R19

I B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2025

I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCC2TH02   DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Time: 3 hours   (Common to CE, EEE, ME, ECE)   Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No.			Questions	Marks
			Unit-I	
	a		i) Solve $\left(2y^2+4x^2y\right)dx+\left(4xy+3x^3\right)dy=0$	[6M]
			ii) Solve $2xy\,y'=y^2-2x^3$, $y(1)=2$.	[6M]
			OR	
1	b		i) If a substance cools from 370k to 330k in 10mts, when the temperature of the surrounding air is 290k, find the temperature of the substance after 40 mts.	[6M]
			ii) A bacterial population B is known to have a rate of growth proportional to B itself. If between noon and 2 PM the population triples, at what time, no controls being exerted, should B become 100 times what it was at noon.	[6M]
			Unit-II	
	a		i) Solve $\left(D^2+5D-6\right)y=\sin 4x\,\sin x$	[12M]
			ii) Solve $\left(D^2-1\right)y=x\sin x+x^2e^x$	
			OR	
2			i) Solve $x^2y''-4xy'+4y=4x^2-6x^3$, $y(2)=4$, $y'(2)=-1$.	[6M]
	b		ii) An RCL circuit in series has $R=180\,ohms$, $C=1/280\,farad$, $L=20\,henries$, and an applied voltage $E(t)=10\sin t$. Assuming no initial charge on the capacitor, but an initial current of 1 ampere at $t=0$ when the voltage is first applied, find the subsequent charge on the capacitor.	[6M]
			Unit-III	
	a		i) Form partial differential equation by eliminating the arbitrary constants (a,b,c) from $z=a(x+y)+b(x-y)+abt+c$	[6M]
3			ii) Form partial differential equation by eliminating the arbitrary functions from $F\left(x^2+y^2+z^2,z^2-2xy\right)=0$	[6M]
			OR	
	b		i) Solve $x^2\left(y^3-z^3\right)p+y^2\left(z^3-x^3\right)q=z^2\left(x^3-y^3\right)$	[6M]
			ii) Solve $(x+2z)p+(4zx-y)q=2x^2+y$	[6M]
4			**Unit-IV**	
	a		i) Find the angle between the surfaces $x^2+y^2+z^2=9$, and $z=x^2+y^2-3$ at the point $(2,-1,2)$.	[6M]
			ii) If $\vec{A}$ and $\vec{B}$ are differentiable vector point functions then find $grad\left(\vec{A}\cdot\vec{B}\right)$.	[6M]

		OR	
	b	i) Find $\nabla^2 r^n$ where $r = \vec{r}$ $\vee$, $\vec{r}$ is the position vector.	[6M]
		ii) Prove that $Curl\,Curl\,\vec{A} = grad\left(\vec{A}\right) - \nabla^2 \vec{A}$.	[6M]
5		Unit-V	
	a	i) Find the work done in moving a particle once around a circle C in the xy-plane, if the circle has centre at the origin and radius 2 and if the force field $\vec{F}$ is given by $\vec{F} = (2x - y + 2z)i + (x + y - z)j + (3x - 2y - 5z)k$.	[6M]
		ii) Evaluate $\iint\limits_{S} \vec{F} \cdot \vec{n}\, dS$, where $\vec{F} = z\,\vec{i} + x\,\vec{j} - 3y^2 z\,\vec{k}$ and S is the surface of the cylinder $x^2 + y^2 = 16$ included in the first octant between $z = 0$ and $z = 5$.	[6M]
		OR	
	b	Verify Gauss divergence theorem for $\vec{F} = 4xz\,\vec{i} - y^2\,\vec{j} + yz\,\vec{k}$ taken over the cube bounded by $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$.	[12M]

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I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCC2TH03   ENGINEERING CHEMISTRY

Time: 3 hours   (Common to CE, ME, ECE)   Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No.			Questions	Marks
			Unit-I	
1	a		i) Differentiate lime soda method and zeolite method.	[6M]
			ii) Discuss how hardness can be estimated by complexometric method.	[6M]
			OR	
	b		i) Explain how dissolved oxygen can be estimated.	[6M]
			ii) Discuss (i) types of hardness (ii) units of hardness (iii) equivalents of calcium carbonate	[6M]
			Unit-II	
2	a		Explain (i) ultimate analysis (ii) cationic chain polymerization	[12M]
			OR	
	b		i) Explain injection moulding technique for preparation of plastics.	[4M]
			ii) Explain higher and lower calorific value.	[4M]
			iii) Explain processing of natural rubber.	[4M]
			Unit-III	
3	a		i) Discuss characterization of nanomaterials by BET method.	[6M]
			ii) Discuss applications of liquid crystals.	[6M]
			OR	
	b		i) Explain sol-gel method for preparation of nanomaterials.	[6M]
			ii) Classify types of composite materials.	[6M]
			Unit-IV	
4	a		i) Discuss (i) single electrode potential (ii) nickel cadmium battery	[6M]
			ii) Discuss factors affecting rate of corrosion.	[6M]
			OR	
	b		i) Discuss constituents of paints and explain their functions.	[6M]
			ii) Discuss H_2-O_2 fuel cell. Mention its applications.	[6M]
			Unit-V	
5	a		i) Explain (i) cloud and pour point (ii) oiliness (iii) saponification value	[6M]
			ii) Describe how Portland cement is manufactured.	[6M]
			OR	
	b		i) Explain the following properties of refractories: (i) refractoriness (ii) Porosity	[6M]
			ii) Explain classification of lubricants.	[6M]

I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCC2TH07 **ENGINEERING PHYSICS**
Time: 3 hours   (Common to EEE, CSE, IT)   Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No			Questions	Marks
			Unit-I	
1	a		i) Explain Newton's rings method for determining the wavelength of monochromatic light. Why is the center of fringes dark, and how can we get a bright center?	[8M]
			ii) Briefly explain Fresnel's and Fraunhofer diffraction.	[4M]
			OR	
	b		i) How is Nicol prism used as an analyzer?	[4M]
			ii) Give the construction and theory of half wave plate.	[8M]
			Unit-II	
2	a		Explain with a neat diagram the principle, construction and working of He-Ne laser. What are its merits and demerits?	[12M]
			OR	
	b		i) The numerical aperture of an optical fibre is 0.39. If the difference in the refractive indices of the material of its core and the cladding is 0.05, calculate the refractive index of the material of the core.	[8M]
			ii) Discuss the advantages of optical fibres over conventional cables.	[4M]
			Unit-III	
3	a		i) Define packing factor. Calculate the packing factor for the Body-centered Cubic (BCC) structure.	[6M]
			ii) Explain the term Miller indices. What is their role in crystal structure? Give the important features of Miller indices.	[6M]
			OR	
	b		i) Deduce a relation between an interpalanr distance 'd' and the Miller indices of the planes for cubic crystal.	[8M]
			ii) Silver has FCC structure and its atomic radius is 1.441 Å. Find the spacing of (220) planes.	[4M]
			Unit-IV	
4	a		i) State and explain Gauss's Law in electrostatics. Derive its integral form.	[6M]
			ii) What is Displacement Current? How it is different from actual current?	[6M]
			OR	
	b		i) Write atleast 5 differences between Dia, Para and ferromagnetic materials.	[6M]
			ii) Discuss the behavior of magnetic susceptibility (χ) with temperature in case of all three kinds of materials.	[6M]
			Unit-V	
5	a		i) What is a wave function? What are the necessary conditions of physically acceptable wave function?	[4M]
			ii) Derive time dependent Schrödinger wave equation..	[8M]
			OR	
	b		i) Show that the wave function for a particle confined in an infinite one-dimensional potential well of length 'l' is given by, $\psi_n(x) = \sqrt{\dfrac{2}{l}}\sin\left(\dfrac{n\pi x}{l}\right)$. Discuss the energy levels and their discreteness.	[12M]

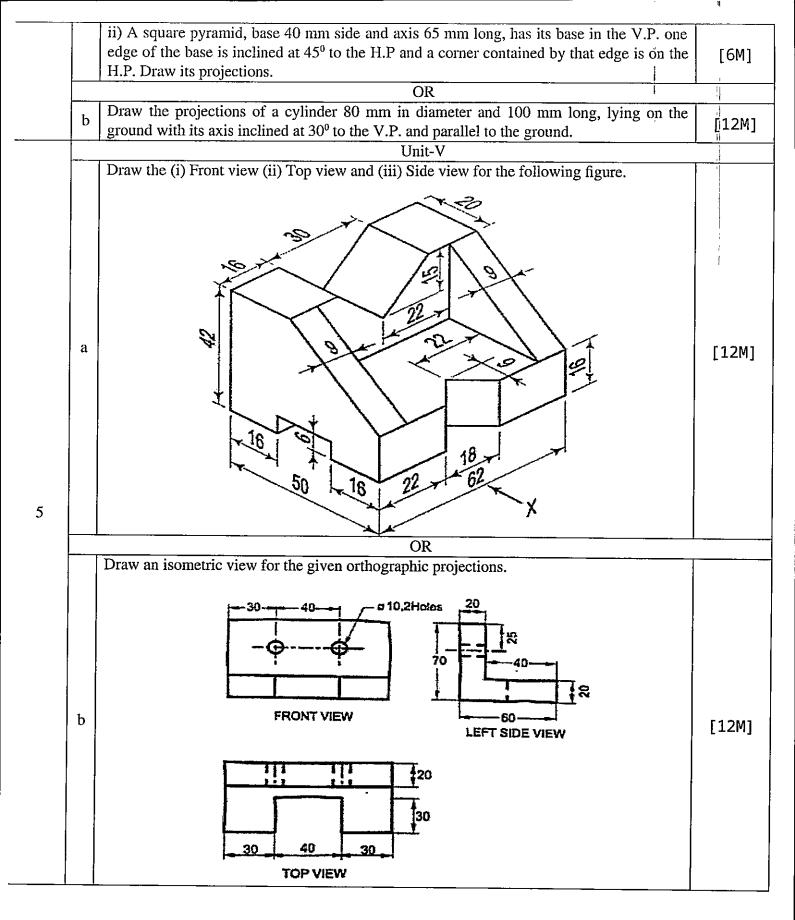### I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCC2TH09 **ENGINEERING GRAPHICS**

Time: 3 hours   (Common to EEE, CSE, IT)   Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No			Questions	Marks
			Unit-I	
1	a		i) Draw a Parabola with the distance between its focus and directrix equal to 75mm and eccentricity equal to 1.	[6M]
			ii) Construct a regular Hexagon with a 35 mm side using the general method.	[6M]
			OR	
	b		i) The major axis of an ellipse is 150 mm long, and the minor axis is 100 mm long. Find the foci and draw the ellipse by using the Concentric Circles Method.	[6M]
			ii) Draw a hyperbola of eccentricity, e=3/2, if the distance of the focus from the directrix is equal to 50 mm.	[6M]
			Unit-II	
2	a		Draw the projections of the following points on the same ground line, keeping the distance between projectors equal to 30mm. i) A: 30 mm in front of VP and 50 mm above HP ii) B: 40 mm behind VP and 60 mm above HP iii) C: 25 mm behind VP and 30 mm below HP iv) D: 55 mm in front of VP and 25 mm below HP v) E: 50 mm from both planes and the point is in the third quadrant	[12M]
			OR	
	b		Draw the projections of a 75 mm long straight line in the following positions. i. Parallel to both the H.P. and the V.P. and 25 mm from each ii. Parallel to and 30 mm above the H.P. and in the V.P. iii. Inclined at 45⁰ to the V.P. in the H.P and its one is in the V.P.	[12M]
			Unit-III	
3	a		i) A hexagonal plate of a side 30 mm side has a corner at 20 mm from V.P. and 50 mm from H.P. Its surface is inclined at 45⁰ to V.P. and perpendicular to H.P. Draw the projection of lamina.	[6M]
			ii) A pentagon lamina ABCDE of side 30 mm is perpendicular to V.P and parallel to H.P. Draw its projections when side AB is 25 mm from V.P. and 30 mm from H.P.	[6M]
			OR	
	b		A rectangular plane surface of size 100 mm x 50 mm is positioned in the first quadrant and is inclined at an angle of 60⁰ with the H.P. and 30⁰ with the V.P. Draw its projections	[12M]
4			**Unit-IV**	
	a		i) A hexagonal prism has one of is rectangular faces parallel to the H.P. Its axis is perpendicular to the V.P. and 45 mm above the ground. Draw its projections when the nearer end is 25 mm in front of the V.P. side of the base is 30 mm long, axis is 60 mm long.	[6M]

	ii) A square pyramid, base 40 mm side and axis 65 mm long, has its base in the V.P. one edge of the base is inclined at 45⁰ to the H.P and a corner contained by that edge is on the H.P. Draw its projections.	[6M]

<center>OR</center>

b	Draw the projections of a cylinder 80 mm in diameter and 100 mm long, lying on the ground with its axis inclined at 30⁰ to the V.P. and parallel to the ground.	[12M]

<center>Unit-V</center>

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

5	a		[12M]

<center>OR</center>

Draw an isometric view for the given orthographic projections.

b		[12M]

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I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCI2TH08   PROBABILITY AND STATISTICS

Time: 3 hours   (Common to CSE, IT)   Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No			Questions	Marks
			Unit-I	

1	a		i)Two fair dice are thrown independently. Three events A,B, and C are defined as follows
			     A :Odd face with first dice
			     B : Odd face with second dice
			     C : Sum of points on two dice is odd
			     Are the events A, B and C mutually independent?
				[6M]

			ii) In a bolt factory machines A, B and C manufacture respectively 25%, 35% and 40% of the total. Of their output 5, 4, 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines A, B, and C?	[6M]
			OR	
	b		i) The probability that a patient recovers from a disease is 0.4. If 15 persons have such a disease, determine the probability that (a) exactly 5 survive (b) at least 10 survive (c) from 3 to 8 survive.	[6M]
			ii)A random variable X has the following probability function 表	[6M]

ii) table:

x	-2	-1	0	1	2	3
$p(x)$	0.1	k	0.2	$2k$	0.3	k

Find the value of k, and calculate mean and variance.

			Unit-II	
2	a		i)Determine the expected number of families to have (a) 2 boys and 2 girls (b) at least one boy (c) no girls (d) at most two girls, out of 800 families with 4 children each. Assume equal probabilities for boys and girls.	[6M]

			ii) A pair of dice is rolled 180 times. Determine the probability that a total of 7 occurs
			    (a) At least 25 times
			    (b) Between 33 and 41 times inclusive
			    (c) Exactly 30 times
				[6M]

			OR	
	b		i)Assume that the average life span of computers produced by a company is 2040 hours with standard deviation of 60 hours. Find the expected number of computers whose life span is (a) more than 2150 hours (b) less than 1950 hours (c) more than 1920 hours and less than 2160 hours From a pool of 2000 computers assuming that the life span X is normally distributed.	[6M]
			ii) Determine the minimum mark a student must get in order to receive an A grade if the top 10% of the students are awarded A grades in an examination where the mean mark is 72 and standard deviation is 9.	[6M]
3			**Unit-III**	
	a	i)	A population consists of four numbers 2,3,4,5. Consider all possible distinct samples of size two with replacement. Find (a) The population mean	[12M]

		(b) The population standard deviation	
		(c) The sampling distribution of means	
		(d) The mean of the sampling distribution of means	
		(e) Standard deviation of sampling distribution of means.	
		Verify (c) and (e) directly from (a) and (b) by use of suitable formulae.	

<div align="center">OR</div>

	b	i) Determine the mean and standard deviation of the sampling distribution of means of 300 random samples each of size n=36 are drawn from a population of N=1500 which is normally distributed with mean $\mu=22.4$ and standard deviation σ of 0.048 if sampling is done (a) with replacement and (b) without replacement.	[6M]
		ii) A process for making certain ball bearings is under control if the diameters of the bearings have a mean of 0.5 cm. If a random sample of 10 of these bearings has a mean diameter of 0.5060 cm and standard deviation of 0.004 cm, is the process under control ?	[6M]

<div align="center">Unit-IV</div>

4	a	i) Write the procedure for testing of Hypothesis.	[6M]
		ii) The means of two single large samples of 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5 inches ? Test at 5% level of significance.	[6M]

<div align="center">OR</div>

	b	i) The theory predicts the proportion of beans in the four groups A, B, C and D should be 9:3:3:1. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287, and 118. Does the experimental result support the theory?	[6M]
		ii)A random sample of 8 enevelopes is taken from letter box of a post office and their weights in grams are found to be 12.1,11.9,12.4,12.3,11.9,12.1,12.4,12.1. (a) Find the 99% confidence limitsfor the mean weight of the envelopes received at that post office. (b) Using the result of part (a), does this sample indicate at 1% level that the average weight of envelopes received at that post office is 12.35 gms.	[6M]

<div align="center">Unit-V</div>

5	a	A steel manufacturer extrudes scrap for manufacturing blades. Specifications require that the thickness of this scrap has $\mu=0.020\,mm$ and $\sigma=0.005\,mm$. (A) Use the specifications to calculate a central line and three-sigma control limits for an x chart with $n=10$. (B) Use the specifications to calculate a central line and three-sigma control limits for an R chart with $n=10$. (C) Plot the following means and ranges, obtained in 20 successive random samples of size 10 on charts based on the control-chart constants obtained in parts (A) and (B) and discuss the process.	[12M]

Sample No.	1	2	3	4	5	6	7
Mean(x)	0.022	0.021	0.029	0.018	0.019	0.027	0.021
Range(R)	0.004	0.002	0.007	0.006	0.003	0.004	0.005

Sample No.	8	9	10	11	12	13	14
Mean(x)	0.022	0.019	0.018	0.017	0.016	0.022	0.023
Range(R)	0.002	0.007	0.002	0.003	0.008	0.006	0.004

Sample No.	15	16	17	18	19	20
Mean(x)	0.019	0.020	0.021	0.022	0.018	0.010
Range(R)	0.002	0.005	0.003	0.002	0.008	0.006

		OR	
☆	b	i) In a study designed to determine the number of turns required for an artillery-shell fuse to arm, 80 fuses, rotated on a turntable, average 45.6 turns with a standard deviation of 5.5 turns. Establish tolerance limits for which one can assert with 95% confidence that at least 99% of the fuses will arm within these limits.	[6M]
		ii) To check the strength of carbon steel for use in chain links, the yield stress of a random sample of 25 pieces was measured, yielding a mean and a standard deviation of 52,800 psi and 4,600 psi, respectively. Establish tolerance limits with $\alpha = 0.05$ and $P = 0.99$, and express in words what these tolerance limits mean.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCI2TH10

NUMERICAL METHODS AND VECTOR CALCULUS

Time: 3 hours (Common to CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No.			Questions	Marks
			Unit-I	
1	a		i) Find a real root of the equation $x^3 - x - 4 = 0$ by bisection method.	[6M]
			ii) Find a real root for $e^x \sin x = 1$, using Regula Falsi method.	[6M]
			OR	
	b		i) Using Newton Raphson method, find the root between 0 and 1 of $x^3 = 6x - 4$ correct to 3 decimal places.	[6M]
			ii) Applying iterative method, find the real root of $x^3 - 2x^2 - 4 = 0$.	[6M]
			Unit-II	
2	a		i) Find $y(142)$ from the following data using Newton's Forward interpolation formula.	[6M]
			ii) Given $f(2)=10$, $f(1),=8$, $f(0)=5$, $f(-1)=10$ estimate $f(12)$ by using Gauss's forward formula.	[6M]
			OR	
	b		i) Using Lagrange's interpolation formula, find the value of $y(10)$ from the following table:	[6M]
			ii) If $f(1.15)=1.0723$, $f(1.20)=1.0954$, $f(1.25)=1.1180$ and $f(1.30)=1.1401$ find $f(1.28)$.	[6M]
			Unit-III	
3	a		i) Find by Taylor's series method the value of y at $x=0.1$ to five places of decimal from $\frac{dy}{dx} = x^2 y - 1$, $y(0) = 1$.	[6M]
			ii) Solve $y^1 = x^2 + y^2$, $y(0)=1$ using picard's method.	[6M]
			OR	
	b		i) Compute $y(0.1)$ and $y(0.2)$ by Runge-Kutta method of 4th order for the differential equation $y^1 = xy + y^2$, $y(0) = 1$.	[6M]
			ii) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ using Trapezoidal rule.	[6M]

Table for Q2 a i):

x:	140	150	160	170	180
y(x)	3.685	4.854	6.302	8.076	10.225

Table for Q2 b i):

X:	5	6	9	11
Y:	12	13	14	16

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Unit-IV

4	a	i) Find the directional derivative of $\varphi = xy^2 + yz^2 + zx^2$ along tangent to the curve $x = t$, $y = t^2$ and $z = t^3$ at (1, 1, 1).	[6M]
		ii) If $\overline{f} = (x+3y)\overline{i} + (y-2z)\overline{j} + (x+pz)\overline{k}$ is solenoidal, find p.	[6M]
		OR	
	b	i) Prove that $div(grad\ r^n) = n(n+1)r^{n-2}$.	[6M]
		ii) Prove that $\nabla \times (\nabla \times \overline{a}) = \nabla(\nabla.\overline{a}) - \nabla^2\overline{a}$.	[6M]

Unit-V

5	a	i) Find the work done by the force $\overline{F} = (3x^2 - 6yz)i + 2y + 3xz)j + (1 - 4xyz^2)k$ in moving particle from the point (0, 0, 0) to the point (1, 1, 1) along the curve C: $x = t$, $y = t^2$, $z = t^3$.	[6M]
		ii) If $\overline{F} = 2xz\,i - x\,j + y^2\,k$ Evaluate $\iiint_V \overline{F}\,dv$ where V is the region bounded by x=0, x = 2; y = 0, y = x; z = x², z = 4.	[6M]
		OR	
	b	i) Evaluate by Green's theorem $\oint_c (x^2 - \cosh y)dx + (y + \sin x)\,dy$ where C s the rectangle with vertices $(0,0)$, $(\pi,0)$, $(\pi,1)$, $(0,1)$.	[6M]
		ii) Apply stokes theorem, to evaluate $\oint_c (y\,dx + z\,dy + x\,dx)$ where C is the curve of intersection of the sphere $x^2 + y^2 + z^2 = a^2$. and $x+z = a$.	[6M]

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I B.Tech II Semester Supple. Examinations, March-2025

Sub Code: 19BCI2TH12   **PYTHON PROGRAMMING**

Time: 3 hours   (Common to CSE, IT)   Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No.		Questions	Marks
		Unit-I	
1	a	i) Explain the concept of a string in Python. Provide an example of a string.	[6M]
		ii) Explain the difference between mutable and immutable objects in Python. Give examples of each.	[6M]
		OR	
	b	i) Write a Python program that calculates and displays the area of a circle given its radius, using the math module.	[6M]
		ii) Explain the difference between a **while** loop and a **for** loop in Python.	[6M]
		Unit-II	
2	a	What is a dictionary? Write a Python program to take a dictionary containing student names and their grades, and then print the names of students who scored above a specified threshold.	[12M]
		OR	
	b	i) List and explain three basic operations that can be performed on a list.	[4M]
		ii) What is a set in Python, and what is its main characteristic?	[4M]
		iii) What is a tuple in Python? How does it differ from a list?	[4M]
		Unit-III	
3	a	i) What is a lambda function? How does it differ from a regular named function?	[6M]
		ii) Write a python script to check whether the given string is palindrome or not using recursion.	[6M]
		OR	
	b	i) Illustrate different Key events in python.	[6M]
		ii) Describe about default arguments with suitable program.	[6M]
		Unit-IV	
4	a	i) Describe the concept of exception handling in programming.	[6M]
		ii) Explain Multi-Level and Multipath In-heritance in Python	[6M]
		OR	
	b	i) Illustrate an abstract class and explain its purpose.	[6M]
		ii) How to implement method overriding in Python? Explain	[6M]
		Unit-V	
5	a	i) Explain about pattern specification using regular expression with example.	[6M]
		ii) Write a Python program to replace all occurrences of space, comma, or dot with a colon.	[6M]
		OR	
	b	i) Write a Python program to match a string that contains only upper and lowercase letters, numbers, and underscores.	[6M]
		ii) Explain about pattern search using regular expression with example.	[6M]

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I B.Tech II Semester Supple. Examinations, March-2025
Sub Code: 19BCC2TH14
ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING
Time: 3 hours   (Common to CE, ME)   Max. Marks: 60
Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No.			Questions	Marks
			Unit-I	
1	a		i) State and explain the source transformation technique in electrical networks?	[6M]
			ii) An electric heater having a resistance of 24.8 ohms is connected to 220V mains supply through a cable having total resistance of 0.32 ohms. Find the power dissipated by the heater, power wasted in cable and the total energy consumed in 2.5 hours?	[6M]
			OR	
	b		i) Compare the properties of series and parallel electrical networks with diagrams?	[6M]
			ii) A voltage of 107V is applied across a resistor of 5050 ohms. Find the current through the resistor? If the voltage is changed to 117V, find the new value of resistance required to keep the same current level? If the resistance is changed to 3235 ohms, find the voltage required to pass 12.7 mA through the resistor?	[6M]
			Unit-II	
2	a		Explain in detail about the excitation based classification of DC machines?	[12M]
			OR	
	b		i) List out the losses in D.C machines and justify its existence?	[6M]
			ii) A 28 H.P 230V D.C series motor has an armature resistance of 0.2 ohms, series field resistance of 0.04 ohms and a brush drop of 2.8V. When the line current is 88A, the speed is 570 r.p.m. Calculate the speed when the line current is 102.3A, the speed when the line current is 102.3A and a diverter having a resistance of 0.06 ohms is connected across the series field?	[6M]
			Unit-III	
3	a		i) Compare the features and working of single phase and three phase induction motors?	[6M]
			ii) A single phase 125 kVA, 1880/220V, 50Hz transformer has impedance drop of 11.8% and resistance drop of 6.2%. Calculate the regulation at full load 0.7 power factor lagging? Find at what power factor is the regulation becomes zero?	[6M]
			OR	
	b		i) Derive and explain the expression of voltage regulation of a static electric machine?	[6M]
			ii) A 3 phase 6 pole 50Hz induction motor has a slip of 2% at no load and 4% at full load. Determine the synchronous speed, no load speed, full load speed, frequency of rotor current at stand still and the frequency of rotor current at full load?	[6M]
			Unit-IV	
4	a		i) Explain the working of Zener diode as voltage regulator with necessary equations?	[6M]
			ii) The forward resistance of a diode has a constant value of 1240 ohms. An AC supply of 48V rms value is connected to this diode in series with a 2020 ohms resistor. Find the DC current through load resistance, the reading of a moving coil voltmeter connected across the load resistor, the DC power delivered to the load resistor and the total power dissipated in the load resistor?	[6M]
			OR	
	b		i) Draw and explain the current and voltage characteristics of p-n junction diode?	[6M]
			ii) Derive the output waveforms of half wave rectifier by drawing the circuit diagram?	[6M]

		Unit-V	
5	a	i) Explain the transistor amplifier circuit necessary equations?	[6M]
		ii) Explain the construction of transistor with neat diagram?	[6M]
		OR	
	b	i) Describe the comparison of CE, CB and CC configurations of transistor amplifiers?	[6M]
		ii) Explain the functioning of transistor as a switch with relevant diagram and an example?	[6M]

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