Code: 19AC22T

I B.Tech. II Semester Supplementary Examinations March 2021
Applied Physics
(Computer Science and Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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			Marks	CO	Blooms Level

UNIT–I

			Marks	CO	Blooms Level
1.	a)	What is interference? Explain how the interference take place in Newton's ring experiment.	4M	CO1	L2
	b)	Give the experimental set up to form Newton rings and determine the wavelength of incident monochromatic light by forming Newton rings.	10M	CO1	L3

OR

2.	a)	Differentiate the interference and diffraction phenomena.	4M	CO1	L2
	b)	Discuss the Fraunhoffer diffraction at a single slit. Obtain the condition for principal maximum and minimum.	10M	CO1	L3

UNIT–II

3.	a)	Define is polarization in dielectrics. Discuss the frequency dependence of various polarization process in dielectrics.	7M	CO2	L2
	b)	Explain ferroelectricity. List the important characteristics of ferroelectric materials.	7M	CO2	L2

OR

4.	a)	What is hysteresis? Explain the hysteresis properties of ferromagnetic materials.	7M	CO2	L2
	b)	Explain the Weiss theory of ferromagnetism.	7M	CO2	L2

UNIT–III

5.	a)	List differential and integral forms of Maxwell's equations for electromagnetic fields.	7M	CO3	L3
	b)	State poynting theorem. Explain how the poynting vector explains the energy flow.	7M	CO3	L2

OR

6.	a)	Distinguish between step index and graded index fibers.	8M	CO3	L2
	b)	Sketch the block diagram of optic fiber communication system explain the function of each block.	6M	CO3	L3

UNIT–IV

7.	a)	What are extrinsic semiconductor? Explain the Hall effect in semiconductors. Obtain an expression for hall coefficient for an extrinsic semiconductor.	10M	CO4	L2
	b)	The Hall coefficient of certain silicon specimen was found to be 7.35×10^{-5} m^3C^{-1} from 100 to 400 K. If the conductivity was found to be $200m^1$ $^{-1}$. Calculate the density and mobility of the charge carrier.	4M	CO4	L2

OR

8.	a)	Discuss the origin of energy band structure in solids. Classify the crystalline solids based on band theory.	8M	CO4	L2
	b)	Derive an equation for the conductivity of an intrinsic semiconductor in terms of carrier concentration and carrier mobility.	6M	CO4	L2

UNIT–V

9.	a)	State the following effects of superconductors (i) Temperature effect (ii) Magnetic effect. (iii) Current effect (iv) Isotope effect	8M	CO5	L2
	b)	What is Meissner effect? Explain.	6M	CO5	L2

OR

10.	a)	Summarize the synthesis of nanomaterials by chemical vapor deposition method.	7M	CO5	L2
	b)	Explain the characterization technique of nanomaterial using x-ray diffraction technique.	7M	CO5	L2

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R-19

Code: 19A221T

I B.Tech. II Semester Supplementary Examinations March 2021

Basic Electrical and Electronics Engineering
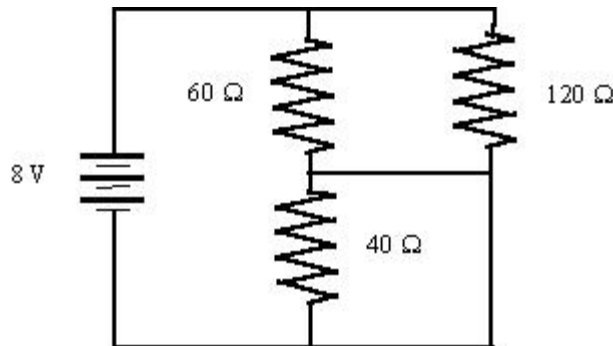
(Computer Science and Engineering)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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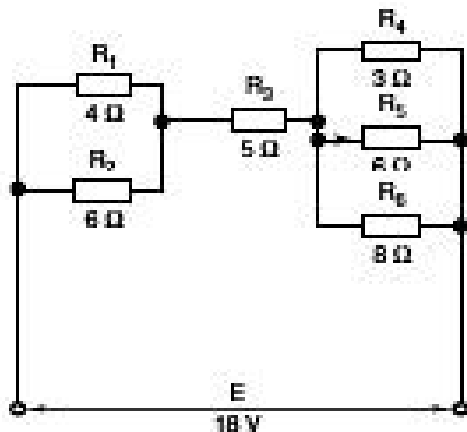|		Marks	CO	Blooms Level

UNIT–I

1. a) Find the equivalent resistance of the circuit shown below.

7M　CO1　L3

b) For the circuit of figure shown below, calculate (i) the current drawn from the source, (ii) the potential drop across 3 resistors, (iii) the current through 6 resistor, and (iv) the power dissipated by the 5 resistor.

7M　CO1　L3

OR

2. a) In a series R-L-C circuit, R = 4 , XC = 6 , XL = 8 . A voltage V is applied across the combination such that the series current is 2 A and it lags the system voltage by 20^0. Assuming the system frequency to be 50Hz, find the voltage drops across each element.

7M　CO1　L3

b) Three identical coils, each of resistance 5 and inductance 10 mH are connected (i) in star and (ii) in delta to a 400V, 50Hz, 3-phase supply. Determine the total power dissipated in each case.

7M　CO1　L3

UNIT–II

3. a) Prove that the emf equation of dc machine is

$$E_g = \left(\frac{\phi.Z.N.P}{60A} \right)$$

7M　CO2　L2

b) How do you determine the efficiency of DC machine both as a generator and motor using Swinburne's Test? Explain

7M　CO2　L2

OR

4.	a)	Explain the constructional aspects of DC machine with neat sketches.	7M	CO2	L2
	b)	Explain the working principal of DC motor with neat sketches.	7M	CO2	L2

UNIT–III

5.	a)	Explain the ideal transformer operation with necessary diagrams.	7M	CO2	L2
	b)	Explain the principle of working of Induction motor with necessary diagrams	7M	CO2	L2

OR

6.	a)	Define voltage regulation in Alternators. Explain EMF method to determine it for alternators.	7M	CO2	L1
	b)	How do you determine the efficiency of 3-phase Induction motor from Brake test? Explain with necessary diagrams.	7M	CO2	L2

UNIT–IV

7.	a)	What are P-type and n-type semiconductors? Draw and explain the V-I characteristics of a p-n junction diode.	7M	CO3	L1
	b)	Draw the Clipper half wave rectifier and full wave rectifier. And explain them with necessary equations in detail.	7M	CO3	L4

OR

8.	a)	Compare between PNP and NPN transistors	7M	CO3	L5
	b)	Draw and explain the common–emitter transistor characteristics.	7M	CO3	L5

UNIT–V

9.	a)	Explain the concept of induction heating and also discuss about various industrial applications of induction heating.	7M	CO4	L2
	b)	Write about voltage, current and frequency measurement using CRO	7M	CO4	L2

OR

10.	a)	Draw the block diagram of a CRO and explain the functions of its various components?	7M	CO4	L4
	b)	Enumerate the applications of induction heating.	7M	CO4	L3

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I B.Tech. II Semester Supplementary Examinations March 2021
Differential Equations and Vector Calculus
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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Marks

UNIT–I

1. a) Solve $\dfrac{d^2 y}{dx^2} - 3\dfrac{dy}{dx} + 2y = xe^{3x} + \sin 2x$ 7M

   b) Solve $\dfrac{d^2 y}{dx^2} - 2\dfrac{dy}{dx} + y = xe^x \sin x$ 7M

OR

2. Using method of variation of parameters, solve

$\dfrac{d^2 y}{dx^2} + y = x \sin x$ 14M

UNIT–II

3. Solve $(2x + 3)^2 \dfrac{d^2 y}{dx^2} - (2x + 3)\dfrac{dy}{dx} - 12y = 6x$ 14M

OR

4. An uncharged condenser of capacity C is charged by applying an e.m.f. $\dfrac{E \sin t}{\sqrt{LC}}$,

through leads of self-inductance L and negligible resistance. Prove that at any

time t, the charge on one of the plates is $\dfrac{EC}{2}\left\{\sin\dfrac{t}{\sqrt{LC}} - \dfrac{t}{\sqrt{LC}}\cos\dfrac{t}{\sqrt{LC}}\right\}$.   14M

UNIT–III

5. a) Form the partial differential equation by eliminating the arbitrary constants a, b

   and c from $(x - a)^2 + (y - b)^2 + z^2 = c^2$ 7M

   b) Solve $2xz - px^2 - 2qxy + pq = 0$ by Charpit's method.   7M

OR

6. a) Form the partial differential equation by eliminating the arbitrary function f from

   $z = y^2 + 2f\left(\dfrac{1}{x} + \log y\right)$ 7M

   b) Solve by the method of separation of variables $\dfrac{\partial u}{\partial x} = 4\dfrac{\partial u}{\partial y}$, given that

   $u(0, y) = 8e^{-3y}$.   7M

UNIT–IV

7. Prove that $\nabla^2 (r^n) = n(n+1)r^{n-2}$ 14M

OR

8. a) What is the directional derivative of $W = xy^2 + yz^3$ at the point (2, -1, 1) in the

   direction of the normal to the surface $x \log z - y^2 = -4$ at (-1, 2, 1).   7M

   b) Find the work done in moving a particle in the force

   field $\overline{F} = 3x^2\overline{i} + (2xz - y)\overline{j} + z\overline{k}$, along the straight line from (0,0,0) to (2,1,3).   7M

UNIT–V

9. Verify Green's theorem for $\int_C (x^2 y\,dx + x^2\,dy)$ where C is the boundary described

counter clockwise of triangle with vertices (0, 0) , (1, 0) , (1, 1).   14M

OR

10. Verify Stoke's theorem for the vector field $\overline{F} = (2x - y)\overline{i} - yz^2\overline{j} - y^2 z\overline{k}$ over

the upper half surface of $x^2 + y^2 + z^2 = 1$, bounded by its projection on the xy-

plane.   14M

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I B.Tech. II Semester Supplementary Examinations March 2021
Engineering Graphics & Design
(Computer Science and Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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		Marks	CO	Blooms Level

UNIT–I

| 1. | Construct a conic when the distance between its focus and its directrix is equal to 60 mm and its eccentricity is one. Name the curve. Draw a tangent at any point on the curve. | 14M | CO 1 | L3 |

OR

| 2. | a) | Divide a straight line AB of 60 mm long into eight number of equal parts. | 7M | CO 1 | L4 |
| | b) | Describe a regular pentagon about a given circle of radius equal to 20 mm. | 7M | CO 1 | L3 |

UNIT–I

| 3. | Draw a hypocycloid having a generating circle of diameter 50 mm and directing circle of radius 10 mm. Also draw a normal and a tangent at any point M on the curve. | 14M | CO 2 | L3 |

OR

| 4. | Draw an involute of a hexagon 30 mm side. Also draw a normal and a tangent at any point on the curve. | 14M | CO 2 | L3 |

UNIT–I

| 5. | a) | Draw the projections of a i) Point P is 30 mm above HP and 40 mm behind VP ii) Point Q is 40 mm below HP and 30 mm behind VP. | 7M | CO 3 | L3 |
| | b) | A line AB 50 mm long is perpendicular to VP and parallel to HP. Its end A is 20 mm in front of VP and the line is 40 mm above HP. Draw the projections of the line. | 7M | CO 3 | L3 |

OR

| 6. | A line AB, 90 mm long, is inclined at 30^0 to the HP. Its end A is 12 mm above the H.P. and 20 mm in front of the VP. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P. | 14M | CO 3 | L3 |

UNIT–I

| 7. | A rectangular plane ABCD inclined to HP by an angle 30°, its shorter edge being parallel to HP and inclined to VP by an angle 45°. Draw its projections. | 14M | CO 4 | L3 |

OR

| 8. | A semicircular plate of 80 mm diameter has its straight edge in the VP and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections. | 14M | CO 4 | L3 |

UNIT–I

| 9. | Draw the projections of a cone, base 30 mm diameter and axis 50 mm long, resting on HP on a point of its base circle with the axis making an angle of 45° with HP and its top view making an angle of 50° with VP. | 14M | CO 5 | L3 |

OR

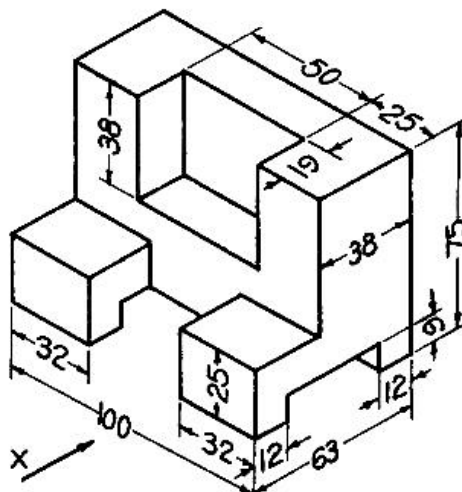| 10. | Study the isometric view of the Figure 1 and draw the front, top and right side views. | | | |

Figure 1

14M   CO 5   L3

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R-19

Code: 19A521T

I B.Tech. II Semester Supplementary Examinations March 2021
Python Programming
(Common to CE, ME & CSE)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	Blooms Level

UNIT–I

		Marks	CO	Blooms Level
1.	Examine the various control structures in python with suitable examples	14M	CO1	L3

OR

			Marks	CO	Blooms Level
2.	a)	Describe the following operation in tuples, i) Maxima ii) Minima iii) Sum of two tuples iv) Duplicate a tuple v) Slicing operator	7M	CO1	L1
	b)	Show how an input and output function is performed in python with an example.	7M	CO1	L1

UNIT–II

			Marks	CO	Blooms Level
3.	a)	Describe the syntax and rules involved in the return statement in python	7M	CO2	L1
	b)	What is the major advantage and disadvantages of sets over lists? Describe a Python program to demonstrate differences between normal and frozen set	7M	CO2	L1

OR

			Marks	CO	Blooms Level
4.		Examine the following **a**) Creating the List **b**) Accessing values in the Lists **c**) Updating the Lists **d**) Deleting the list Elements	14M	CO2	L3

UNIT–III

			Marks	CO	Blooms Level
5.	a)	How to access characters of a string?	7M	CO3	L3
	b)	Define file handling. Illustrate with an example of closing a file.	7M	CO3	L3

OR

			Marks	CO	Blooms Level
6.	a)	Examine the importance of user – defined Exceptions	7M	CO3	L3
	b)	Write a python program for reading text from a file	7M	CO3	L3

UNIT–IV

			Marks	CO	Blooms Level
7.	a)	Show the importance of encapsulation in python. Explain with example.	7M	CO4	L3
	b)	List the companies which employ python and quote the areas in which python is used extensively nowadays.	7M	CO4	L3

OR

			Marks	CO	Blooms Level
8.		Illustrate the concept of classes in python with suitable program.	14M	CO4	L3

UNIT–V

			Marks	CO	Blooms Level
9.		Describe the concept of stack implementation using python list.	14M	CO5	L1

OR

			Marks	CO	Blooms Level
10.		Define Single linked list and examine (**i**) traversing (**ii**) searching operations with example program	14M	CO5	L1&L3

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