Hall Ticket Number :										

R-19

Code: 19AC12T

I B.Tech. I Semester Supplementary Examinations December 2020

Applied Physics

(Common to EEE & ECE)

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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UNIT–I

1. a) Distinguish between interference and diffraction. 4M

   b) Explain diffraction of light by single slit and obtain conditions for various positions of intensity distribution pattern of it. 10M

OR

2. a) Describe the construction and working of Nicol prism. 9M

   b) What are half and quarter waveplates? Explain their function. 5M

UNIT–II

3. a) What is meant by local field? Derive expression of local field in case of solid dielectrics. 10M

   b) Write a short note on ferroelectricity. 4M

OR

4. a) What are distinguish properties of dia, para and ferromagnetic materials? 6M

   b) Construct hysteresis loop of ferromagnetic materials and explain significance of hysteresis loop. 8M

UNIT–III

5. a) State and prove Gauss divergence theorem. 6M

   b) Write Maxwell's equations and explain physical meaning of each equation. 8M

OR

6. a) Discuss the working principle and identity medical applications of optical fibers. 6M

   b) Define the terms numerical aperture and acceptance angle. Derive expression for numerical aperture of optical fibers. 8M

UNIT–IV

7. a) With the help of band diagrams explain p & n type semiconductors and discuss the effect of temperature on charge carrier concentration in n-type semiconductors. 10M

   b) Summarize applications of semiconductors. 4M

OR

8. a) Explain the terms drift and diffusion and obtain their expressions in semiconductors. 8M

   b) Derive Einstein's relation and give significance of it. 6M

UNIT–V

9. a) Explain classification of superconductors into type I and type II. 8M

   b) Discuss essential features of BCS theory of superconductivity. 6M

OR

10. a) With the help of neat sketches, explain the construction and working of Scanning Electron Microscope (SEM) and discuss its role in nano world. 10M

    b) Write on applications of nano materials 4M

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		CO	Blooms Level
1.	a)	CO1	L2
	b)	CO1	L2
2.	a)	CO1	L2
	b)	CO1	L3
3.	a)	CO2	L3
	b)	CO2	L2
4.	a)	CO2	L2
	b)	CO2	L3
5.	a)	CO3	L3
	b)	CO3	L2

		CO	Blooms Level
6.	a)	CO3	L3
	b)	CO3	L2
7.	a)	CO4	L3
	b)	CO4	L2
8.	a)	CO4	L2
	b)	CO4	L3
9.	a)	CO5	L2
	b)	CO5	L3
10.	a)	CO5	L2
	b)	CO5	L2

Hall Ticket Number :										

R-19

Code: 19AC11T

I B.Tech. I Semester Supplementary Examinations December 2020

Algebra and 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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UNIT–I

1. a) Find the rank of the matrix $A=\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ by reducing it to Echelon form. 7M

   b) Determine whether the following equations will have a non-trivial solution, if so solve them $4x + 2y + z + 3w = 0$, $6x + 3y + 4z + 7w = 0$, $2x + y + w = 0$. 7M

OR

2. Find the eigenvalues and eigenvectors of the following matrix

$$A=\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}.$$

14M

UNIT–II

3. If $A=\begin{bmatrix} 2 & 1 & 2 \\ 5 & 3 & 3 \\ -1 & 0 & -2 \end{bmatrix}$, verify Cayley-Hamilton theorem. Hence find A^{-1} and A^4. 14M

OR

4. Reduce the Quadratic form $x^2+3y^2+3z^2-2yz$ to a canonical form by an orthogonal transformation and discuss its nature also find the modal matrix. 14M

UNIT–III

5. a) If $U=\dfrac{1}{\sqrt{x^2+y^2+z^2}}$, $x^2+y^2+z^2\neq 0$ then prove that $\dfrac{\partial^2 U}{\partial x^2}+\dfrac{\partial^2 U}{\partial y^2}+\dfrac{\partial^2 U}{\partial z^2}=0.$ 7M

   b) Find the maximum value of $x^m y^n z^p$ under the condition that $x+y+z=a$. 7M

OR

6. a) If $x=u(1-v)$ and $y=uv$, then prove that $JJ'=1$. 7M

   b) Examine the following function for extreme values $f(x,y)=x^4+y^4-2x^2+4xy-2y^2$. 7M

UNIT–IV

7. a) Obtain the Taylor's series expansion of $f(x) = \log_e x$ about x=1 and hence evaluate $\log_e 1.1$ correct to 4 decimal places. 7M

   b) Trace the curve $y^2(2a - x) = x^3$. 7M

OR

8. a) Obtain the Maclaurin's series expansion of $e^{\sin x}$ up to the term containing x^4. 7M

   b) Trace the curve $r = a\sin 3\theta$. 7M

UNIT–V

9. a) Evaluate $\int_0^5 \int_0^{x^2} x(x^2 + y^2)dxdy$. 7M

   b) Show that $(m,n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$, where $m > 0 \;\; n > 0$. 7M

OR

10. a) Change the order of integration and evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dydx$. 7M

    b) Evaluate $\int_0^1 \frac{x^2 dx}{(1-x^4)}$. 7M

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		CO	Blooms Level
1.	a)	CO1	L3
	b)	CO1	L5
2.		CO1	L3
3.		CO2	L3
4.		CO2	L3
5.	a)	CO3	L3
	b)	CO3	L3
6.	a)	CO3	L3
	b)	CO3	L4

		CO	Blooms Level
7.	a)	CO4	L2
	b)	CO4	L2
8.	a)	CO4	L2
	b)	CO4	L2
9.	a)	CO5	L3
	b)	CO5	L3
10.	a)	CO5	L3
	b)	CO5	L3

Hall Ticket Number :										

R-19

Code: 19A411T

I B.Tech. I Semester Supplementary Examinations December 2020

Essentials of Electrical & Electronics Engineering

(Common to EEE & ECE)

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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UNIT–I

1. a) Explain about the independent and dependent sources. 7M

   b) Classify the types of inductors. Explain about any two fixed inductors with neat sketches. 7M

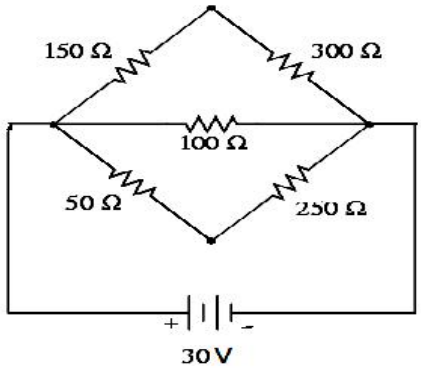
OR

2. a) Derive the expression for energy stored by the capacitor. 6M

   b) What are the different types of potentiometers? Explain. 8M

UNIT–II

3. a) Determine the current flowing through 100Ω resistor using KCL and KVL in the following circuit.

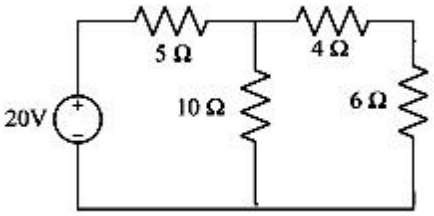


7M

   b) Derive the expressions for equivalent resistance of series and parallel connection of resistors. 7M

OR

4. a) Determine the current through 6Ω resistor using Thevenins' theorem in the following circuit.



7M

   b) State and explain Maximum power transfer theorem with an example. 7M

UNIT–III

5. a) Explain the energy band diagrams of intrinsic and extrinsic semiconductors. 7M

   b) Explain the construction and operation of Zener diode with neat sketches. 7M

OR

6. a) Explain the V-I characteristics of PN junction diode with neat sketches. 8M

   b) A silicon diode has a reverse saturation current of 7.12nA at room temperature of 27^0C.Caluclate its forward current if it is forward biased with a voltage of 0.7V. 6M

UNIT–IV

7. a) Explain the operation half wave rectifier with inductor filter. 7M

   b) A 50Ω load resistance is connected across a half wave rectifier. The input supply voltage is 240V (rms) at 50 Hz. Determine the average output voltage, RMS output voltage, average load current and PIV rating. 7M

OR

8. a) Construct and explain the operation of bridge full wave rectifier with neat waveforms. 7M

   b) The four diodes used in a bridge rectifier circuit have forward resistances which may be considered constant at 2Ω and an infinite reverse resistance. The alternating supply voltage is 240V (rms) and the resistive load is of 48Ω. Calculate (i) Average load current (I_{dc}) (ii) RMS load current (I_{rms}) (iii) Rectifier efficiency. 7M

UNIT–V

9. a) Explain the construction and operation of PNP transistor with neat sketches. 7M

   b) Explain the Input and Output characteristics of transistor in CB configuration. 7M

OR

10. a) Explain the operation of Multimeter with a neat sketch. 7M

    b) With a block diagram explain the operation of Digital Storage Oscilloscope. 7M

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		CO	Blooms Level
1.	a)	CO1	L2
	b)	CO1	L2
2.	a)	CO1	L2
	b)	CO1	L2
3.	a)	CO2	L3
	b)	CO2	L3
4.	a)	CO2	L3
	b)	CO2	L3
5.	a)	CO3	L2
	b)	CO3	L2

		CO	Blooms Level
6.	a)	CO3	L2
	b)	CO3	L2
7.	a)	CO4	L2
	b)	CO4	L2
8.	a)	CO4	L2
	b)	CO4	L2
9.	a)	CO5	L2
	b)	CO5	L2
10.	a)	CO5	L2
	b)	CO5	L2

Hall Ticket Number :										

R-19

Code: 19A312T

I B.Tech. I Semester Supplementary Examinations December 2020

Engineering Graphics & Design

(Common to EEE & ECE)

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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UNIT–I

1. A highway bridge of parabolic shape is to be constructed with a span of 10m and a rise of 5m. Make out a profile of the bridge. 14M

OR

2. Inscribe the largest possible ellipse in a rectangle of sides 160 mm and 100 mm. Use Oblong method. 14M

UNIT–II

3. Draw a hypocycloid of a circle of 40 mm diameter which rolls inside another circle of 200 mm diameter for one revolution. Draw a tangent and normal at any point on it. 14M

OR

4. Draw the curve traced out by the end of a straight line 308 mm long as it rolls over the circumference of a circle 98 mm diameter. 14M

UNIT–III

5. An 80 mm long line MN has its end M 15 mm in front of the VP the distance between the end projectors is 50 mm. The front view is parallel to and 20 mm above reference line. Draw the projections of the line and determine its inclination with the VP. 14M

OR

6. a) A line CD 40 mm long is in VP and inclined to HP. The top view measures 30 mm. The end C is 10 mm above HP. Draw the projections of the line. Determine its inclination with HP. 7M

   b) A line AB 45 mm long is in HP and inclined to VP. The end A is 15 mm in front of VP. The length of the front view is 35 mm. Draw the projections of the line. Determine its inclination with VP. 7M

UNIT–IV

7. A regular pentagon of 30 mm sides is resting on HP on one of its sides while its opposite vertex (corner) is 30 mm above HP. Draw projections when side in HP is 30^o inclined to VP. 14M

OR

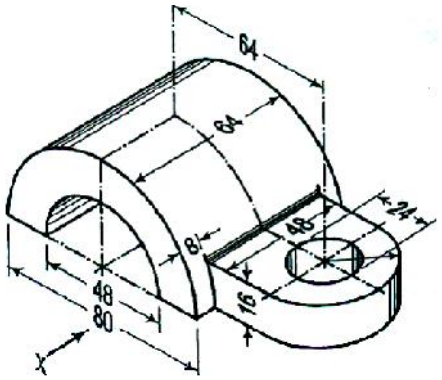
8. A semi-circular lamina of 64mm diameter has its straight edge in VP and inclined at an angle of 45^o to HP. The surface of the lamina makes an angle of 30^o with VP. Draw the projections. 14M

UNIT–V

9. Draw the projections of a pentagonal prism of base 25mm side and 50mm long. The prism is resting on one of its rectangular faces in VP with its axis inclined at 45° to HP. 14M

OR

10. Draw the front view, top view and side view for the component shown in figure. All dimensions are in mm.



14M

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		CO	Blooms Level
1.		CO1	L2
2.		CO1	L1
3.		CO2	L2
4.		CO2	L3
5.		CO3	L3
6.	a)	CO3	L2
	b)	CO3	L2
7.		CO4	L2
8.		CO4	L3
9.		CO5	L3
10.		CO5	L4

Hall Ticket Number :										

R-19

Code: 19A511T

I B.Tech. I Semester Supplementary Examinations December 2020

Problem Solving and C programming

(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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UNIT–I

1. a) Explain the structure of C program with an example program. 7M

   b) Write a C Program to find maximum number among three numbers using conditional operator. 7M

OR

2. a) List and explain the various symbols used in flowchart with figures. 7M

   b) Discuss about C data types. 7M

UNIT–II

3. a) In what way if statements differ from switch case statements. Explain 7M

   b) What is meant by searching? Explain binary search algorithm 7M

OR

4. a) What are the different types of arrays in C? Explain with a suitable example, array declaration, initialization and accessing of the elements for these different types. 7M

   b) Write a c program to print array of elements in ascending order using bubble sort. 7M

UNIT–III

5. a) Illustrate different String Input/output functions 6M

   b) Explain the following key words with example. i) auto ii) register iii) static iv) extern. 8M

OR

6. Explain all the function prototypes with example 14M

UNIT–IV

7. a) Define pointer. Explain pointer arithmetic operations 7M

   b) Explain dynamic memory allocation functions. 7M

OR

8. a) Write a C program to demonstrate array of pointers 7M

   b) Explain different parameter passing techniques with suitable routines. 7M

UNIT–V

9. a) Define structure and union. Explain the syntax and accessing elements from structure and union with an example. 7M

   b) Explain with example structures within structures. 7M

OR

10. a) Discuss about file operations 7M

    b) Write a program in C that reads files and displays them on the screen. 7M

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		CO	Blooms Level
1.	a)	CO1	L2
	b)	CO1	L3
2.	a)	CO1	L2
	b)	CO1	L1
3.	a)	CO2	L2
	b)	CO2	L1
4.	a)	CO2	L1
	b)	CO2	L3
5.	a)	CO3	L2
	b)	CO3	L2

		CO	Blooms Level
6.		CO3	L2
7.	a)	CO4	L1
	b)	CO4	L2
8.	a)	CO4	L3
	b)	CO4	L2
9.	a)	CO5	L1
	b)	CO5	L2
10.	a)	CO5	L1
	b)	CO5	L3