diagrams of oxygen and fluorine with magnetic behavior	L2	10M
	OR		
3.	Explain HSAB concept and its applications.	L2	10M

UNIT - II

4.	Define Entropy. Entropy changes in reversible and irreversible process.	L2	10M
	OR		
5.	Explain various factors influencing the rate of corrosion.	L2	10M

UNIT - III

6.	What are the units to express hardness of water? and explain sludge and Scale formation in boilers.	L1	10M
	OR		
7.	Describe the Ion exchange process for demineralization of water. What are the advantages and disadvantages of ion exchange process?	L2	10M

UNIT - IV

8.	Write the preparation, properties & uses of Bakelite and Teflon, Nylon 6, 6.	L1	10M
	OR		
9.	Define addition and elimination reactions. Explain the addition and elimination reactions with examples	L2	10M

UNIT - V

10.	Explain the working principle of atomic absorption spectrometer and How will you determine the nickel using by AAS?	L2	10M
	OR		
11.	Discuss the principle, instrumentation and applications of Transmission electron microscopy	L5	10M

Q.P. Code: 18HS0851 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
SEMICONDUCTOR PHYSICS
(ECE and CSE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	What are direct band gap semiconductors?	L1	2M
(b)	Locate the Fermi level of intrinsic semiconductor.	L4	2M
(c)	Give the principle of solar cell.	L1	2M
(d)	Mention the characteristics of LASER.	L1	2M
(e)	What is quantum dot?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	(a)	Explain different Brillouin zones using E-K diagram.	L1	5M
	(b)	Classify solids as Conductors, semiconductors and insulators.	L2	5M
		OR		
3.		Describe the electrical conductivity in a metal using quantum free electro theory	L3	10M

UNIT - II

4.	(a)	Explain Hall effect. Give its Applications.	L2	7M
	(b)	The hall coefficient of a specimen is $3.66\times10^{-4}m^3c^{-1}$. Its resistivity is $8.93\times10^{-3}\Omega m$. Find μ and n.	L3	3M
		OR		
5.		Describe drift and diffusion currents of a semiconductor.	L3	10M

UNIT - III

6.	(a)	Explain the principle, construction and working of LED.	L1	8M
	(b)	Give the applications of LED.	L2	2M
		OR		
7.		Discuss the I-V characteristics of photodiode and solar cell.	L3	10M

UNIT - IV

8.	(a)	Explain spontaneous and stimulated emission of radiation.	L2	5M
	(b)	Obtain relation among Einstein's coefficients.	L4	5M
		OR		
9.	(a)	Obtain an expression for Numerical Aperture of an optical fiber.	L2	7M
	(b)	Calculate the fractional index change for a given optical fiber if the refractive indices of the core and cladding are 1.563 and 1.498 respectively.	L4	3M

UNIT - V

10.	(a)	Explain surface area to volume ratio and quantum confinement in nano materials.	L1	7M
	(b)	Give the industrial and medical applications of nanomaterials	L2	3M
11.	(a)	Describe sol-gel technique of nanomaterials synthesis.	L4	7M
	(b)	Give the advantages of sol-gel technique.	L2	3M

Q.P. Code: 18HS0810 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
ENGLISH
(CE, ME & EEE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Give two examples on simple sentence	L2	2M
(b)	What are the basic rules for writing precisely?	L1	2M
(c)	What is the difference between listening and hearing?	L1	2M
(d)	What is the theme of Where the mind is without fear?	L1	2M
(e)	What are the principles of writing Essays?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	Sketch the Character of Mr Jimmy Wells in the story "After Twenty Years"	L2	10M
	OR		
3.	What is the essence of the speech made by Jaques to Duke Junior with reference to "All world"s a Stage?	L1	10M

UNIT - II

4.	Write a summary of Bertrand Russel „s "Knowledge and Wisdom	L2	10M
	OR		
5.	Justify the title "Knowledge and Wisdom."	L5	10M

UNIT - III

6.	Justify the title` The Happy Prince`	L5	10M
	OR		
7.	Discuss Nelson Mandela`s Armed Resistance Movement.	L2	10M

UNIT - IV

8.	What is the contribution of Rabindranath Tagore for Indian literature?	L1	10M
	OR		
9.	What are the policies implemented by government to reduce pollution?	L1	10M

UNIT - V

10.	What is the gist of the Astrologer"s Day by R.K Narayanan?	L1	10M
	OR		
11.	How did R.K. Narayan"s an astrologer prove that he was a successful professional?	L2	10M

Q.P. Code: 18CS0501 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
PROGRAMMING FOR PROBLEM SOLVING
(ECE & CSE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Define Variable. Give syntax.	L1	2M
(b)	What is the use of Break statement?	L2	2M
(c)	Recall User defined Function?	L1	2M
(d)	List any three String handling Functions?	L1	2M
(e)	Define Array?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.	What is a token? What are different types of tokens available in C language? Explain.	L2	10M

OR

3.	Evaluate the following expressions: i) 22 + 3 < 6 && !5 | | 22 = =7 && 22 – 2 > +5 ii) a + 2 > b | | !c && a = = d *a – 2 < = e Where a=11, b=6, c=0, d = 7 and e=5.	L3	10M

UNIT – II

4.	Show how break and continue statements are used in a C-program, with example.	L4	10M

OR

5.	Write a C program to display your branch name based upon the branch code using switch statement?	L3	10M

UNIT – III

6.	Write a program in C using functions to swap two numbers using global variables concept and call by reference concept.	L3	10M

OR

7.	What is an array? How a single dimension and two dimension arrays are declared and initialized?	L2	10M

UNIT – IV

8.	Write a program in C to find the sum and mean of all elements in an array using pointers.	L3	10M

OR

9.	Explain string manipulation library functions with their syntaxes. Write a program to check whether a string is palindrome or not.	L3	10M

UNIT – V

10.	Write a c-program using structures to read, write, compute average - marks and display the students scoring above and below the average marks for a class of N students.	L3	10M

OR

11.	Illustrate the purpose of feof() & ferror() functions? Also explain the general format of fseek() function.	L4	10M

Q.P. Code: 18ME0302 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
ENGINEERING & GRAPHICS DESIGN
(Common to CE, ME & EEE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Divide a line of 100 mm in to 7 equal parts	L1	2M
(b)	Draw the projection of the line of 70 mm, when the line is parallel to both the reference planes and 30 mm away from HP and 20 mm Infront of VP	L4	2M
(c)	Define the terms prism and pyramid	L3	2M
(d)	What is the true shape of the section	L1	2M
(e)	what is the difference between isometric and orthographic projections	L2	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2. Draw an epi-cycloid of rolling circle of diameter 40 mm which rolls outside another circle (base circle) of 150 mm diameter for one revolution. Draw a tangent and normal at any point on the curve. L3 10M

OR

3. a) Draw an ellipse having major axis equal to 100 mm and the minor axis equal to 70 mm. Use the concentric circle method. L3 5M

   b) Draw a parabola having a distance of 50 mm between the focus and directrix. Draw a normal and tangent to the parabola at a point 35 mm from the focus. L2 5M

UNIT – II

4. Draw the projections of the following points, keeping the distance between the projectors as 25 mm on the same reference lines. L2 10M

   A – 20 mm above HP and 30 mm in front of VP
   B – 20 mm above HP and 30 mm behind VP
   C – 20 mm below HP and 30 mm behind VP
   D – 20 mm below HP and 30 mm in front of VP
   E – On HP and 30 mm in front of VP
   F – On VP and 20 mm above HP
   G – Lying on both HP and VP

OR

5. A line AB of 100 mm length is inclined at an angle of 45 degree to HP and 30 degree to VP. The point A is 15 mm above HP and 20 mm in front of VP. Draw the projections of the line. L3 10M

Q.P. Code: 18ME0302 R18

UNIT – III

6. An equilateral triangular plane ABC of side 40 mm, has its plane parallel to VP and 20 mm away from it. Draw the projections of the plane when one of its sides is (i) perpendicular to HP (ii) parallel to HP and (iii) inclined to HP at an angle of 45 degree L1 10M

OR

7. A square pyramid, base 40 mm side and axis 70 mm long, is freely suspended from one of the corners of its base. Draw its projections, when the axis as a vertical plane makes an angle of 45 degree with the VP L3 10M

UNIT – IV

8. A hexagonal prism of side of base 30 mm and length of axis 75 mm, is resting on its base on HP. It is cut by a section plane inclined 35 degree to HP and passing through top corner. Draw the front and sectional top views of the solid and true shape of the section. L2 10M

OR

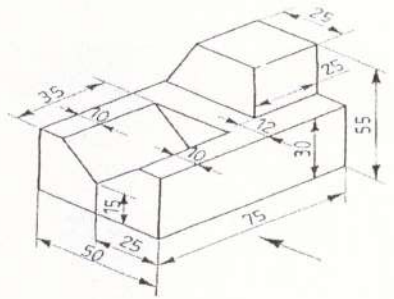
9. A square prism of side of base 40 mm and axis 80 mm long, is resting on its base on HP such that, a rectangular face of it is parallel to VP. Draw the development of the prism. L2 10M

UNIT – V

10. Draw the isometric projection of the frustum of a cone of base diameter 60 mm, top diameter 30 mm and height 55 mm. L1 10M

OR

11. Draw three views of the blocks shown pictorially in figure according to first angle projection L4 10M



Q.P. Code: 18CE0101 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
ENGINEERING MECHANICS
(ECE)

Time: 3 hours Max.Marks: 6

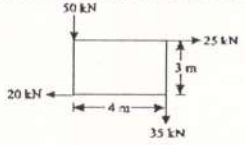
PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)
   (a) Write the equations of equilibrium for a system of Coplanar Concurrent Forces in terms of moments. L1 2M
   (b) What is cone of friction? L1 2M
   (c) What is the importance of center of gravity? L1 2M
   (d) What is Radius of gyration? Explain. L1 2M
   (e) State the Principle of Conservation of Momentum. L1 2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

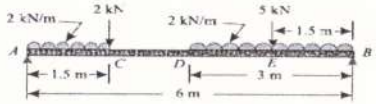
UNIT – I

2. (a) State and prove parallelogram law of forces. L2 5M
   (b) A system of forces is acting at the corners of a rectangular block as shown in Fig. Determine the magnitude and direction of the resultant force. L3 5M



OR

3. A simply supported beam AB of span 6 m is loaded as shown in Fig. Determine the reactions at A and B. L3 10M

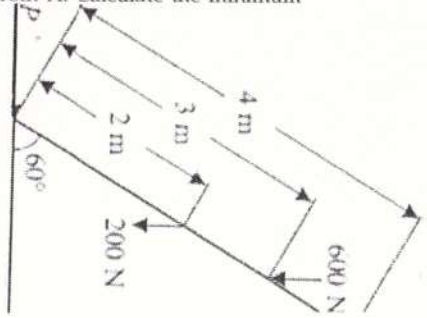


UNIT – II

4. Define the following: L1 10M
   (a) Limiting Force of Friction, (b) Kinetic Friction, (c) Co-efficient of Friction
   (d) Angle of Friction, (e) Angle of Repose.

OR

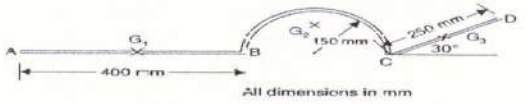
5. A ladder of length 4 m, weighing 200 N is placed against a vertical wall as shown in Fig.10. The coefficient of friction between the wall and the ladder is 0.2 and that between floor and the ladder is 0.3. The ladder, in addition to its own weight, has to support a man weighing 600 N at a distance of 3 m from A. Calculate the minimum horizontal force to be applied at A to prevent slipping. L3 10M



Q.P. Code: 18CE0101 R18

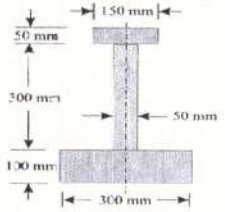
UNIT – III

6. Locate the centroid of the uniform wire bent as shown in Fig. L3 10M



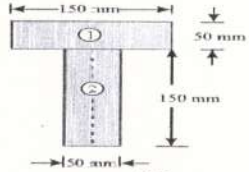
OR

7. An I-section as shown in Fig. has the following dimensions in mm units: L3 10M
   Bottom flange = 300 × 100
   Top flange = 150 × 50
   Web = 300 × 50
   Determine mathematically the position of center of gravity of the section



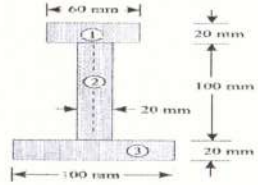
UNIT – IV

8. Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the center of gravity of the section as shown in fig. L3 10M



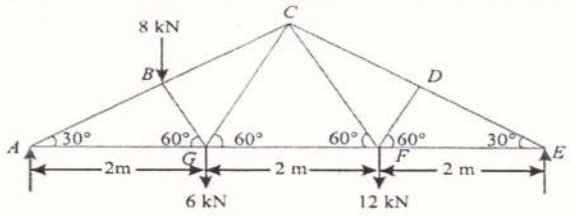
OR

9. 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 passing through the center of gravity of the section. L3 10M



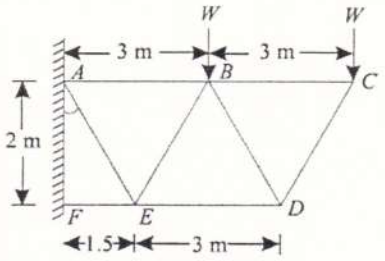
UNIT - V

10. Analyze the members of a inclined truss loaded as shown in fig. L3 10M



OR

11. A cantilever truss is loaded as shown in Fig. Find the value W, which would produce the force of magnitude 15 kN in the member AB. L4 10M



SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
ELECTRICAL CIRCUITS-I
(EEE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

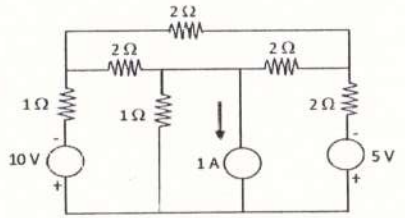
1. Answer the following: (5 X 2 = 10 Marks)
   (a) Define independent and dependent sources. L1 2M
   (b) Define form factor. L1 2M
   (c) State the Superposition Theorem. L1 2M
   (d) Define Q factor. L1 2M
   (e) Define Ideal Transformer. L1 2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT – I

2. Derive the expression for Delta connected resistances in terms of Star connected resistances and vice versa? L5 10M

OR

3. Obtain the node voltages for the following network shown in figure. L6 10M



UNIT – II

4. An alternating current is expressed as I = 14.14 sin 314t. Determine. L5 10M
   (i) Maximum current
   (ii) RMS current
   (iii) Frequency
   (iv) Instantaneous current when t = 0.02msec.

OR

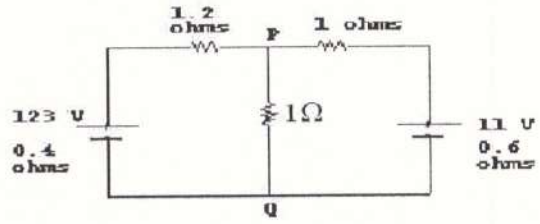
5. A 1KΩ resistor is connected in series with an inductance of 50mH across a 230V, 50HZ AC Supply. Find L5 10M
   (i) Inductive reactance
   (ii) Impedance
   (iii) Current
   (iv) Phase angle
   (v) Voltage drop across resistance.

UNIT – III

6. Derive the condition for the maximum power to be transferred from the source to the load. L5 10M

OR

7. For the circuit shown in figure , find the value of current through 1 ohm in the arm PQ using Thevenin's theorem. L5 10M



UNIT – IV

8. In the parallel RLC circuit, calculate resonant frequency, bandwidth, Q- factor. L5 10M

OR

9. (a) Draw and explain the Locus diagram of a Series RL Circuit? L2 5M
   (b) Draw and explain the Locus diagram of a Series RC Circuit? L2 5M

UNIT – V

10. Explain Self Inductance, Mutual Inductance and Co-efficient of coupling in detail? Give the relation between L_1, L_2, K & M? L4 10M

11. Two coupled coils with L1=0.02H, L2=0.01H and K=0.5 are connected in four different ways Series aiding, series opposing, parallel aiding and parallel opposing. Determine the equivalent Inductances in all the four cases? L5 10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R18) Supplementary Examinations July-2022
BASIC ELECTRICAL ENGINEERING
(CSE & ECE)

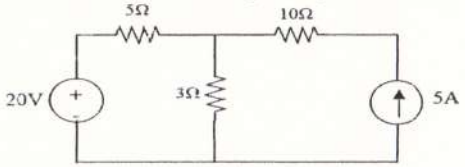
Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)
   (a) State Ohm's law and write its expression ? L1 2M
   (b) Draw Star and Delta Connections of Three Phase circuit? L1 2M
   (c) Why Transformer rating will be in kVA? L1 2M
   (d) Why is an induction motor called a rotating transformer?justify L1 2M
   (e) Define Switch Gear? L1 2M

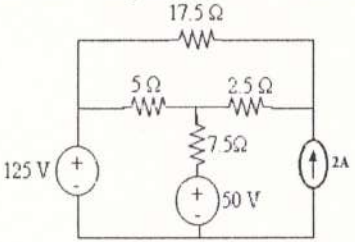
PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT - I

2. State and Explain the Super position theorem. And By using superposition theorem find the current flowing through the 3 ohm resister. L4 10M



OR

3. Use nodal analysis to find the node voltages for the below circuit. L3 10M



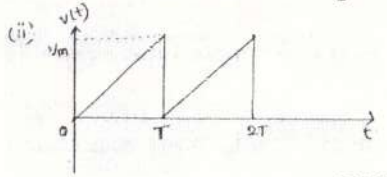
UNIT - II

4. Derive an expression for the current and impedance for a series RL and RC circuit excited by a sinusoidally alternating voltage. Draw the phasor diagrams. L3 10M

OR

5. a) Derive the voltage and current relations in three phase balanced circuits for delta connection. L2 6M

   b) Find the rms value for the following waveform L3 4M



UNIT - III

6. a) Explain about magnetic materials. L1 4M

   b) A 1-Φ,50 HZ transformer has 80 turns on the primary winding and 400 turns on the secondary winding. The net cross sectional area of the core is 200 cm^2.If the primary winding is connected to a 240v,50 HZ supply, determine (i)The emf induced in the secondary winding. L2 6M

   (ii) The maximum value of the flux density in the core.

OR

7. Explain the practical transformer on load and draw the phasor diagrams L3 10M

UNIT - IV

8. Explain the construction of three phase alternator? L1 10M

OR

9. Explain the working principle of synchronous generator? L2 10M

UNIT - V

10. Explain briefly about earthing and how it plays an important role in installation. L2 10M

OR

11. What is energy consumption and Explain how it is calculated by an example. L4 10M

Q.P. Code: 19HS0849 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July-2022

APPLIED PHYSICS

(EEE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1	a)	What is a simple harmonic oscillator? Derive the equation of motion of simple harmonic oscillator.	L4	8M
	b)	A particle executes SHM with a period of 0.002 sec and amplitude of 10 cm. Find its acceleration when it is 4 cm away from its mean position and also obtain its maximum velocity	L3	4M
		OR		
2	a)	Define damped harmonic motion. Give examples.	L1	4M
	b)	Derive and solve differential equation of damped harmonic oscillator.	L4	8M

UNIT-II

3	a)	What are matter waves? Write their properties.	L1	4M
	b)	Derive the expression for de Broglie wavelength.	L4	4M
	c)	Calculate the velocity and kinetic energy of an electron of wavelength 1.66×10^{-10}m.	L3	4M
		OR		
4	a)	Deduce Schrodinger time independent wave equation.	L4	8M
	b)	Write the physical significance of wave function ψ.	L1	4M

UNIT-III

5	a)	What are the salient features of classical free electron theory? Derive an expression for electrical conductivity in a metal. Mention its drawbacks.	L4	8M
	b)	Find relaxation time of conduction electron in metal if its resistivity is $1.54 \times 10\text{-}8\Omega$-m and it has 5.8×10^{28} conduction electron/m^3. Given m= 9.1×10^{-31} kg, e= 1.6×10^{-19} C.	L3	4M
		OR		
6	a)	What is Hall Effect? Obtain an expression for Hall coefficient. Write the applications of Hall Effect.	L4	8M
	b)	The RH of a specimen is 3.66×10^{-4} m^3c^{-1}. Its resistivity is 8.93×10^{-3} ohm-m.Find 'μ' and 'n'	L3	4M

UNIT-IV

7	a)	Explain the construction and working of Nd:YAG laser with a neat diagram.	L2	8M
	b)	Write the application of lasers in in industry and medicine.	L1	4M
		OR		
8	a)	Deduce expressions for acceptance angle and numerical aperture of an optical fiber.	L4	8M
	b)	An optical fiber has a core material of refractive index 1.55 and cladding with refractive index 1.50. Calculate its numerical aperture.	L3	4M

UNIT-V

9	a)	Explain the synthesis of nanomaterials by ball milling method.	L2	8M
	b)	Write any four applications of nanomaterials.	L1	4M

OR

10	a)	What is Scanning Electron Microscope? Discuss in detail the construction and working of SEM.	L2	8M
	b)	Explain the strengths and limitations of SEM.	L2	4M

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Q.P. Code: 19HS0851 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July- 2022

SEMICONDUCTOR PHYSICS

(CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

		UNIT-I			
1	a)	List the postulates of classical free electron theory and quantum free electron theory.	L1	8M
	b)	Write a brief note on Fermi-Dirac distribution function	L1	4M
		OR			
2	a)	Outline the various sources of electrical resistance in metals.	L2	8M
	b)	Define the terms a) relaxation time b) mobility	L1	4M
		UNIT-II			
3	a)	Develop Einstein's relation in semiconductors.	L3	6M
	b)	Define Fermi level. Prove that the Fermi level lies exactly in between the valency band and conduction band of an intrinsic semiconductor.	L5	6M
		OR			
4	a)	State and explain Hall effect. Derive an expression for Hall potential in a semiconductor.	L3	7M
	b)	Summarize the working mechanism of a solar cell.	L2	5M
		UNIT-III			
5	a)	Explain the behavior of particle in a one-dimensional infinite-depth potential well in terms of Eigenvalues and Eigen function.	L2	8M
	b)	List the physical significance of wave function.	L1	4M
		OR			
6	a)	Describe the propagation of the electromagnetic wave in non-conducting media.	L2	8M
	b)	Explain the properties of matter waves.	L2	4M
		UNIT-IV			
7	a)	Discuss population inversion.	L2	4M
	b)	Demonstrate the construction and working mechanism of He-Ne Laser with neat energy level diagram.	L2	8M
		OR			
8	a)	Define acceptance angle and numerical aperture. Derive an expression for acceptance angle of an optical fiber.	L3	7M
	b)	Describe optical fiber communication system with block diagram.	L3	5M
		UNIT-V			
9	a)	Explain why surface area to volume ratio is very large for Nano materials.	L2	8M
	b)	Write the applications of nanomaterial in industries and information technology.	L1	4M
		OR			
10	a)	Describe the sol-gel technique for the synthesis of nanomaterials.	L2	6M
	b)	List the advantages of sol-gel process.	L1	6M

Q.P. Code: 19HS0801 **R19**

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
I B.Tech II SEM (R19) Supplementary Examinations of July-2022
APPLIED CHEMISTRY
(CSE)

Time: 3 hours Max.Marks: 60

(Answer all five units, 5 x 12 =60 Marks)

UNIT - I

2.		Explain the Nernst equation for a single electrode potential and write its applications.	L2	12M
		OR		
3.	(a)	Explain the construction and working principle of lead storage battery.	L2	6M
	(b)	Explain a brief note on Zinc-Air battery.	L2	6M
		UNIT - II		
4.		Write the salient features of MOT. Draw the energy level diagrams of O_2	L2	12M
		OR		
5.		Draw the band diagrams of Conductors, Semiconductors and Insulators.	L3	12M
		UNIT - III		
6.		Explain the following mechanism with examples. (i) Anionic addition polymerization. . (ii) Co-ordination or Ziegler-Natta polymerization.	L2	12M
		OR		
7.		Write the preparation, properties and application of Buna-S rubber and Buna-N rubber.	L3	12M
		UNIT - IV		
8.		Give an account on principle and instrumentation of IR spectroscopy. Explain stretching and bending vibrations.	L2	12M
		OR		
9.		Explain the principle and instrumentation of High Performance Liquid Chromatography (HPLC). .	L2	12M
		UNIT - V		
10.		Explain the applications of supramolecules in a) Sensors, Gas storage. b) Molecular switches	L2	12M
		OR		
11.		Discuss about Super conductors and their applications?	L2	12M

Q.P. Code: 19HS0831 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July 2022

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to CE, ME, EEE & ECE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	a)	Solve $(1+y^2dx)+(x-\tan^{-1}y)dy=0$.	L3	6M
	b)	Solve $(D^2-4D+4)y=8(e^{2x}+\sin 2x+x^2)$.	L3	6M

OR

2	a)	Solve $\frac{dy}{dx}-2\cos x.\cot y+\sin^2 x.\cos ecy.\cos x=0$.	L3	6M
	b)	Solve $\frac{d^4y}{dx^4}-y=\cos x\cosh x$.	L2	6M

UNIT-II

3		Solve the simultaneous equations: $\frac{dx}{dt}+5x-2y=t, \frac{dy}{dt}+2x+y=0$ being given $x=y=0$ when $t=0$.	L3	12M

OR

4	a)	Solve $x^2\frac{d^2y}{dx^2}-4x\frac{dy}{dx}+4y=4x^2$.	L2	6M
	b)	Solve $(2x+5)^2\frac{d^2y}{dx^2}-6(2x+5)\frac{dy}{dx}+8y=6x$.	L2	6M

UNIT-III

5		Solve $\frac{\partial u}{\partial x}=2\frac{\partial u}{\partial t}+u$, where $u(x,0)=6e^{-3x}$ by the method of separation of variables.	L5	12M

OR

6	a)	Form the partial differential equation by eliminating the arbitrary function f from $z=y^2+2f\left(\frac{1}{x}+\log y\right)$.	L5	6M
	b)	Solve the PDE $(x^2-y^2-z^2)p+2xyq=2xz$.	L2	6M

UNIT-IV

7	a)	Find the directional derivative of $f(x,y,z)=xy^3+yz^3$ at the point (2,-1,1) in the direction of the vector $\bar{i}+2\bar{j}+2\bar{k}$.	L1	12M
	b)	Show that $\bar{F}=yz\,i+zx\,j+xy\,k$ is Conservative vector field and find its Potential function.	L2	6M

OR

8	a)	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point $(2,-1,2)$.	L2	6M
	b)	Show that $div(grad\,r^n)=n(n+1)r^{n-2}$ where $r^2=x^2+y^2+z^2$.	L3	6M

Q.P. Code: 19HS0831 R19

UNIT-V

9		Verify Green's theorem in plane for $\int_C[(xy+y^2)dx+x^2dy]$, Where C is boundary of the region defined by $y=x$ and $y=x^2$.	L3	12M

OR

10	a)	Find the work done in moving a particle in the force field $\bar{F}=3x^2\bar{i}+(2xz-y)\bar{j}+z\bar{k}$ along the line joining (0, 0, 0) to (2, 1, 3).	L3	6M
	b)	Use Gauss divergence theorem to evaluate $\iint(xdydz+ydzdx+zdxdy)$, where S is the surface of a sphere of radius a.	L3	6M

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Q.P. Code: 19HS0835 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester Supplementary Examinations July-2022
PROBABILITY & STATISTICS
(CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1 a) If A and B are two events, then prove that $P(A \cup B) = P(A) + P(B) - P(A \cap B)$. L3 6M

b) Three balls are drawn successively from the box containing 6 red balls, 4 white balls and 5 blue balls. Find the probability that they are drawn in the order red, white and blue if each ball is (i) replaced, (ii) not replaced. L2 6M

OR

2 a) A random variable X has the following probability function : Values of X, L3 6M

X	−3	−1	2	5
P(X = x)	$\frac{2k-3}{10}$	$\frac{k+1}{10}$	$\frac{k-1}{10}$	$\frac{k-2}{10}$

(i) Find the value of k (ii) Determine the distribution of X.

b) Let X be a continuous random variable with distribution : L2 6M

$$f(x)=\begin{cases} kx & if\ 0 \le x \le 5 \\ 0 & elsewhere \end{cases}$$

(i) Evaluate k. (ii) Find $P(1 \le X \le 3)$, $P(2 \le X \le 4)$ and $P(X \le 3)$.

UNIT-II

3 a) Find the mean and variance of the Poisson distribution. L3 6M

b) A sample of 100 dry battery cells tested to find the length of life produced the following results : L2 6M

$\bar{x}$ = 12 hours, σ = 3 hours.

Assuming the data to be normally distributed, what percentage of battery cells are expected to have life

(i) more than 15 hours (ii) less than 6 hours (iii) between 10 and 14 hours?

OR

4 a) Find the mean and variance of Binomial distribution. L2 6M

b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution? L2 6M

UNIT-III

5 a) Calculate mean and median of the following date relating to weight of 120 articles: L5 6M

weight (in gm)	0-10	10-20	20-30	30-40	40-50	50-60
No.of articles	14	17	22	26	23	18

b) Two random variables have the regression lines with equations $4x - 5y + 33 = 0$ and $20x - 9y = 107$. L5 6M

Find the means values and the correlation co-efficient between x and y.

OR

6 a) Calculate correlation coefficient to the following data ; L5 6M

x	10	15	12	17	13	16	24	14	22	20
y	30	42	45	46	33	34	40	35	39	38

b) Explain the Skewness and Kurtosis. L2 6M

UNIT-IV

7 The following data pertain to the cosmic ray doses measured at various altitudes: L1 12M

Altitude(feet) x	50	450	780	1200	4400	4800	5300
Count y	28	30	32	36	51	58	69

(i) Fit an exponential curve.
(ii) Use the result obtained in part (i) to estimate the mean does at an altitude of feet.

OR

8 a) In a random sample of 100 tube lights produced by company A, the mean life time of tube light is 1190 hours with standard deviation of 90 hours. Also in a random sample of 75 tube lights from company B the mean life time is 1230 hours with standard deviation of 120 hours. Is there a difference between the mean lifetimes of the two brands of tube lights at a significance level of 0.01? L2 6M

b) In a study to estimate the proportion of residents in a certain city and its suburbs who favor the construction of a nuclear power plant, it is found that 63 of 100 urban residents favor the construction while only 59 of 125 suburban residents are in favor. Is there a significant difference between the proportion of urban and suburban residents who favor construction of the nuclear plant? Use a 0.05 level of significance. L3 6M

UNIT-V

9 Fit a Binomial distribution to the following data and test for its goodness of fit at level of significance 0.05. L3 12M

No. of Heads	0	1	2	3	4	5
No.of Tosses(Frequency)	38	144	342	287	164	25

OR

10 a) The IQ s (intelligence quotients) of 16 students from one area of a city showed a mean of 107 with a standard deviation of 10, while the IQs of 14 students from another area of the city showed a mean of 112 with a standard deviation of 8. Is there a significant difference between the IQs of the two groups at a 0.05 level of significance? L3 6M

b) It is desired to determine whether there is less variability in the silver plating done by Company 1 than in that done by Company 2. If independent random samples of size 12 of the two companies' work yield $s_1 = 0.035$ mil and $s_2 = 0.062$ mil, test the null hypothesis $\sigma_1^2 = \sigma_2^2$ against the alternative hypothesis $\sigma_1^2 < \sigma_2^2$ at the 0.05 level of significance. L3 6M

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SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester Supplementary Examinations July 2022
STRENGTH OF MATERIALS-I
(CE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	A specimen of steel 25 mm in diameter with a gauge length of 200 mm is tested to destruction. It has an extension of 0.16 mm under a load of 80 kN and the load at elastic limit is 160 kN. The maximum load is 180 kN. The total extension is 56 mm and diameter at the neck is 18 mm. Find (i) The stress at elastic limit (ii) Young's modulus (iii) Percentage of elongation (iv) percentage reduction in area (v) Ultimate tensile stress.	L2	12M
	OR		
2	A bar of 20 mm diameter is tested in tension. It is observed that when a load of 37.7 kN is applied, the extension measured over a gauge length of 200 mm is 0.12 mm and contraction in diameter is 0.0036 mm. find the Poison's ration, Yong's modulus, bulk modulus of elasticity and modulus of rigidity.	L2	12M

UNIT-II

3	A cantilever of 14 m span carries loads of 6 kN, 4 kN, 6 kN and 4 kN at 2 m, 4 m, 7 m and 14 m respectively from the fixed end. If also has a uniformly distributed load of 2 kN/m run for the length between 4 m and 10 m from the fixed end. Draw the shear force and bending moment diagrams.	L3	12M
	OR		
4	A 10 m long simply supported beam carries two points loads of 10 kN and 6 kN at 2 m and 9 m respectively form the left end. It has also a uniformly distributed load of 4 kN/m run for the length between 4 m and 7 m from the left end. Draw shear force and bending moment diagrams.	L2	12M

UNIT-III

5	A timber beam of rectangular section supports a load of 20 kN uniformly distributed over a span of 3.6 m. If depth of the beam section is twice the width and maximum stress is not to exceed 7 MPa, find the dimensions of the beam section.	L2	12M
	OR		
6	Draw the shear stress distribution of triangular section of width 'b' and height 'h'. Prove that the maximum shear stress is 1.5 times the average shear stress.	L5	12M

UNIT-IV

7	Derive the expression for slope and deflection of a cantilever beam carrying a point load at the free end by Moment Area method.	L2	12M
	OR		
8	A simply supported beam is subjected to uniformly distributed load w /unit length completely over a span 'l'. Using Moment Area method find the maximum slope and deflection.	L2	12M

UNIT-V

Q.P. Code: 19CE0102 R19

9	Compare the Euler crippling loads of two columns-one of solid circular section and the second of hollow circular section of internal diameter 70% of the external diameter if they are of the same material, same length, same area, and same end conditions.	L3	12M
	OR		
10	A T-section 150 mm x 120 mm x 20 mm is used as a strut of 4 m long with hinged at its both ends. Calculate the crippling load, if Young's modulus for the material be 200 GPa.	L3	12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July-2022

ELECTRICAL CIRCUITS - I

(EEE)

Time: 3 Hours Max. Marks: 60

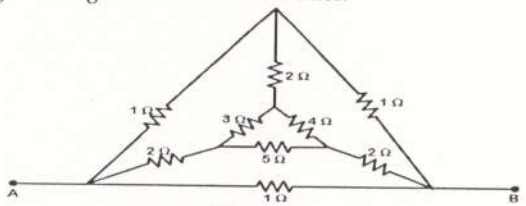
Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1 Derive the expression for Delta connected resistances in terms of Star connected resistances. L2 12M

OR

2 Find the equivalent resistance across the terminals A and B of the network shown in Figure using Star-delta transformation L3 **12M**



UNIT-II

3 Derive the expression for equivalent inductance when the coupled inductors are connected in series aiding and series opposition. L2 12M

OR

4 When two identical coupled coils are connected in series, the inductance of the combination is found to be 80 mH. When the connections to one of the coils are reversed, a similar measurement indicates 20 mH. Find the coupling coefficient between the coils. L3 12M

UNIT-III

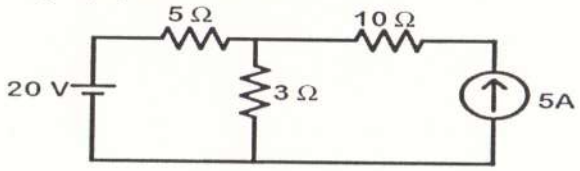
5 A 1kΩ resistor is connected in series with an inductance of 50mH across a 230V, 50Hz AC Supply. Find Inductive reactance,Impedance,Current,Phase angle,Voltage drop across resistance and Voltage drop across Inductance L3 12M

OR

6 A Pure Inductive coil allows a current of 10A to flow from a 230V, 50Hz AC Supply. Find Inductive Reactance, Inductance of the coil, Power Absorbed, Sinusoidal equations for Voltage and Current. L3 12M

UNIT-IV

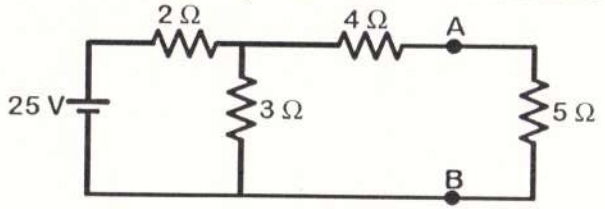
7 Find the current passing through 3Ω Resistor for the circuit shown below figure by using Superposition theorem. L1 12M



Q.P. Code: 19EE0201 R19

OR

8 Determine the Norton's equivalent circuit for the circuit shown in below L3 12M



UNIT-V

9 A series RLC circuit has R=10Ω, L=0.5H and C=40μF. The applied voltage is 100V. Find, L3 12M

- Resonant frequency & Quality factor of a coil
- Bandwidth
- Upper and lower Half power frequencies
- Current at resonance & current at half power points
- Voltage across inductance & voltage across capacitance at resonance

OR

10 Two coils one of R1=0.51Ω, L1=32mH and other coil of R2=1.3Ω, L2=15mH are in series and are connected in series with a capacitor of C1=25μF, C2=62μF and a resistor of R3=0.24Ω. Determine, L3 12M

- Resonant frequency
- Quality factor of the circuit
- Bandwidth

Power dissipated in the circuit at resonance frequency if the supply is 230V AC Supply.

Q.P. Code: 19EE0239 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July-2022

BASIC ELECTRICAL ENGINEERING

(ECE)

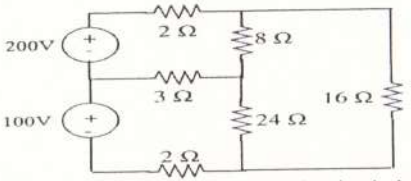
Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	a)	Explain about Ideal and Practical Current sources in detail.	L1	6M
	b)	State and Prove Maximum Power Transfer Theorem	L1	6M

OR

2	a)	 Determine the mesh currents for the circuit shown below.	L4	6M
	b)	State &explain Super position theorem.	L1	6M

UNIT-II

3		Derive the voltage and current relations in three phase balanced circuits for star connection	L2	12M

OR

4	a)	Derive an expression for the voltage and impedance for a series RLC circuit excited by a Sinusoidally alternating voltage.	L2	6M
	b)	A series circuit consisting of a 10Ω resistor, a 100μF capacitor and a 10 mH inductor is driven by a 50 Hz a.c. voltage source of maximum value 100 volts. Calculate the equivalent impedance,Current in the circuit and the phase angle.	L2	6M

UNIT-III

5	a)	The armature of a 6-pole,wave wound D.C generator has 604 conductors. Calculate the generated EMF when the flux per pole is 60mWb and the speed is 250rpm.At what speed, the armature to be driven in order to generate an EMF of 550V,if the flux per pole is reduced to 58mWb	L4	6M
	b)	Define Torque and derive the expression for torque in a D.C. Motor.	L2	6M

OR

6	a)	A 4-pole, 500V, Wave wound D.C shunt motor has 720 conductors on its armature. The full- load armature current is 60A and the flux per poleis 0.03Wb armature resistance is 1.2Ω and the brush contact drop is 1V/brush. Calculate the full-load speed.	L4	6M
	b)	What are the losses occur in a D.C Generator?	L1	6M

UNIT-IV

7	a)	A single-phase 600/230V,50Hz transformer has a core area of 400cm^2 and a maximum flux density of 1.18Wb/m^2.Calculate the number of turns in Primary& Secondary windings.	L4	6M
	b)	Explain about Various losses occurs in a transformer.	L1	6M

Q.P. Code: 19EE0239 R19

OR

8	a)	Write the short notes on Voltage Regulation & Efficiency.	L1	6M
	b)	Compare Core type &Shell type transformer.	L1	6M

UNIT-V

9		Classify cables based on different aspects.	L2	12M

OR

10	a)	What is the necessity of Earthing?	L1	6M
	b)	What is Fuse & explain the principle of operation of Fuse.	L2	6M

Code: 19EE0240 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester (R19) Supplementary Examinations July-2022
BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(CSE)

Time: 3 hours Max.Marks: 60

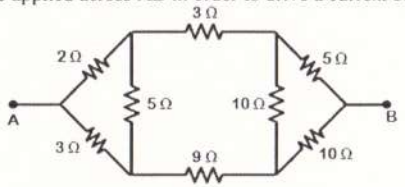
PART-A
(Answer all Three units, 3 x 10 =30 Marks)

UNIT - I

1. Explain the following in detail L2 10M
   i) Resistive networks
   ii) Inductive networks
   iii) Capacitive networks

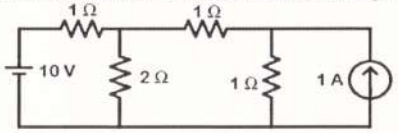
OR

2. Find the voltage to be applied across AB in order to drive a current of 5A into the circuit. L3 10M



UNIT - II

3. a) State Super position theorem. L1 2M
   b) Calculate the current in 20Ω resistor in the given circuit using super position theorem, L3 8M



OR

4. a) Explain in detail about Impedance parameters. L2 5M
   b) Briefly discuss about Admittance parameters. L2 5M

UNIT - III

5. a) Derive EMF equation of a transformer L2 6M
   b) A 100 kVA, 11000/400 V, 50 Hz transformer has 40 secondary turns. Calculate the number of primary turns and primary and secondary currents. L3 4M

OR

6. Explain in detail about various transformer losses. L2 10M

PART- B
(Answer all Three units, 3 x 10 =30 Marks)

UNIT - I

1. Discuss the conduction properties of semiconductors and explain the process of electron hole Pair generation and recombination. L3 10M

OR

2. a) Draw the circuit diagram of a Bridge Rectifier and explain its operation with input and output waveforms. L3 5M
   b) Discuss the operation of full wave rectifier with capacitor filter. L2 5M

UNIT - II

3. a) Explain the functioning of Common Collector Configuration of BJT. State why this arrangement is also called an emitter follower circuit. L3 5M
   b) Compare the characteristics of BJT CB, CE and CC transistor configurations. L2 5M

OR

4. Draw the circuit diagram for a common base circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence. L3 10M

UNIT - III

5. a) Explain about the JFET and draw the construction of JFET L3 5M
   b) Explain the operation of JFET L3 5M

OR

6. a) Explain the construction and principle of operation of N-channel JFET. L3 5M
   b) Define the JFET Volt-Ampere Characteristics and determine FET parameters. L3 5M

Q.P. Code: 18EC0444 **R18**

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July- 2022
DIGITAL ELECTRONICS
(EEE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Write code for 2421.	L2	2M
(b)	With an example explain essential prime implicant.	L1	2M
(c)	Write the comparison between synchronous and asynchronous counter.	L1	2M
(d)	Define Tri-state buffer.	L1	2M
(e)	Write the working of dynamic RAM cell.	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT – I

2.	(a)	Convert the following Decimal to Hexadecimal. (i) 725.25 (ii) 574.35	L3	4 M
	(b)	Simplify the following Boolean functions to minimum number of literals (i) xyz + x′y + xyz′ (ii) xz + x′yz.	L4	6 M
		OR		
3.		Prove with neat sketch why NAND and NOR gates are universal gates.	L3	10M
		UNIT – II		
4.	(a)	Design & implement Half Adder and Full Adder with truth table.	L2	6M
	(b)	Design Full Adder by using two half adders.	L3	4M
		OR		
5.	(a)	Implement the fallowing Boolean function with 8:1 multiplexer. F(A,B,C,D)=πM(0,2,6,10,12,13)	L3	5M
	(b)	Simplify the following expression using the K-map and implement with NAND – NAND logic $Y = \sum m(0,1,3,5)$	L3	5M
		UNIT – III		
6.	(a)	Convert S-R flip flop into JK-flip flop. Draw and explain the logic diagram.	L2	6M
	(b)	Explain below with neat sketch (i) Ring counter (ii) Twisted ring counter	L1	4M
		OR		
7.	(a)	Design MOD-10 Asynchronous counter by using T-Flip flop	L3	6M
	(b)	Explain Parallel in Parallel out Register and Series in Parallel out Register	L2	4M
		UNIT – IV		
8.	(a)	Write the electrical characteristic comparison between TTL, ECL and CMOS	L1	6M
	(b)	Design CMOS NOT gate.	L2	4M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July-2022
ANALOG CIRCUITS
(ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)
   (a) Mention the advantages of Darlington pair amplifier. L1 2M
   (b) Compare the performance of various feedback amplifiers. L4 2M
   (c) In a tuned amplifier, L = 100mH and C= 100pF. Determine its resonant frequency. L1 2M
   (d) List the characteristics of an ideal OPAMP. L1 2M
   (e) What is Sallen-Key Filter? L1 2M

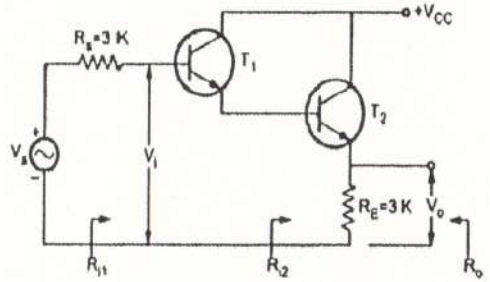
PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2. A BJT has g_m=38mhos, $r_{b'c}$=5.9KΩ ,h_{ic}=6KΩ, $r_{bb'}$=100Ω, $C_{b'c}$=12pF,$C_{b'e}$=63pF and h_{fe}=224 at 1KHz . Calculate α, β, cut off frequencies and f_T Also draw the hybrid pi model of BJT. L3 10M

OR

3. For the circuit shown in Fig. Calculate Ri, Ai, Av and Ro if the h parameters are hie=1.1K Ω , hfe=50, hoe=25μA/V , hre= 2.5×10^{-4} L3 10M



UNIT – II

4. With the help of a neat circuit diagram, discuss Hartley oscillator using BJT and also derive the expression for its frequency of oscillation. L2 10M

OR

5. An amplifier has voltage gain with feedback of 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2%, determine the value of open loop gain A and feedback ratio β. L3 10M

Q.P. Code: 18EC0407 R18

UNIT – III

6. Draw the circuit diagram of push pull class B amplifier and explain its working principle. L1 10M

OR

7. A class A power amplifier has zero signal collector current of 100mA.If the collector supply voltage is 5V, determine a) Maximum a.c power output b) Power rating of transistor c) Maximum collector efficiency. L3 10M

UNIT – IV

8. Draw the circuit diagram of an ideal and practical integrator. Derive the expression for their voltage gain. L2 10M

OR

9. Explain the Schmitt Trigger with neat circuit diagram, input and output waveforms. L2 10M

UNIT – V

10. With a neat diagram of second order high pass active filter, derive the expressions for its transfer function. Also discuss the steps to design a wide band reject filter. L1 10M

11. The basic step of a 9 bit DAC is 10.3 mV. If 000000000 represents 0Volts, what is the output for an input of 101101111? Also discuss R-2R ladder DAC with a suitable diagram. L4 10M

OR

9.	(a)	Explain in detail about TTL to CMOS interfacing	L1	5M
	(b)	Design TTL NAND gate.	L2	5M

UNIT - V

10.	(a)	Compare the three PLA, PAL and PROM.	L1	6M
	(b)	Explain about CAM and CCD.	L2	4M
11.		Implement the following function using PLA $A(x,y,z) = \Sigma m(1,2,4,6)$, $B(x,y,z) = \Sigma m(0,1,6,7)$, $C(x,y,z) = \Sigma m(2,6)$	L4	10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech. II Year II Semester (R18) Supplementary Examinations July 2022
PROBABILITY STATISTICS & NUMERICAL METHODS
(EEE)

Time: 3 hours Max. Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a) If $P(A^c)=\frac{3}{8}$, $P(B^c)=\frac{1}{2}$ *and* $P(A\cap B)=\frac{1}{4}$ *then find* $P\left(\frac{A}{B}\right)$. L1 2M

(b) Define Poisson distribution. L4 2M

(c) If the weights of 6 competitors in a game are 58,62,56,63,55,61 kgs. Then find arithmetic mean of weight of competitors. L1 2M

(d) Construct a forward difference table for the function $y = x^3$ for x = 0, 1, 2, 3, 4, 5. L1 2M

(e) Write the standard five-point formula L1 2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2. Two dice are thrown. Let X assign to each point (a, b) in S the maximum of its numbers i.e., $X(a, b) = \max(a, b)$. Find the probability distribution. X is a random variable with $X(s)=\{1,2,3,4,5,6\}$. Also find the mean and variance of the distribution. L3 10M

OR

3. Probability density function of a random variable X is $f(x)=\begin{cases}\frac{1}{2}\sin x, & for\ 0\le x\le\pi\\ 0, & elsewhere\end{cases}$. Find the mean, mode and median of the distribution and also find the probability between 0 and $\pi/2$. L3 10M

UNIT – II

4. (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 3boys? Assume equal probabilities for boys and girls. L2 6M+
(b) If two dice are thrown five times, then find the probability of getting 7 as sum (i) at least once (ii) $p(1 < x < 5)$. 4M

OR

5. In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find (i) how many students score between 12 and 15. (ii) How many students score above 18? (iii) How many students score below 18? L3 10M

UNIT – III

6. Compute the first four central moments to the following data and also find Sheppard's correction, β_1 and β_2: L1 10M

Class intervals	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	2	8	12	40	20	15	3

OR

7. (i) Calculate correlation coefficient to the following data: L3 5M+

X	10	15	12	17	13	16	24	14	22	20
Y	30	42	45	46	33	34	40	35	39	38

5M

(ii) Obtain the rank correlation coefficient for the following data:

X	48	60	72	62	56	40	39	52	30
Y	62	78	65	70	38	54	60	32	31

UNIT – IV

8. Find a real root of the equation $xe^x - \cos x = 0$ using Newton-Raphson method. L2 10M

OR

9. (i) Compute $\int_0^4 e^x dx$ by Simpson's $\frac{1}{3}$ rule with 10 sub divisions. L2 10M

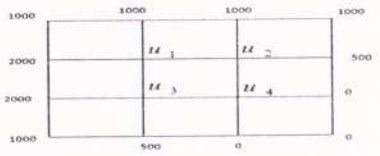
(ii) Compute $\int_3^7 x^2 \log x dx$ using trapezoidal rule and Simpson's rule by taking 10 sub divisions.

UNIT – V

10. Using Taylor's series method find an approximate value of y at x = 0.2 for the D.E $y' - 2y = 3e^x$, $y(0) = 0$. Compare the numerical solution obtained with exact solution. L1 10M

OR

11. Evaluate the function $u(x, y)$ satisfying $\nabla^2 u = 0$ at the pivotal points given the boundary values as follows: L4 10M



Q.P.Code: 18EE0240 R18

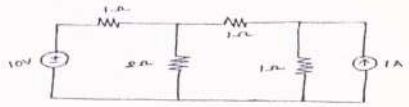
SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Regular Examinations July 2022
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(ME)

Time: 3 hours Max.Marks: 60

PART-A
(Answer all Three units, 3 x 10 =30 Marks)

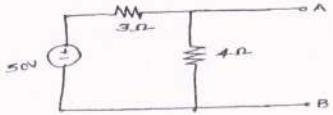
UNIT - I

1.		Explain the following networks		
	(a)	Resistive networks	L1	5M
	(b)	Inductive networks	L1	5M
		OR		
2.	(a)	Explain the Capacitive networks.	L1	5M
	(b)	Define and Explain about ohms law.	L1	5M
		UNIT - II		
3.	(a)	State super position theorem.	L1	2M
	(b)	Calculate the current in 2Ω resistor in the fig. using super position theorem	L1	8M



OR

4.	(a)	State Norton's theorem.		2M
	(b)	Find Norton's equivalent circuit across AB for the circuit shown in below.		8M



UNIT - III

5.	(a)	Derive Torque equation of dc motor.	5M
	(b)	The counter emf of Shunt motor is 227 volts the field resistance is 160Ω and field current 1.5A if the line current is 36.5A find the armature resistance also find armature current when the motor is stationary.	5M
		OR	
6.		A 220Vshunt motor takes a total current of 80A and runs at 800 r.p.m .Shunt field resistance and armature resistance are 50Ω and 0.1Ω respectively. If iron and friction losses amount to 1600W. find (i)Copper losses (ii)Armature torque (iii)Shaft torque (iv)Efficiency.	10M

PART- B
(Answer all Three units, 3 x 10 =30 Marks)

UNIT - I

1.	Explain the operation of forward biased and reverse biased PN junction Diode	10M
	OR	
2.	Briefly explain about avalanche and zener breakdown	10M
	UNIT - II	
3.	Draw and explain the input and output characteristics of a transistor in CE configuration.	10M
	OR	
4.	Derive the expression for AI, AV, Ri and Ro for CB amplifier using h-parameter model.	10M
	UNIT - III	
5.	Explain with the help of neat diagrams, the structure of an N-channel FET and its Volt-ampere characteristics. In what ways it is different from a bipolar transistor	10M
	OR	
6.	Describe the construction and explain the operation of depletion mode MOSFET. Also draw the static characteristics	10M

Q.P. Code: 18EC0408 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July-2022
ANALOG COMMUNICATIONS
(ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.		Answer the following; (5 X 2 = 10 Marks)		
	(a)	Write a short note on external noise sources.	L2	2M
	(b)	Define modulation index	L1	2M
	(c)	Write short notes on Synchronous detection for SSB-SC.	L1	2M
	(d)	Write Shannon's algorith	L1	2M
	(e)	What are the advantages of super heterodyning	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	(a)	Draw the waveforms and spectrum of Amplitude Modulation (AM) for an arbitrary baseband signal x(t).	L2	5M
	(b)	With necessary expressions, Explain single-tone AM.	L2	5M
		OR		
3.	(a)	Derive an expression for SSB-SC wave using the concept of pre-envelope.	L4	6M
	(b)	The total power content of AM signal is 1kW. Determine the power being transmitted at the carrier frequency and each of the sidebands when the %modulation is 100.	L3	4M

UNIT - II

4.	(a)	Expand the expression for FM signal in terms of Bessel functions.	L1	6M
	(b)	Explain the generation of FM using direct method.	L1	4M
		OR		
5.	(a)	Write short note on Pre-Emphasis and De-Emphasis circuits.	L1	6M
	(b)	Explain non-linear effects in FM system	L2	4M

UNIT - III

6.	(a)	Write a short note on external noise sources.	L2	5M
	(b)	Describe thermal noise and shot noise.	L3	5M
		OR		
7.		Obtain the expression for figure of merit of AM(DSB-FC) system.	L3	10M

UNIT - IV

8.	(a)	Explain about frequency division multiplexing	L2	5M
	(b)	Explain about Time division multiplexing	L2	5M
		OR		
9.		With a neat sketch, explain the detection/demodulation of pulse duration modulation	L2	10M

UNIT - V

10.	(a)	Explain the Super-heterodyne FM receiver	L1	5M
	(b)	Describe the disadvantage of Super-heterodyne FM receiver	L1	5M
		OR		
11.	(a)	Write short notes on measures of information and entropy	L3	5M
	(b)	Derive the expression for the condition of maximum entropy	L4	5M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July-2022
FORMAL LANGUAGES AND AUTOMATA THEORY
(CSE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

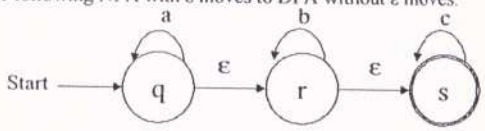
1. Answer the following; (5 X 2 = 10 Marks)

(a)	Write about relations on sets.	L2	2M
(b)	List out the identities of Regular expression.	L1	2M
(c)	State Arden's theorem	L1	2M
(d)	Define Mealy machine and Moore machine	L1	2M
(e)	Define Ambiguous grammar	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2. Convert the following NFA with ε moves to DFA without ε moves. L2 10M

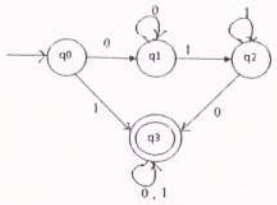


OR

3.	(a)	Design DFA which accepts even number of 0's over {0,1}.	L6	6M
	(b)	Explain Chomsky Hierarchy.	L2	4M

UNIT – II

4.	(a)	Prove R=Q+RP has unique solution, R=QP*	L1	3M
	(b)	Explain about the Arden' theorem, for constructing the RE from a FA with an example	L1	7M



OR

5. Prove that the language L= $\{a^n b^n c^n \mid n>=1\}$ is not regular using pumping lemma. L3 10M

UNIT – III

6.	(a)	Find the parse tree for generating the string 11001010 from the given grammar. S→1B/0A A→1/1S/0AA B→0/0S/1BB	L2	5M
	(b)	Explain about derivation and parse trees? Construct the string 0100110 from the Leftmost and Rightmost derivation. S→0S/1AA A→0/1A/0B B→1/0BB	L2	5M

OR

7.		What is meant by simplifying grammar? Remove the Unit productions from the following Grammar. S→ aSb, S→A, A→cAd, A→cd	L3	10M

UNIT – IV

8.	(a)	Construct a PDA which recognizes all strings that contain equal number of 0's and 1's.	L2	8M
	(b)	A PDA is more powerful than a finite automaton. Justify this statement.	L2	2M

OR

9.		Construct a PDA to accept the language L = $\{a^n b^{2n}, n >= 1\}$ by empty store and final state.	L5	10M

UNIT – V

10.		Explain conversion of regular Expression to TM with example.	L3	10M

OR

11.		Design a Turing Machine to accept the set of all palindrome over {0,1}*. Draw the Trasition diagram for the same.	L2	10M

Q.P. Code: 18EC0409 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B. Tech II Year II Semester (R18) Supplementary Examinations July-2022
PROBABILITY THEORY AND STOCHASTIC PROCESSES
(ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	State Baye's Theorem.	L4	2M
(b)	State Central Limit Theorem?	L4	2M
(c)	Define WSS random process.	L1	2M
(d)	Write some properties of auto Power density Spectrum?	L4	2M
(e)	Write on a brief note on auto correlation function of output response?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT – I

2.	(a)	Define the following with examples. i. Sample space ii. Event iii. Mutually exclusive events. iv. Independent events.	L1	5M
	(b)	Two cards are drawn from a 52-card deck. i. Given the first card is queen, what is the probability that the second is also a queen?	L1	5M
		OR		
3.	(a)	Explain the different types of random variables.	L1	5M
	(b)	Discuss Rayleigh and exponential distribution function.	L1	5M
		UNIT – II		
4.	(a)	Discuss the properties of conditional distribution function.	L4	5M
	(b)	If the joint PDF of two-dimensional random variable (x, y) is given by: $f_{X,Y}(x,y) = 2$; for $0 \le X \le 1, 0 \le Y \le x$ $= 0$; otherwise	L6	5M
		OR		
5.		The joint pdf is given as $fx,y(x,y) = e^{-(2x+y)}$ for $x \ge 0$ and $y \ge 0$. Find (a) the value of A and (b) the marginal density functions.	L6	10M
		UNIT – III		
6.		What is ACF? State and explain the properties of ACF?	L1	10M
		OR		
7.		Explain about first order, second, wide-sense and strict sense stationary process.	L1	10M
		UNIT – IV		
8.	(a)	Briefly explain the concept of cross power density spectrum.	L1	5M
	(b)	Find the cross correlation of functions sin ωt and cos ωt.	L6	5M
		OR		
9.		State and prove properties of PDS	L4	10M
		UNIT – V		
10.	(a)	Derive the relation between PSDs of input and output random process of an LTI system.	L4	5M
	(b)	Discuss about cross correlation between the input X (t) and output Y (t).	L4	5M
11.		Write notes on: (a) Band Pass random process. (b) Band limited random process (c) Narrow band random process.	L1	10M

Q.P. Code: 18EE0207 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July-2022
ELECTRICAL MACHINES-II
(EEE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	What is meant by crawling?	L2	2M
(b)	What are the types of poly phase IM?	L1	2M
(c)	Define slip of induction motor?	L1	2M
(d)	What is Cogging in an induction motor?	L1	2M
(e)	Define load angle and phase angle	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.	Explain Scott Connection or T-T Connection of three phase transformers in detail	L2	10M
	OR		
3.	State and explain the various conditions of parallel operation of three-phase transformers	L4	10M

UNIT – II

4.	Explain the production of rotating magnetic field and prove that resultant flux is equal to 1.5 times of maximum flux with phasor diagrams	L2	10M
	OR		
5.	Explain the equivalent circuit of 3-phase induction motor with schematic diagram and draw phasor diagram	L2	10M

UNIT – III

6.	Explain the procedure to construct circle diagram to find performance characteristics of three phase induction motor.	L2	10M
	OR		
7.	A 3-phase,6-pole,50Hz induction motor takes 60A at full-load speed of 940rpm and develops a torque of 150 N-m. The starting current at rated voltage is 300A. What is the starting torque? If a star/delta starter is used, determine the starting torque and starting current.	L3	10M

UNIT – IV

8.	Explain the principle of operation of synchronous generator and draw its equivalent circuit.	L2	10M
	OR		
9.	Draw the phasor diagram of Salient Pole Synchronous Machine and explain the concept of direct axis reactance and quadrature axis reactance.	L4	10M

UNIT – V

10.	What is meant by synchronization of alternators? Discuss any two methods of synchronization of alternator	L2	10M
	OR		
11.	Briefly discuss about the starting methods of synchronous motor with suitable diagrams	L2	10M

Q.P. Code: 18HS0812

R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July- 2022
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(ECE)

Time: 3 hours

Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Define Elasticity of demand.	L1	2M
(b)	Define Break-even point.	L1	2M
(c)	What is Monopolistic competition?	L1	2M
(d)	What is working capital?	L1	2M
(e)	What is a Balance sheet?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	What is Managerial Economics? Define the scope of Managerial Economics?	L3	10M
	OR		
3.	Define the law of demand. What are their exceptions?	L3	10M

UNIT - II

4.	Define production function and explain it.	L2	10M
	OR		
5.	Explain Iso-quant and Iso-cost curves and state characteristics.	L3	10M

UNIT - III

6.	What are different methods of pricing followed by companies?	L2	10M
	OR		
7.	What is Perfect Competition? Describe its features.	L3	10M

UNIT - IV

8.	The cost of a project is Rs.50,000 which has an expected life of 5 years. The cash inflows for next 5 years are Rs.24,000; Rs.26,000; Rs.20,000; Rs.17000 and Rs.16,000 respectively. Determine the Payback period.	L2	10M
	OR		
9.	Explain the methods of capital budgeting in detail.	L2	10M

UNIT - V

10.	What is meant by Ratio analysis? Explain briefly about various types of ratios	L3	10M
	OR		
11.	What is journal? Give the points of distinction between journal and ledger.	L3	10M

Q.P. Code: 18CS0511

R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July-2022
OBJECT ORIENTED PROGRAMMING
(CSE)

Time: 3 hours

Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Explain the importance of java Bytecode?	L1	2M
(b)	Define class and object?	L4	2M
(c)	What is finally class?	L1	2M
(d)	List two Event Handling Mechanisms?	L1	2M
(e)	What is a socket?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	Explain about the Iteration Statements with an example.	L3	10M

OR

3.	Write a Java program to read and display the array elements.	L3	10M

UNIT - II

4.	a. What is a Class, Method and Object? Write the syntax to define these in java	L2	5M
	b. What is a Constructor? Explain types of Constructors in Java? Write a java program to find the Area of Circle using Constructor.	L2	5M

OR

5.	Write a java program to find the factorial value of the given number using user defined package concept.	L3	10M

UNIT - III

6.	Write a java program to create own exception for NegativeValueException if the user enter negative value.	L1	10M

OR

7.	a. What is a String? Explain different String declarations with an example.	L2	5M
	b. Write a java program to check the given string is palindrome or not	L3	5M

UNIT - IV

8.	Explain about Delegation Event Model in Event Handling with example.	L2	10M

OR

9.	Write a java swing program to find the sum of two numbers	L2	10M

UNIT - V

10.	Write a java program to implement simple client and server program.	L1	10M
11.	Explain about Prepared Statement in JDBC.	L4	10M

Q.P. Code: 18EC0403 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July 2022
SIGNALS & SYSTEMS
(EEE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.		Answer the following; (5 X 2 = 10 Marks)		
	(a)	How the signals are classified?	L1	2M
	(b)	What is Fourier series	L1	2M
	(c)	Define impulse response of a system.	L1	2M
	(d)	What is convolution? State the shift property of convolution.	L1	2M
	(e)	What are the properties of ROC.	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.		What are the basic operations on signals? Illustrate with an example.	L1	10M
		OR		
3.		Explain the classification of signals in both continuous time and discrete time with suitable examples.	L2	10M

UNIT – II

4.		State and Prove any Five Properties of the Fourier Series.	L3	10M
		OR		
5.		State and Prove the properties of Continuous time Fourier transform?	L4	10M

UNIT – III

6.	(a)	Derive the transfer function and impulse response of an LTI system.	L1	5M
	(b)	Define Linear time variant, Linear time-invariant, step response of the system.	L2	5M
		OR		
7.		State and prove the sampling theorem for the band-limited signals with the help of graphical representation.	L1	10M

UNIT – IV

8.	(a)	Derive the relation between convolution and correlation.	L2	5M
	(b)	Write the properties of cross correlation for energy signals	L1	5M
		OR		
9.		Explain the extraction of a signal from noise by filtering.	L3	10M

UNIT – V

10.		State and prove the any five Properties Laplace Transform	L3	10M
11.	(a)	State and prove initial and final value theorems of Z-transform?	L3	5M
	(b)	Using the Properties of Z-transform. Find the Z-transform of following signals	L1	5M

(i) $x(n)=u(-n)$ (ii) $x(n)=2^n u(n-2)$ (iii) $2(3)^n u(-n)$

Q.P. Code: 18HS0803 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester (R18) Supplementary Examinations July-2022
BIOLOGY FOR ENGINEERS
(ECE & CSE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.	Answer the following; (5 X 2 = 10 Marks)			
	(a)	Define the autotrophs & heterotrophs.	L1	2M
	(b)	What is meiosis?	L4	2M
	(c)	What are polysaccharides?	L1	2M
	(d)	Distinguish between DNA and RNA?	L1	2M
	(e)	Define photo systems?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.	(a)	Draw ultra structure of Prokaryotic cell.	L3	5M
	(b)	Compare the characteristics of Prokaryotic and Eukaryotic cell.	L4	5M
		OR		
3.		Draw labeled diagram of Animal cell as seen in Electron microscope. Comment on functions of cell organelles.	L3	10M

UNIT - II

4.		Define gene Interaction. Give brief account on Dominant Epistasis with suitable example.	L2	10M
		OR		
5.		Explain Meiosis with diagrammatic representation.	L3	10M

UNIT - III

6.		Describe the enzyme action and kinetics?	L1	10M
		OR		
7.		Biological classification of amino acids and their importance.	L3	10M

UNIT - IV

8.		Explain about Genetic material of DNA?	L2	10M
		OR		
9.		Discuss the functions & Structure of Proteins?	L2	10M

UNIT - V

10.		Illustrate step by step process in Glycolysis.	L1	10M
		OR		
11.		Write a note on sterilization and various techniques used.	L4	10M

Q.P. Code: 19HS0833 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2022
NUMERICAL METHODS, PROBABILITY & STATISTIC
(CE & ME)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1 Find a positive root of $x^3 - x - 1 = 0$ correct to two decimal places by Bisection method L1 12M

OR

2 From the following table values of x and $y=\tan x$. Interpolate values of y when $x=0.12$ and $x=0.28$. L1 12M

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

UNIT-II

3 Tabulate y(0.1), y(0.2) and y(0.3) using Taylor's series method given that $y^1 = y^2 + x$ and $y(0) = 1$ L6 12M

OR

4 Evaluate $\int_0^1 \frac{1}{1+x} dx$ by i) Trapezoidal rule and Simpson's 1/3rd Rule L5 12M
ii) Simpson's 3/8th Rule

UNIT-III

5 a) Find the median to the following data L1 6M

Class Intervals	40-50	50-60	60-70	70-80	80-90
Frequency	5	12	23	8	2

b) Find arithmetic mean to the following data L1 6M

X	1	2	3	4	5
F	5	8	10	12	6

OR

6 Compute the first four central moments to the following data and also find Sheppard's correction, μ_1 and μ_2 L6 12M

Class Intervals	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	2	8	12	40	20	15	3

UNIT-IV

7 Two dice are thrown. Let X assign to each point (a, b) in S the maximum of its numbers i.e, X (a, b) = max (a, b). Find the probability distribution. X is a random variable with X(s)={1,2,3,4,5,6}. Also find the mean and variance of the distribution. L1 12M

Q.P. Code: 19HS0833 R19

OR

8 a) Define Probability density function. L2 2M

b) A continuous random variable x has the distribution function L6 10M

$$F(x) = \begin{cases} 0, x \le 1 \\ k(x-1)^4, 1 < x \le 3 \\ 0, x > 3 \end{cases}$$

Find the value of k and the probability density function of x.

UNIT-V

9 Out of 800 families with 5 children each, how many would you expect to have L5 12M
(i) 3 boys (ii) 5 girls (iii) either 2 or 3boys iv) At least one boy

OR

10 In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find L6 12M
(i) How many students score between 12 and 15?
(ii) How many students score above 18?
(iii) How many students score below 18?

Q.P. Code: 19EC0401 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

SWITCHING THEORY AND LOGIC DESIGN

(EEE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

		UNIT-I		
1		Explain about Logic gates with symbols and truth tables.	L1	12M
		OR		
2	a)	Simplify the following Boolean functions to minimum number of literals (i) xyz + x'y + xyz'. (ii) xz + x'yz.	L3	6M
	b)	Simplify the following Boolean functions to minimum number of literals: F = ABC + ABC' + A'B	L3	6M
		UNIT-II		
3		Minimize the following Boolean function using K-Map. F(A, B, C, D)= Σm(0, 2, 4, 6, 8, 10, 12, 14).	L2	12M
		OR		
4	a)	Simplify the following expression using the K-map for the 3-variable. Y = AB'C+A'BC+A'B'C+A'B'C'+AB'C'	L3	6M
	b)	Simplify the following Boolean expressions using K-map. F(A, B, C, D)= Σm(1,3,7,11,15)+Σd(0,2,5)	L3	6M
		UNIT-III		
5		What is combinational logic circuit? Give the analysis procedure for combinational logic circuit.	L5	12M
		OR		
6		Design 32:1 Mux using two 16:1 Muxs and one 2:1 Mux	L5	12M
		UNIT-IV		
7		What is Register? Explain i) Parallel in Parallel out Register ii) Series in Parallel out Register	L3	12M
		OR		
8	a)	Draw the logic diagram for D Flip Flop by using SR Flip Flop Explain the operation with truth table.	L1	7M
	b)	Write the differences between combinational and sequential circuits.	L2	5M
		UNIT-V		
9		Explain about Mealy and Moore Models of sequential machines.	L3	12M
		OR		
10		Implement PLA circuit for the following functions. F1(A,B,C)= Σm(3,5,6,7), F2(A,B,C)= Σm(0,2,4,7).	L3	12M

Q.P. Code: 19EC0407 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

ELECTRONIC CIRCUIT ANALYSIS

(ECE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1.		With the help of necessary circuit diagrams and approximations, deduce the expression for CE short circuit current gain and derive the relation between f_β and f_T.	L4	12M

OR

2.	a)	Sketch the Hybrid-Pi model and explain the significance of each and every component in it.	L3	6M
	b)	Deduce the expression for Emitter diffusion capacitance of CE transistor at high frequency.	L4	6M

UNIT-II

3.		Deduce the expressions of Gain, input and output resistances for a Voltage Shunt feedback amplifier.	L4	12M

OR

4.	a)	Explain in detail about basic Amplifiers used in Feedback amplifiers.	L2	6M
	b)	Explain Feedback amplifier topologies with necessary diagram.	L2	6M

UNIT-III

5.	a)	Construct RC phase shift oscillator using BJT and deduce its expression for frequency of oscillations.	L4	6M
	b)	Determine the frequency of oscillations when a RC phase shift oscillator has R=100 kΩ, C=0.01μF and R_C = 2.2 KΩ. Also find the minimum current gain needed for this purpose.	L3	6M

OR

6.		Establish the condition for sustained oscillations for Hartley and Colpitts oscillator with suitable equations.	L3	12M

UNIT-IV

7.		The loudspeaker of 8 Ω is connected to the secondary of the output transformer of a Class A amplifier. The quiescent collector current is 140 mA. The turns ratio of transformer is 3:1. The collector supply voltage is 10 V. If ac power delivered to the loudspeaker is 0.48 W, assuming ideal transformer, Determine (i) AC power developed across primary, (ii) RMS value of load voltage, (iii) RMS value of primary voltage, (iv) RMS value of load current, (v) RMS value of primary current, (vi) DC power input, (vii) efficiency and (viii) power dissipation.	L3	12M

OR

8.	a)	Discuss the stability considerations of a tuned amplifier.	L2	6M
	b)	Compare different types of tuned amplifiers.	L2	6M

UNIT-V

9.		With neat diagram, explain the Emitter Coupled Astable multivibrator, and derive the expression for frequency.	L3	12M

OR

10.	a)	Explain briefly the operation of Bistable multivibrator with neat circuit diagram.	L2	6M
	b)	Compare Astable and Monostable multivibrators.	L4	6M

Q.P. Code: 19HS0836 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

DISCRETE MATHEMATICS

(CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 What is principle disjunctive normal form? Obtain the PDNF of $P \to ((P \to Q) \wedge \neg(\neg Q \vee \neg P))$ and also Obtain PCNF of $(\neg P \to R) \wedge (Q \leftrightarrow P)$ L3 12M

OR

2 a) Define NAND, NOR & XOR and give their truth tables. L3 6M

b) Show that $((P \to Q) \to Q) \Rightarrow P \vee Q$ without constructing truth table. L2 6M

UNIT-II

3 Define Equivalence class. Determine A/R when A = { 1,2,3,4} and let R ={ (1,1),(1,2),(2,1),(2,2), (3,4), (4,3), (3,3) , (4,4)} be an equivalence relation on R ? L3 12M

OR

4 a) Define an equivalence relation? If R be a relation in the set of integers Z defined by $R = \{(x, y) : x \in Z, y \in Z, (x - y) \text{ is divisible by } 6\}$ Then prove that R is an equivalence relation. L2 6M

b) Define a binary relation with an example. Let R be the relation from the set A = {1, 3, 4}on itself and defined by R = { (1, 1), (1, 3), (3, 3), (4, 4)} the find the matrix of R draw the graph of R . L2 6M

UNIT-III

5 a) Applying pigeon hole principle show that if any 14 integers are selected from the set S = {1, 2, 3… 25 } there are at least two whose sum is 26. Also write a statement that generalizes this result L5 6M

b) Find the minimum number of students in a class to be sure that 4 out of them are born on the same month. L5 6M

OR

6 a) A Survey among 100 students shows that of the three ice cream flavors vanilla, chocolate, straw berry. 50 students like vanilla, 43 like chocolate, 28 like straw berry, 13 like vanilla and chocolate, 11 like chocolate and straw berry,12 like straw berry and vanilla and 5 like all of them. Find the following. L5 6M

1. Chocolate but not straw berry
2. Chocolate and straw berry but not vanilla
3. Vanilla or chocolate but not straw berry

b) Out of 80 students in a class, 60 play foot ball, 53 play hockey and 35 both the games. How many students (i) do not play of these games? (ii) Play only hockey but not foot ball L2 6M

UNIT-IV

7 Find the sequence generated by the following generating functions L1 12M

(i) $(2x - 3)^3$ (ii) $\frac{x^4}{1-x}$

Also Find the coefficient of x^{20} in $(x^2 + x^3 + x^4 + x^5 + x^6)^5$?

Q.P. Code: 19HS0836 R19

OR

8 a) Solve the recurrence relation using generating functions L2 6M

$a_n - 9a_{n-1} + 20a_{n-2} = 0$ for $n \geq 2$ and $a_0 = -3, a_1 = -10$

b) Solve the recurrence relation $a_r = a_{r-1} + a_{r-2}$ Using generating function. L3 6M

UNIT-V

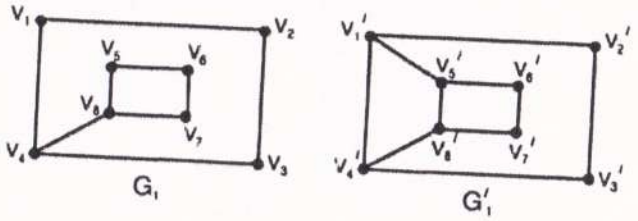
9 (i) Find the chromatic polynomial & chromatic number for $K_{3,3}$ L3 12M

(ii) Define Spanning tree and explain the algorithm for Breadth First Search (BFS) traversal of a graph with suitable example

OR

10 a) Show that in any graph the number of odd degree vertices is even. L3 6M

b) Is the following pairs of graphs are isomorphic or not ? L3 6M



Q.P. Code: 19CE0109 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July 2022

FLUID MECHANICS

(CIVIL ENGINEERING)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1		The space b/w two square parallel plates filled with oil. Each side of the plate is 60 cm. The thickness of oil film is 12.5. The upper plate which moves at 2.5m/sec requires a force 98.1 N to maintain the speed. Determine kinetic viscosity of the oil. If the specific gravity of the oil 0.95 and dynamic viscosity of oil	L2	12M
		OR		
2		Find the volume of water displayed and center of buoyance for a wooden block of width 2.5 m and depth 1.5 m. when it floats horizontally in water. The density of wooden block is 650 kg/m3 and its length is 6m.	L3	12M

UNIT-II

3		Explain about the stream function with definition in Two-dimensional flow and polar co- ordinates. Also write its properties	L3	12M
		OR		
4		A 30 cm dia. pipe conveying water branches into two pipes of dia. 20 cm and 15 cm respectively. If the average velocity in the 30 cm dia. pipe is 2.5 m/s. Find the discharge in this pipe. Also determine the velocity in 15 cm pipe. If the average velocity in 20 cm diameter pipe is 2 m/s.	L3	12M

UNIT-III

5		A vertical wall of 8m in height. A jet of water is carrying out from a nozzle with a velocity of 20 m/s. The nozzle is situated at a distance of 20m from the vertical wall. Find the angle of projection of the nozzle to the horizontal so that the jet of water just clears the top of wall.	L2	12M
		OR		
6		Derive the expression of discharge over a Triangular notch or Weir (V-NOTCH).	L3	12M

UNIT-IV

7		A horizontal pipe line 40m long is connected to the water tank at one end and discharges freely into the atmosphere at the other end. For the first 25 m of its length from the tank pipe is 150mm and its dia is suddenly enlarged to 300mm. the height of water level in the tank is 8m above the center of pipe considering all losses of head which cover occur. Determine the rate of flow. Take f = 0.01, for both sections of the pipe?	L3	12M
		OR		
8		A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of dia 300mm at the rate of 300 lit/s. find the head lost due to friction for a length of 50m of the pipe	L2	12M

UNIT-V

9		Derive the equation for i) velocity distribution and ii) ratio of maximum velocity to average velocity	L3	12M
		OR		
10	a)	Define turbulent flow. What are the causes of turbulent flow	L2	6M
	b)	derive the equation for pressure drop in laminar flow	L2	6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July 2022

ENGINEERING THERMODYNAMICS

(MECHANICAL)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	a)	Describe Pressure, Temperature, Enthalpy and Internal energy.	L2	6M
	b)	Show that work is a path function and not a property.	L1	6M
		OR		
2	a)	Explain Zeroth law of thermodynamics.	L2	6M
	b)	During a heating process, the temperature of a system rises by 10°C. Express this rise in temperature in K, °F, and R.	L1	6M

UNIT-II

3	a)	A tank containing air is stirred by a paddle wheel. The work input to the paddle wheel is 9000 kJ and the heat transferred to the surroundings from the tank is 3000 kJ. Determine : (i) Work done ; (ii) Change in internal energy of the system	L3	6M
	b)	What is Steady Flow Process? Derive Steady Flow Energy Equation(SFEE) for an open system	L1	6M
		OR		
4		Two reversible heat engines A and B are arranged in series."A" rejects heat directly into B". Engine receives 200kJ at a temperature of 421°C from a hot source while engine B is communication with cold sink at a temperature of 44°C.If work output of A is twice that of B. Find(i)The intermediate temperature between A and B. (ii) The efficiency of heat engine.(iii)Heat rejected to cold sink.	L3	12M

UNIT-III

5		A mixture of 2 kg Oxygen and 2 kg Argon is in an insulated piston cylinder arrangement at 100Kpas. 300k. the piston now compresses the mixture to half its initial volume. Molecular weight of oxygen is 32 and for organ is 40. Ratio of specific heats for oxygen is 1.39 and for argon is 1.667.Find the following (i) Final Pressure,(ii)Final temperature, (iii) Piston work.	L3	12M
		OR		
6	a)	10 kg of gas at 10 bar and 400°C expands reversibly and adiabatically to 1 bar. Find the final temperature, work done and change in internal energy.	L3	6M
	b)	Derive the Work done equation for adiabatic process	L2	6M

UNIT-IV

7	a)	Develop the expression for air standard efficiency of an Otto cycle.	L2	6M
	b)	A carnot engine working between 400° C and 40° C produce 130 kJ of work. Determine i) The thermal efficiency. ii) the heat added iii) The entropy changes during the heat rejection process.	L3	6M
		OR		
8	a)	Show the phase equilibrium diagram for a pure substance H-S plot with relevant constant property line.	L1	6M

Q.P. Code: 19ME0305 R19

	b)	A steam at 10 bar and 0.85 dry expands accordingly to the law of $PV^{1.2}$ = Constant to final pressure of 1 bar find the final volume, final enthalpy and final entropy.	L3	6M

UNIT-V

9	a)	Explain the Rankine cycle with PV and TS diagrams.	L2	6M
	b)	A simple Rankine cycle, steam power plant operating between the temperature of 260°C and 95°C. The steam is supplied to the turbine at a dry saturated condition. In the turbine it expands in an isentropic process. Determine the Rankine efficiency.	L3	6M
		OR		
10		In a steam power plant operating on an ideal reheat Rankine cycle, the steam enters the high-pressure turbine at 3 Mpa and 400°C. After expansion to 0.6 Mpa, the steam is reheated to 400°C and then expanded the low pressure turbine to the condensor pressure of 10 kPa. Determine the thermal efficiency of the cycle and the quality of the steam at the oulet of the low pessure turbine.	L3	12M

Q.P. Code: 19EC0446 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July 2022

ANALOG ELECTRONIC CIRCUITS

(EEE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1		Determine the voltage gain, input and output impedance with feedback for voltage series having A=-100, R_i=10kohm, R_o=10kohm for feedback of i) β=-0.1 ii) β=-0.5	L4	12M
		OR		
2	a)	An amplifier has open lop gain 1000 and feedback ration 0.04if the open lop gain changes by 10% due to temperature find the percentage change in gain of the amplifier feedback	L4	6M
	b)	Compare and contrast the various types of feedback amplifiers	L2	6M

UNIT-II

3		Explain Hartley oscillator using BJT and derivethe expression for its frequency of oscillations and condition for sustained oscillations	L3	12M
		OR		
4	a)	Draw the circuit diagram of Colpitts oscillator using BJT and derive theexpression for frequency of oscillations	L2	6M
	b)	Colpitts oscillator is designed with C_1 = 100 pF and C_2 = 7500 pF. The inductance is variable. Determine the range of inductance values, if the frequency of oscillation is to vary between 950 KHz to 2050 KHz	L3	6M

UNIT-III

5	a)	List out the ideal characteristics of an operational amplifier	L1	6M
	b)	An op-amp has a slew rate of 2V/μs. What is the maximum frequency of an output sinusoid of peak value 5V at which the distortion sets in due to the slew rate limitation	L4	6M
		OR		
6	a)	Explain dc characteristics of op-amp	L2	6M
	b)	Define the terms CMRR, common mode gain, differential mode gain and slew rate	L1	6M

UNIT-IV

7		Draw a neat circuit of an integrator circuit. Explain the functioning with the input-output waveforms and derive the output equation	L2	12M
		OR		
8	a)	Draw an Astable multi vibrator using op-amp and explain the operation with waveforms	L2	6M
	b)	Define duty cycle, if Ton =0.6 msec, Toff=0.4 msec calculate percentage of duty cycle	L5	6M

UNIT-V

9		Design a highpass filter at a cut-of frequency of 10kHz with passband gain 1.5 and plot frequency response of this circuit	L3	12M
		OR		
10	a)	Draw and explain in detail about R-2R DAC	L2	6M
	b)	The basic step of a 9-bit DAC is 10.3 mV. If "000000000" represents 0 V. What output is produced if the input is "101101111"?	L5	6M

Q.P. Code: 19EC0408 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2022
ANALOG COMMUNICATIONS
(ECE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1		Draw and explain the function of each block in communication system. Explain the NEED for Modulation.	L2	12M

OR

2	a)	Elucidate Amplitude modulation for single tone information.	L2	6M
	b)	A modulating signal 10 $Sin(2\pi\times10^3t)$ is used to modulate a carrier signal $20sin(2\pi\times10^4t)$. Determine the modulation index, % of modulation index, frequency of sideband components and their amplitudes. What will be the bandwidth of modulated signal?	L2	6M

UNIT-II

3		What is DSB-SC Modulation? Explain the time and frequency domain expressions of DSB-SC wave.	L2	12M

OR

4	a)	Explain how Ring Modulator can be used to generating the DSB-SC wave.	L2	6M
	b)	Consider a resultant wave obtained by adding a non-coherent wave A_C $Cos(2\pi f_c t+\phi)$ to a DSB-SC wave $cos(2\pi f_c t)$ m(t). This composite wave is applied to an ideal envelope detector. Find the resulting detector output. Evaluate this output $\phi=0$.	L4	6M

UNIT-III

5	a)	With the necessary circuit and voltage to frequency characteristics, explain the functionality of balanced slope detector for FM.	L2	6M
	b)	Explain non-linear effects in FM system.	L2	6M

OR

6	a)	Discuss about the transmission bandwidth of FM signal.	L3	6M
	b)	A 107.76MHz carrier signal is frequency modulated by a 7kHz sine wave. The resultant FM signal has a frequency deviation of 50kHz. Determine carrier swing, highest & lowest frequencies of frequency modulated signal, and modulation index of FM wave.	L1	6M

UNIT-IV

7		What is heterodyning? Write about different types of super heterodyne Receivers, list out the advantages of super heterodyning.	L4	12M

OR

8	a)	Discuss about different sources of noise.	L1	6M
	b)	What is meant by narrow band noise and explain time domain representation of narrow-band noise.	L1	6M

UNIT-V

9		With a neat sketch, explain the detection/ demodulation of Pulse Duration Modulation.	L2	12M

OR

10	a)	Explain Entropy, Information rate, Channel capacity theorem, Mutual information.	L5	6M
	b)	Explain Shannon's encoding algorithm.	L1	6M

Q.P. Code: 19CS0509 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

FORMAL LANGUAGES AND AUTOMATA THEORY

(CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	a)	Analyze and explain with example Chomsky Hierarchy.	L4	6M
	b)	Design DFA which accepts language L = {100, 101}.	L6	6M
		OR		
2	a)	Define relations on sets and explain its properties with an example.	L1	6M
	b)	Differences between DFA and NFA with examples.	L4	6M

UNIT-II

3	a)	Convert the given RG to FA. S → aA/bB/a/b A→ aS/bB/b B→ aA/Bs	L3	6M
	b)	Construct an equivalent FA for the given regular expression. 10 + (0 + 11) 0* 1	L6	6M
		OR		
4	a)	Define Regular expressions. List its Applications.	L1	4M
	b)	Compare and prove that the following regular expressions are equivalent. L1 = 1*(011)*(1*(011)*)* L2 = (1+011)*	L4	8M

UNIT-III

5	a)	Describe Simplification of the context free grammar.	L2	6M
	b)	Evaluate simplification of the grammar for the following context free grammar. S→ AaB/aaB A→D B→bbA/ ϵ D→E E→F F→aS	L5	6M
		OR		
6	a)	Remove the unit production from the grammar. S→AB A→E B→C C→D D→b E→a	L3	6M
	b)	Remove ϵ productons from the grammar. S→ABaC A→BC B→b/ ϵ C→D/ϵ D→d	L3	6M

UNIT-IV

7	a)	A PDA is more powerful than a finite automaton. Justify this statement.	L6	6M
	b)	Construct a PDA which recognizes all strings that contain equal number of 0's and 1's.	L6	6M
		OR		
8	a)	State Push Down Automata.	L1	2M
	b)	Construct a NPDA to accept the language L={WW^R / W ∈ (a,b)* }by empty stack and final state.	L6	10M

Q.P. Code: 19CS0509 R19

UNIT-V

9		Construct a Turing machine which multiplies two unary numbers.	L6	12M
		OR		
10	a)	Differentiate PCP and MPCP.	L4	6M
	b)	Find the PCP solution for the following sets.	L5	6M

A	B
10	101
01	100
0	10
100	0
1	010

Q.P. Code: 19ME0306 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July 2022
MANUFACTURING PROCESSES
(ME)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1		Explain the different types of moulding machines with neat sketch and its applications.	L2	12M

OR

2	a)	Discuss the relative advantages and disadvantages of various types of furnaces used in foundry shops	L2	6M
	b)	With neat sketch explain the construction and working of cupola furnace.	L3	6M

UNIT-II

3		With neat sketch explain Electron Beam Welding. Give its advantages and disadvantages	L3	12M

OR

4	a)	Explain briefly how can be metals joined using adhesives.	L2	6M
	b)	Write various fields of applications of adhesives.	L2	6M

UNIT-III

5		Distinguish hot working and cold working processes in metal working	L2	12M

OR

6	a)	With neat sketch explain magnetic pulse forming process	L5	6M
	b)	Write short note on peen forming process.	L2	6M

UNIT-IV

7		What are the secondary finishing operations in powder metallurgy?	L2	12M

OR

8		What are the production processes of metallic powders?	L2	12M

UNIT-V

9		Explain the working principles and application of Injection Moulding	L3	12M

OR

10	a)	What are the major considerations in the design of plastic parts?	L3	6M
	b)	Explain briefly about calendaring with neat sketch	L3	6M

Q.P. Code: 19EE0207 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

ELECTROMAGNETIC FIELDS

(EEE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1	a)	Convert point P (1, 3, 5) from cartesian to cylindrical and spherical co-ordinates system.	L3	6M
	b)	Given the two points A (X=2, Y=3, Z=-1) and B= (r=4, θ=25 and ϕ=120°). Find the spherical co-ordinates of A and Cartesian co-ordinates of B	L2	6M
		OR		
2	a)	Transform the vector field $W=10a_x - 8a + 6a_z$ to cylindrical co-ordinate system at pointP (10, -8, 6)	L3	6M
	b)	Express $B= r^2 a_r + \sin\theta a_\Phi$ in the cartesian co-ordinates. Hence obtain B at P (1,2,3)	L2	6M

UNIT-II

3	a)	State and explain Coulomb's law indicating clearly the units of quantities in the equation of force?	L3	6M
	b)	State and prove Gauss's law and write limitations of Gauss's law?	L3	6M
		OR		
4		Given that $A= 30 e^{-r} a_r - 2 z a_z$ in the cylindrical co-ordinates. Evaluate both sides of the divergence theorem for the volume enclosed by r=2, z=0 and Z=5	L2	12M

UNIT-III

5		Explain the boundary conditions of two perfect dielectrics materials?	L5	12M
		OR		
6		Explain the boundary conditions between conductor and free space?	L5	12M

UNIT-IV

7		Using Biot-savart's law. Find due conductor of finite length?	L3	12M
		OR		
8		Evaluate both sides of the stokes theorem for the filed $H=6xy\, a_x - 3y^2\, a_y$ A/m and the rectangular path around the region $2<x<5$, $-1<y<1$, Z=0. Let the positive direction of d_s be a_z.	L4	12M

UNIT-V

9		Write Maxwell's equation in good conductors for time varying fields and static fields both indifferential and integral form?	L3	12M
		OR		
10		Explain Faraday's law of electromagnetic induction and derive the expression for induced e.m.f?	L3	12M

Q.P. Code: 19EC0409 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

LINEAR & DIGITAL IC APPLICATIONS

(ECE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

		UNIT-I		
1		Obtain the overall gain for an Instrumentation Amplifier and list out its applications.	L3	12M
		OR		
2		Discuss about DC and AC characteristics of an ideal OP-AMP with relevant expressions.	L3	12M
		UNIT-II		
3		Explain the operation of a Free running multivibrator using 555 timer and also solve the expression for frequency of oscillation.	L3	12M
		OR		
4	a)	Draw the circuit of a 1st order low pass Butterworth filter and discuss its transfer functions.	L2	6M
	b)	Explain the principle of operation of RC phase shift oscillator.	L2	6M
		UNIT-III		
5	a)	Interpret CMOS, TTL and ECL logic families.	L5	6M
	b)	Evaluate the output voltage equation for a R-2R DAC.	L5	6M
		OR		
6	a)	Estimate the lock range and capture range for IC 565 PLL.	L5	6M
	b)	Explain about counter type ADC with neat block diagram.	L2	6M
		UNIT-IV		
7		Describe in detail about the design flow model of VHDL.	L1	12M
		OR		
8	a)	Explain the significance of time dimension in VHDL.	L2	6M
	b)	Design the logic circuit and write VHDL program for the following function. $F(X) = \Sigma A, B, C, D (0, 2, 5, 7, 8, 10, 13, 15) + d (1, 6, 11)$.	L3	6M
		UNIT-V		
9		Draw an 8 -bit serial in and serial out shift register and write a VHDL cod for it.	L3	12M
		OR		
10	a)	Illustrate the operation of standard IC for 3X8 decoder with necessary truth table and internal architecture.	L3	6M
	b)	Develop a 8-bit serial in and parallel out shift register.	L3	6M

Q.P. Code: 19CS0510 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2022
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

		UNIT-I		
1		With an example explain about the Iteration Statements	L3	12M
		OR		
2	a)	Define the Java data type. Give the declaration of variable in Java. Write the rules.	L3	6M
	b)	State the Java Selection statements. Give an example to each one.	L2	6M
		UNIT-II		
3		Write a Java program to find the factorial value of the given number using user defined package concept.	L3	12M
		OR		
4		What is an abstract class? Explain all the cases to implement abstract class.	L2	12M
		UNIT-III		
5	a)	What is synchronization? How many types? Explain	L5	6M
	b)	Justify with an example Java program to implement inter thread communication.	L5	6M
		OR		
6	a)	What is Multithreading? Illustrate the ways to create multiple threads in Java.	L5	6M
	b)	Explain about Thread Life Cycle.	L2	6M
		UNIT-IV		
7		Discuss about the File Input Stream and File Output Stream in Java with examples.	L1	12M
		OR		
8	a)	Explain File operations in Java?	L2	4M
	b)	Write a Java Program to read a text file and print the number of unique words.	L3	8M
		UNIT-V		
9		List out the steps for creating simple user Registration form using Java swing with an example.	L3	12M
		OR		
10	a)	Explain Lambda Expression.	L3	8M
	b)	Discuss Functional Interface in Java.	L3	4M

Q.P. Code: 19ME0307 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2022
THEORY OF MACHINES
(ME)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1		A racing car weighs 20 KN. It has a wheel base of 2 m, track width 1 m and height of C.G. 300mm above the ground level and lies midway between the front and rear axle. The engine flywheel rotates ar 300 r.p.m clockwise when viewed from the front. The moment of inertia of the flywheel is 4 kg-m². Find the reactions between the wheels and the ground when the car takes a curve of 75 m radius towards right at 30 km/hr. taking into consideration the gyroscopic and the centrifugal effects. Each wheel radius towards radius is 400 mm.	L3	12M
		OR		
2	a)	A vertical double steam engine develops 75 KN at 250 r.p.m. the maximum fluctuation of energy is 30 percent of the work done per stroke. The maximum and minimum speeds are not to vary more than 1% on either of the mean speed. Find the mass of the fly wheel required if the radius of gyration is 0.6 meters. 5M (b) The radius of gyration of a fly wheel is 1 meter and the fluctuation of speed is not to exceed 1% of the mean speed of the fly wheel. If the mass of the fly wheel is 3340 kg and the steam engine develops 150 KW at 135 r.p.m. then find 1) Maximum fluctuation of energy, and 2) Coefficient of fluctuation of energy.	L2	6M
	b)	The radius of gyration of a fly wheel is 1 meter and the fluctuation of speed is not to exceed 1% of the mean speed of the fly wheel. If the mass of the fly wheel is 3340 kg and the steam engine develops 150 KW at 135 r.p.m. then find 1) Maximum fluctuation of energy, and 2) Coefficient of fluctuation of energy.	L2	6M

UNIT-II

3	a)	A single plate clutch, effective on both sides, is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner radii of a frictional surface if the coefficient of friction is 0.255, the ratio of radii is 1.25 and the maximum pressure is not to exceed 0.1 N/mm². Also determine the axial thrust to be provided by springs. Assume the theory of uniform wear.	L3	6M
	b)	Explain the working of a single-plate clutch with neat sketch.	L1	6M
		OR		
4	a)	Describe with sketches one form of torsion dynamometer and explain in detail the calculations involved in finding the power transmitted.	L1	6M
	b)	A torsion dynamometer is fitted to a propeller shaft of a marine engine. It is found that the shaft twists 2° in a length of 20 metres at 120 r.p.m. If the shaft is hollow with 400 mm external diameter and 300 mm internal diameter, find the power of the engine. Take modulus of rigidity for the shaft material as 80 GPa.	L2	6M

Q.P. Code: 19ME0307 R19

UNIT-III

5	a)	Derive the expression for Porter governor.	L1	6M
	b)	Calculate the vertical height of a Watt governor when it rotates at 60 r.p.m. Also find the change in vertical height when its speed increases to 61 r.p.m.	L5	6M
		OR		
6		A Porter governor has all four arms 250 mm long. The upper arms are attached on the axis of rotation and the lower arms are attached to the sleeve at a distance of 30 mm from the axis. The mass of each ball is 5 kg and the sleeve has a mass of 50 kg. The extreme radii of rotation are 150 mm and 200 mm. Determine the range of speed of the governor.	L5	12M

UNIT-IV

7		A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.	L5	12M
		OR		
8	a)	Derive the following expression of effects of partial balancing in two-cylinder locomotive engine (i) Variation of attractive force (ii) Swaying couple (iii) Hammer blow	L2	6M
	b)	Differentiate 'static balancing' and 'dynamic balancing'. State the necessary conditions to achieve them.	L2	6M

UNIT-V

9		The measurements on a mechanical vibrating system show that it has a mass of 8 kg and that the springs can be combined to give an equivalent spring of stiffness 5.4 N/mm. If the vibrating system have a dashpot attached which exerts a force of 40 N when the mass has a velocity of 1 m/s, find: 1. critical damping coefficient, 2. damping factor, 3. Logarithmic decrement, and 4. ratio of two consecutive amplitudes.	L5	12M
		OR		
10	a)	Derive the natural frequency of Free Transverse Vibrations by (i) Rayleigh's method (ii) Dunkley's method.	L2	6M
	b)	A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m2 Determine the frequency of longitudinal and transverse vibrations of the shaft.	L5	6M

Q.P. Code: 19EE0208 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

ELECTRICAL MACHINES-II

(EEE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1	a)	Describe briefly the working principle of slip ring induction motor. Explain how its speed control is effected.	L2	8M
	b)	Explain the speed torque characteristics of a 3-phase induction motor.	L2	4M
		OR		
2		A 4 pole, 3-phase induction motor operates from a supply whose frequency is 50Hz. Calculate. i) the speed at which the magnetic field of the stator is rotating. ii) the speed of the rotor when the slip is 0.04 iii) the frequency of the rotor currents when the slip is 0.03 iv) the frequency of the rotor currents at standstill. v) speed of the rotor when the slip is unity.	L4	12M

UNIT-II

3	(a)	List various starting methods of three phase induction motors. Explain any one method in detail.	L3	6M
	(b)	A cascaded set consists of 2 motors 4-pole and 6-poles respectively. The Supply frequency is 50 Hz, While the frequency in rotor circuit of 6 pole motor s 1Hz. Determine the slip of each machine and combined speed of the set.	L2	6M
		OR		
4	a)	Write short notes on Injection of emf into the rotor circuit to control speed.	L2	6M
	b)	Summarize the procedure to construct the circle diagram of a 3-phase induction motor.	L2	6M

UNIT-III

5	a)	Derive the emf equation of an alternator.	L2	6M
	b)	A 3-phase, 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. It is driven at 375 rpm. The line value of emf available across the terminals is observed to be 2.657KV. Find the frequency of the induced emf and flux per pole.	L4	6M
		OR		
6		Draw the phasor diagram of Salient Pole Synchronous Machine and explain the concept of direct axis reactance and quadrature axis reactance.	L3	12M

UNIT-IV

7		Write a short note on i) Synchronous Condenser ii) Hunting and elimination of hunting	L2	12M
		OR		
8	a)	Explain the principle of operation of a synchronous motor.	L2	6M
	b)	Compare between synchronous motor and 3-phase induction motor.	L2	6M

Q.P. Code: 19EE0208 R19

UNIT-V

9		Explain the working operation of universal motor and list out the applications.	L2	12M
		OR		
10	a)	Explain the phasor Diagram of A.C Series Motor.	L2	6M
	b)	A 220V,500W,50Hz series motor has a total resistance of 2Ω and total reactance of 20 Ω. The full load stray losses and speed are 40W and 500r.p.m. Determine the current taken by the motor and power factor at rated load.	L4	6M

Q.P. Code: 19EC0410 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(ECE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1	a)	State and explain Coulomb's law. Obtain an expression in vector form	L2	6M
	b	Three Point Charges Q_1=1 mc, Q_2=2 mc and Q_3=-3 mc are respectively located at (0,0,4), (-2,6,1) and (3,-4,-8). Calculate the electric force and electric field on Q_1 due to Q_2 and Q_3.	L3	6M

OR

2	a)	State and explain Gauss law. Find electric field intensity at a distance 'r' from an infinite line charge using Gauss law	L3	6M
	b)	Two point charges, QA = +8 μC and QB = -5 μC, are separated by a distance r = 10 cm. What is the magnitude of the electric force between them?	L3	6M

UNIT-II

3	a)	Determine the Magnetic Flux Density due to Infinite Sheet of Current.	L5	6M
	B)	A Positive Y-axis (Semi Infinite Line with respect to the Origin) Carries a Filamentary Current of 2 A in the -ay Direction. Assume it is part of a large circuit. Find H at (i) A(2,3,0). (ii) B(3,12,-4).	L3	6M

OR

4	a)	Explain about Non-Existence of Magnetic Mono pole.	L2	6M
	b)	A Current Distribution gives rise to the vector potential $A= X^2Ya_x+Y^2Xa_y+XYZa_z$ web/m. Calculate B.	L2	6M

UNIT-III

5	a)	Explain Faraday's law of electromagnetic induction and derive the Expression for Induced EMF.	L2	6M
	b)	Prove that one of the Maxwell's equation is $\nabla \times E = -dB/dt$	L5	6M

OR

6	a)	Prove that one of the Maxwell's equation is $\nabla \times H = J_d + J$.	L5	6M
	b)	An antenna radiates in free space and E= 80 cos(500t-8z)ax V/m. Calculate ω and β.	L2	6M

UNIT-IV

7	a)	Discuss about pointing theorem and poynting vector.	L6	6M
	b)	In lossless medium $\eta = 40\pi, \mu_r = 1$, H=2 cos (ωt - z) $\hat{a}_x$+5sin (ωt - z) $\hat{a}_y$.Find ε_r the medium.	L3	6M

OR

8	a)	Determine the expression for intrinsic impendence and propagation constant in a good conductor.	L2	6M
	b)	Given that $E=40\cos(10^8t - 3x)\,a_y v/m$, Determine the direction of wave propagation, velocity of the wave, wave length.	L3	6M

Q.P. Code: 19EC0410 R19

UNIT-V

9	a)	Evaluate the equation for voltage and current at any point in a transmission line.	L5	6M
	b)	A 50Ω lossless transmission line is terminated on a load impedance of Z_L =(25 + j 50)Ω. Use the smith chart to find. i) Voltage reflection coefficient. ii) VSWR.	L3	6M

OR

10	a)	Explain about the smith chart for finding the SWR and Reflection co-efficient.	L2	6M
	b)	List out the applications of smith chart?	L1	6M

Q.P. Code: 19CS0511

R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

OPERATING SYSTEMS

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1		List the different functions of an operating system and discuss the various services provided by an operating system.	L4	12M
		OR		
2	a)	What is operating system? Explain multiprogramming and time-sharing systems.	L1, L2	6M
	b)	Discuss briefly about User and Operating System Interface.	L6	6M

UNIT-II

3		Build SJF , Priority CPU Scheduling algorithms for given Problem:	L3	12M

Process	P1	P2	P3	P4
Process Time	8	4	9	5
Priority	3	2	4	1

OR

4	a)	With a neat sketch explain process state diagram.	L3	6M
	b)	Illustrate the criteria for evaluating the CPU scheduling algorithm.	L2	6M

UNIT-III

5	a)	List various methods for handling deadlock.	L4	6M
	b)	Explain how to recover from deadlock.	L2	6M
		OR		
6	a)	Write about deadlock and starvation.	L3	6M
	b)	Write about semaphore	L2	6M

UNIT-IV

7		Given page reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm.	L5	12M
		OR		
8	a)	What is virtual memory? Discuss the benefits of virtual memory techniques.	L1	6M
	b)	Write a short note on Disk management.	L3	6M

UNIT-V

9		Determine basic concepts of cryptography with examples.	L5	12M
		OR		
10	a)	Explain about access method with Example.	L2	6M
	b)	List various types of file operations.	L4	6M

Q.P. Code: 19CS0551 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2022
JAVA PROGRAMMING
(Common to EEE, ME, ECE & CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

		UNIT-I		
1		What is an Operator? Explain type of operators in Java with example programs.	L3	12M
		OR		
2	a)	Explain History and Evolution of Java.	L1	8M
	b)	What is Byte Code? Interpret the different states of Java Program execution.	L1	4M
		UNIT-II		
3		Discuss about the static, final keywords with an example.	L1	12M
		OR		
4	a)	Create a java program to display "Hello! Java" using Class, Object and Method.	L1	6M
	b)	Give the differences between Abstract class and Interface	L2	6M
		UNIT-III		
5		Explain Exception handling fundamentals	L2	12M
		OR		
6		Contract in detail about throw and throws statements with examples	L1	12M
		UNIT-IV		
7		What is Multithreading? What are the ways to create multiple threads in java.	L1	12M
		OR		
8	a)	Define String? Explain different String declarations with an example	L2	6M
	b)	Write a java program to check the given string is palindrome or not.	L1	6M
		UNIT-V		
9		Explain about Delegation Event Model in Event Handling with example.	L2	12M
		OR		
10	a)	Difference between AWT and Swings.	L1	6M
	b)	Create a java swing program implement Border Layout.	L2	6M

Q.P. Code: 19CE0143 R19

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2022
FUNDAMENTALS OF URBAN PLANNING
(Common to EEE, ME, ECE & CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

		UNIT-I		
1		Draw a neat sketch of Prastara type town plan and mention various places in it	L3	12M
		OR		
2	a)	What are the various principles of town planning?	L1	8M
	b)	Elucidate the necessity for town planning in detail.	L1	4M
		UNIT-II		
3		What is rural planning? Explain in detail	L1	12M
		OR		
4	a)	Write a brief note on Urban Planning and International Planning?	L1	6M
	b)	Explain about functional survey?	L2	6M
		UNIT-III		
5		Explain in detail about various causes and effects of slum formation	L2	12M
		OR		
6		Illustrate various process involved in prevention of slum formation.	L1	12M
		UNIT-IV		
7		Mention the categories in which the public buildings are generally group	L1	12M
		OR		
8	a)	Explain various responsibility of a building owner	L2	6M
	b)	What are the applicability of Bye-law to gasoline cum service station	L1	6M
		UNIT-V		
9		Discuss in detail about the advantages & disadvantages of traffic signals	L2	12M
		OR		
10	a)	Draw the neat sketches of traffic islands for the road junctions with four streets.	L1	6M
	b)	Explain, with the help of neat sketches, various arrangements of the street lights.	L2	6M

Q.P. Code: 18EC0451 **R18**

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July-2022
DATA COMMUNICATION AND NETWORKING
(ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.		Answer the following; (5 X 2 = 10 Marks)		
	(a)	List out the advantages of star topology.	L1	2M
	(b)	Examine the access method used by wired Lan and Wireless Lan.	L4	2M
	(c)	Expand ICMP and write the function	L1	2M
	(d)	Differentiate IMAP and POP.	L1	2M
	(e)	Explain the need of using internet devices and Protocols?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT - I

2.	a)	Explain the various forms in which data's can be represented?	L2	3M
	b)	Describe the working of various topologies with its advantages and disadvantages.	L3	7M
		OR		
3.	a)	Discuss the principle of Protocol layering.	L3	5M
	b)	Give comparison between LAN, MAN, WAN.	L1	5M
		UNIT - II		
4.	a)	Define Ethernet in wired LANs. Write down the name of different generations of Ethernet.	L2	5M
	b)	Sketch a diagram of Ethernet frame & explain all the parts.	L4	5M
		OR		
5.	a)	Explain the services of WiMAX.	L3	5M
	b)	Draw a WiMAX frame & define all the parts.	L4	5M
		UNIT - III		
6.		Explain IP Datagram format with proper diagram.	L1	10M
		OR		
7.	a)	Describe in detail the working of ARP protocol.	L3	4M
	b)	Describe in detail the working of RARP protocol.	L3	6M
		UNIT - IV		
8.		Explain the architecture and services of e-mailing system.	L2	10M
		OR		
9.	a)	Discuss the working of frame relay.	L2	5M
	b)	Describe the architecture of ATM.	L3	5M
		UNIT - V		
10.		Write short notes on 1. Connecting devices 2. Routers	L1	10M
		OR		
11.	a)	Discuss about the basic threats in network security.	L4	5M
	b)	Explain in detail about the firewall.	L2	5M

Q.P. Code: 18CS0522

R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July 2022
SOFTWARE ENGINEERING
(Computer Science Engineering)

Time: 3 hours

Max.Marks: 60

PART-A
(Compulsory Questions)

1.		Answer the following; (5 X 2 = 10 Marks)		
	(a)	List out the characteristics of the Software?	L2	2M
	(b)	What different points of view can be used to describe the Requirements Model?	L1	2M
	(c)	Define Cohesion and Coupling?	L1	2M
	(d)	Give the golden rules in Interface Design?	L2	2M
	(e)	Compare Validation Testing with Verification Testing?	L4	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.		Explain about Waterfall and Incremental Process models with examples?	L5	10M
		OR		
3.	(a)	What is the difference between a Unified Process (UP) phase and UP workflow?	L1	5M
	(b)	Illustrate any two Agile Process Models?	L2	5M

UNIT – II

4.		Construct Class based Modeling with an example?	L3	10M
		OR		
5.		Explain about Eliciting requirements in Software Requirements gathering?	L2	10M

UNIT - III

6.		Why is quality so important in Software Design? Write and explain the characteristics of a good design? Explain?	L4	10M
		OR		
7.	(a)	How to identify Architectural Patterns?	L3	5M
	(b)	Discuss briefly about Architectural Design?	L6	5M

UNIT - IV

8.		Examine the elements of Interface Analysis with examples?	L4	10M
		OR		
9.		What are Quality attributes of WebApp Design and discuss the set of Design goals in WebApp?	L1 L6	10M

UNIT - V

10.	(a)	Write a short notes on Black box Testing?	L3	5M
	(b)	How to test Specialized environments, Architectures and Applications?	L3	5M
		OR		
11.		Explain about the importance of Test strategies in Conventional Software?	L5	10M

Q.P. Code: 18EC0419

R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July 2022
ANTENNAS AND WAVE PROPAGATION
(ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	Define Directivity of an antenna	L1	2M
(b)	What are the advantages of Yagi-Uda antenna?	L1	2M
(c)	What is the need for antenna measurements?	L1	2M
(d)	What are the advantages of Antenna arrays?	L1	2M
(e)	Draw the structure of Ionosphere and name its regions.	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.	(a)	Explain Radiation Intensity and Antenna Gain.	L2	5M
	(b)	Write short notes on Radiation Pattern and Beam Efficiency	L1	5M
		OR		
3.		Derive expression for Electric and Magnetic Field radiated by Half Wave Dipole and Sketch its Field Strength pattern.	L3	10M

UNIT – II

4.	(a)	Explain the types & characteristics of horn antenna.	L2	5M
	(b)	Explain about the helical antenna geometry, axial mode of radiation and its applications.	L2	5M
		OR		
5.	(a)	Write short notes on Horn antenna.	L1	3M
	(b)	Design Yagi-Uda antenna of six elements to provide a gain of 12dB if the operating frequency is 200 MHz.	L6	7M

UNIT – III

6.	(a)	Write the advantages and limitations of micro strip antennas.	L1	4M
	(b)	Explain Gain measurement by direct comparison method.	L1	6M
		OR		
7.	(a)	Explain about the Reciprocity with respect to antenna measurements.	L5	5M
	(b)	Explain the effect between variation of focal length position and radiation in paraboloid.	L2	5M

UNIT – IV

8.		Derive the expression for far field pattern of an array of two isotropic point sources at equal amplitude& same phase.	L4	10M
		OR		
9.		Explain End fire array with increase directivity and derive the directivity equation	L5	10M

UNIT – V

10.		Explain the Structure of Ground wave propagation with neat sketch.	L5	10M
		OR		
11.	(a)	Explain Virtual height and its significance.	L5	4M
	(b)	Explain Skip distance and derive its expression.	L5	6M

Q.P. Code: 18ME0321 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July-2022
METROLOGY & MEASUREMENTS
(ME)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	What is Taylor's principle?	L1	2M
(b)	what is mean by wringing process of slip gauge	L4	2M
(c)	Name the various types of errors in gears	L1	2M
(d)	What is transducer?	L1	2M
(e)	What is Seebeck Effect?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2. Define fit? With neat sketch describe three types of fits. L3 10M

OR

3. Between two mating parts of 100 mm basic size, the actual interference fit is to be from 0.05mm to 0.12mm. The tolerance for hole is the same as the tolerance for the shaft. Find the size of the shaft and the hole on (a) hole basis unilateral system b) Shaft basis unilateral system. L3 10M

UNIT – II

4. Construct in detail the working of the Sine Bar to measure unknown angle L2 10M

OR

5. Express the following methods of qualifying surface roughness: L3 10M

(a) Ra value. (b) RMS value. (c) Rz value.

UNIT – III

6. Sketch and explain working and application of versatile instrument of toolmakers microscope L1 10M

OR

7. With the help of an illustration, explain any four alignment tests on lathe L3 10M

UNIT – IV

8. List out Displacement transducers? Explain inductive transducer with suitable sketch. L2 10M

OR

9. What is the principle of strain gauge? Explain the method of usage for measurement of strains. L2 10M

UNIT – V

10. Sketch a Mcleod gauge and explain working principles. Describe applications and limitations. L1 10M

OR

11. What are the basic methods of force measurement? Elaborate elastic force devices with neat sketch L4 10M

Q.P. Code: 18CS0523 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July 2022
WEB TECHNOLOGIES
(CSE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.		Answer the following; (5 X 2 = 10 Marks)		
	(a)	List out the basic Internet Protocols	L1	2M
	(b)	What are the six JavaScript data types?	L2	2M
	(c)	What is DOM?	L3	2M
	(d)	How is XML parsing done with SAX?	L2	2M
	(e)	What are Web Services?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.		State the types of lists supported by HTML and explain the lists with necessary attributes. Write the html code to print nested lists	L2	10M
		OR		
3.	(a)	Discuss about HTTP Request-Response Message?	L1	5M
	(b)	Discuss about Working with Links and URLs with example.	L6	5M

UNIT - II

4.		What is CSS? List out the various properties. Explain the various concepts of CSS properties with neat example	L2	10M
		OR		
5.		Define Function in JavaScript. Write a program using functions with arguments.	L1	10M

UNIT - III

6.		Describe the servlet architecture and Execution of servlet for the program to display a welcome message on the client system.	L1	10M
		OR		
7.	(a)	Difference between Generic Servlet and HTTP Servlet	L2	5M
	(b)	Describe DOM Event handling	L1	5M

UNIT - IV

8.		Write a php program to check the user credentials, whether they are correct are not. If the credentials are correct then the user will be redirected to another page	L6	10M
		OR		
9.		Write a Java servlet Program to implement the Book Information using JDBC.	L3	10M

UNIT - V

10.	(a)	What is the difference between XML HTTP Request and AJAX ?	L1	5M
	(b)	Discuss the security issues of AJAX.	L2	5M
		OR		
11.		Explain the method of creating a web service client with an example.	L2	10M

Q.P. Code: 18EC0420

R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July-2022
MICROPROCESSORS & MICROCONTROLLERS
(ECE&EEE)

Time: 3 hours

Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

a)	List out some examples of high level languages	L1	2M
b)	Give the function of timing and control unit of 8085 microprocessor	L1	2M
c)	Draw the configuration of TCON register	L1	2M
d)	Classify addressing modes of 8051 μC	L1	2M
e)	What is matrix keypad and give its use	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.	a.	Draw the block diagram of microcomputer and explain function of each block	L2	5M
	b.	Define microprocessor. Explain the brief history of evolution of μP	L2	5M

OR

3.	a.	Compare RAM and ROM memories	L2	5M
	b.	What is the need of memory? And classify different types of memory	L2	5M

UNIT – II

4.	a.	List out the important features of 8085 microprocessor	L1	5M
	b.	Sketch neat block diagram of 8085 microprocessor	L2	5M

OR

5.	a.	Explain the requirement of a program counter, stack pointer & ALU in 8085μP	L3	5M
	b.	Draw and define the flags in 8085μp	L2	5M

UNIT – III

6.	a.	Define register. Mention the need of registers in μP or μC	L2	5M
	b.	Draw the flag register of 8051 μC and describe the functionality of each flag in detail	L2	5M

OR

7.		With the help of a neat block diagram, Explain the internal architecture of 8051 microcontroller in detail	L2	10M

UNIT – IV

8.	a.	Explain the difference between Jump and Call operations	L2	5M
	b.	Explain the logical Instructions of 8051 μC with an example	L2	5M

OR

9.		Write an assembly program of 8051 μC to multiply two 8-bit numbers and store the result in a memory location	L4	10M

UNIT – V

10.	a.	Write a short notes on7-Segemnt display	L2	5M
	b.	With the help of a neat diagram, show the interfacing of ADC 0808 with 8051 μC and explain its operation.	L3	5M

OR

11.		Design and explain any microcontroller-based system	L4	10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July 2022
MICROWAVE THEORY & TECHNIQUES
(ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.	Answer the following; (5 X 2 = 10 Marks)			
	(a)	Mention any two applications of Microwaves	L1	2M
	(b)	What is a Gyrator	L1	2M
	(c)	What is a waveguide attenuator and why it is used	L1	2M
	(d)	Differentiate between O-type and M-type Microwave tubes	L1	2M
	(e)	What is the difference between thermistor and baretter	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT – I

2.	a)	Mention the various Power Losses that occur during transmission of waves in Rectangular Guide	L2	4M
	b)	A 600 Ohm transmission line is fed by a 50 Ohm generator. If the line is 100m long and terminated by load of 500 Ohm, Determine (i) reflection loss, (ii) transmission loss and (iii) return loss (in dB)	L5	6M

OR

3.		Show that Wavelengths and Impedance of the field are related to cut off frequency in transverse Magnetic (TM) waves .	L5	10M

UNIT – II

4.	a)	Derive TE mode field expressions for propagation in Circular Waveguide	L5	6M
	b)	Discuss about the excitation modes in circular waveguides	L2	4M

OR

5.		Prove that Transverse Electric(TM)waves propagate through rectangular waveguides	L6	10M

UNIT – III

6.		Explain the operation of Two hole Directional Coupler and Derive its S-matrix	L2	10M

OR

7.	a)	With a neat sketch explain the principle of waveguide phase shifter	L2	5M
	b)	The coupling factor and isolation of a lossless, symmetric directional coupler are 8dB and 20dB respectively. Determine the scattering matrix of the directional coupler. Also determine the directivity of the device?	L5	5M

Q.P. Code: 18EC0428 R18

UNIT – IV

8.		With the neat sketch discuss on the velocity modulation process of two cavity Klystron tube.	L2	10M

OR

9.		Deduce the expression for magnetic and voltage expression for cylindrical magnetron for field condition $B_0 < B_{0C}$ with the help of neat sketch of cylindrical magnetron.	L2	10M

UNIT – V

10.	a)	Write about the method of measuring the VSWR(S>10) using the block diagram.	L2	5M
	b)	With the block diagram explain the measurement of Quality factor (Q) using slotted line method	L2	5M

OR

11.		Mention the two methods of the microwave frequency measurement and explain them with a diagram.	L2	10M

Q.P. Code: 18CS0517 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July 2022
PYTHON PROGRAMMING
(CE, EEE, MECH & ECE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1.		Answer the following; (5 X 2 = 10 Marks)		
	(a)	How to take input from user in python?	L1	2M
	(b)	Write syntax of for loop with example.	L4	2M
	(c)	What does the "self" keyword do?	L1	2M
	(d)	What is an exception? Give an example.	L1	2M
	(e)	What does file handling mean?	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT - I

2.	(a)	Write history of Python.	L3	5M
	(b)	List features and applications of Python.	L2	5M
		OR		
3.	(a)	Define Variable and mention rules for choosing names of Variable.	L3	5M
	(b)	What is Set? Explain set Operations.	L1	5M
		UNIT - II		
4.		Summarize Control flow structures in python.	L2	10M
		OR		
5.	(a)	Write a Python program to find sum of natural numbers.	L3	5M
	(b)	Discuss the assignment and bitwise operators supported in Python.	L2	5M
		UNIT - III		
6.	(a)	Discuss about key word arguments with example.	L1	5M
	(b)	Distinguish global and local variables with example.	L2	5M
		OR		
7.		What is inheritance? Illustrate types of inheritance with python code.	L3	10M
		UNIT - IV		
8.		Summarize the different types of Exceptions in Python.	L2	10M
		OR		
9.		Describe about Handling Exceptions in detail with examples.	L2	10M
		UNIT - V		
10.	(a)	Discuss about maps in python.	L2	5M
	(b)	Discuss about filters in python.	L2	5M
		OR		
11.		Express about Mathematics functions in python.	L4	10M

Q.P. Code: 18CE0127 R18

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July 2022
ELEMENTS OF ROAD TRAFFIC SAFETY
(ME, ECE, EEE & CSE)

Time: 3 hours Max.Marks: 60

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

(a)	What are the preventive measures for accidents?	L1	2M
(b)	Describe traffic congestion.	L2	2M
(c)	What are the types of road safety signs?	L1	2M
(d)	What are the different signals used to guide pedestrians?	L1	2M
(e)	What is longitudinal marking?	L2	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)

UNIT - I

2.		Give a detailed discussion about Accident situation in India with past accident data?	L2	10M
		OR		
3.	a)	Give the detailed notes on cost of road accidents?	L2	5M
	b)	Apply your knowledge to suggest the preventive measures of road accidents by cyclist.	L4	5M

UNIT - II

4.	a)	Give the discussion about Regulation of speed at night.	L2	3M
	b)	Discuss about various Speed limits in rural and urban areas.	L2	7M
		OR		
5.		Briefly explain the various traffic regulatory measures that should be considered for On-street Parking.	L2	10M

UNIT - III

6.	a)	Why traffic signing requires International standardization?	L2	5M
	b)	Briefly explain about traffic signs situation in India.	L2	5M
		OR		
7.		What do you know about Informatory signs and Route marker signs with neat sketch?	L1	10M

UNIT - IV

8.	a)	What is meant by Signal Face, explain it with neat sketch?	L1	6M
	b)	Explain the concept of illumination of signals with specifications.	L2	4M
		OR		
9.		List out various Traffic control methods & explain any four of them in detail.	L3	10M

UNIT - V

10.	a)	Explain briefly about commonly used Materials and Colours in road markings.	L2	5M
	b)	Briefly explain about stop lines with neat sketch.	L2	5M
		OR		
11.		Briefly explain about various types of Lamps used in street lighting in view of road traffic safety at night time on roads.	L2	10M

Q.P. Code: 18ME0319 **R18**

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester (R18) Supplementary Examinations July-2022
DESIGN OF MACHINE ELEMENTS-II
(Mechanical Engg.)

Time: 3 hours Max.Marks: 6

PART-A
(Compulsory Questions)

1. Answer the following; (5 X 2 = 10 Marks)

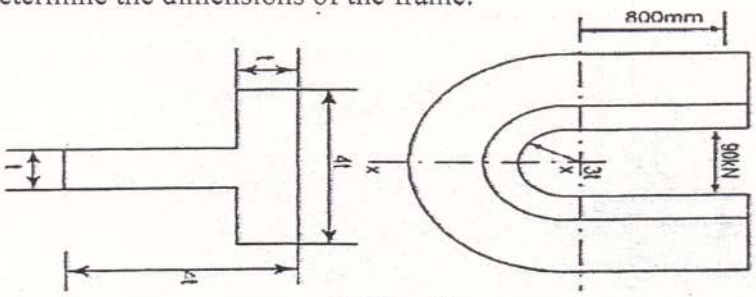
(a)	Why are idler pulleys used in a belt drive?	L1	2M
(b)	What is a bearing?	L1	2M
(c)	What are the main functions of cylinder liner?	L2	2M
(d)	Explain the terms 'surge' in springs	L1	2M
(e)	List any two advantages of gear drives.	L1	2M

PART- B
(Answer all five units, 5 x 10 =50 Marks)
UNIT – I

2. A rope drive is to transmit 250 kW from a pulley of 1.2 m diameter, running at a speed of 300 r.p.m. The angle of lap may be taken as π radians. The groove half angle is 22.5°. The ropes to be used are 50 mm in diameter. The mass of the rope is 1.3 kg per metre length and each rope has a maximum pull of 2.2 Kn, the coefficient of friction between rope and pulley is 0.3.Determine the number of ropes required. If the overhang of the pulley is 0.5 m, suggest suitable size for the pulley shaft if it is made of steel with a shear stress of 40 Mpa. L3 10M

OR

3. A punch press of capacity 90KN has a c-frame of T- cross section as shown in fig. The frame is made of a material with an ultimate tensile stress of 400MPa for a factor of safety of 3.5, determine the dimensions of the frame. L3 10M



UNIT – II

4. A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm^2. The speed of the journal is 900 rpm and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 35°C. Find: (i) The amount of artificial cooling required. (ii) The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C. Take specific heat of the oil as 1850 J/kg/°C. L4 10M

OR

5.	Select a suitable spherical roller bearing from SKF series 222C to support a radial load of 4kN and axial load of 2kN. Minimum life required is 10000 hrs at 1000 rpm. For this select bearing find (i) The expected life under the given loads (ii) The equivalent load that can be supported with a probability of survival of 95% with 10000 hours.	L3	10M

UNIT – III

6.	The following data is given for the piston of a four stroke diesel engine: Cylinder bore = 250 mm Material of piston rings = Gray cast iron Allowable tensile stress=100N/mm^2 Allowable radial pressure on cylinder wall = 0.03 MPa Thickness of piston head = 42 mm and No of piston rings = 4 Calculate: (i) Radial with of piston rings. (ii) Axial thickness of piston rings. (iii) Gap between the ends of piston rings before and after assembly. (iv) Width of the top land. (v) Width of the ring grooves. (vi) Thickness of the piston barrel and thickness of the barrel open end.	L4	10M

OR

7.	Design a I-section of a connecting rod for an I.C engine using the following data: Piston diameter = 125 mm Stroke = 150 mm Length of connecting rod = 300 mm Gas pressure = 5 N/mm^2 Speed of engine = 1200 rpm Factor of safety = 5 and material is steel 35 NiCr60.	L4	10M

UNIT – IV

8.	It is required to design a helical compression spring with plain ends, made of cold drawn plain carbon steel, for carrying a maximum pure static force of 1000 N. The ultimate tensile strength and modulus of rigidity for spring material are 1430 N/mm^2 and 85 N/mm^2 respectively. The spring rate is 48 N/mm. If spring index is 5, determine: (i) Wire diameter. (ii) Total number of coils. (iii) Free length and (iv) Pitch. Draw a neat sketch of spring with necessary dimensions.	L4	10M

OR

9.	Design a close coiled helical compression spring for a service load ranging from 2250 N to 2750 N. The axial deflection of the spring for the load range is 6 mm. Assume a spring index of 5. The permissible shear stress intensity is 420 MPa and modulus of rigidity, G = 84 kN/mm^2.	L2	10M

UNIT – V

10.	A pair of straight spur gears is required to reduce the speed of shaft from 500 to 100 rpm while continuously running 12hr per day. The pinion is of 40C8 steel and has 20 teeth. The wheel is of cast iron of grade FG200 and has 100 teeth. The gears are of 8mm module, 100 mm face width and 20^0 pressure angle. Calculate power rating.	L4	10M

OR

11.	A pair of helical gears in a milling machine is used to transmit 4.5 kW at 1000 rpm of the pinion and the velocity ratio is 3:1. The helix angle of the gear is 15^0 and both gears are made of steel C45. The gears are 20^0 FDI and the pinion is to have minimum of 20 teeth. The gear is to work 8 hrs/day for 3 years. Design the helical gears. Take the required hardness for both gears is more than 350 BHN.	L4	10M