Hall Ticket Number :										

R-19

Code: 19AC12T

I B.Tech. I Semester Regular Examinations January 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) What is interference of light and state principle of superposition? 4M

   b) Discuss theory of interference in thin films by reflection and obtain conditions for dark and positions. 10M

OR

2. a) Identify how polarized light is different from unpolarized light and give important engineering applications of polarized light. 4M

   b) Explain polarization by double refraction and write on positive and negative crystals. 10M

UNIT–II

3. a) Derive expression of electronic polarizability and show that electronic polarization is temperature independent process. 8M

   b) Obtain Clausius and Mossotti relation in dielectrics. 6M

OR

4. a) Explain the origin of permanent magnetic moment and define Bohr magnetron. 9M

   b) Discuss Weiss theory of ferromagnetism. 5M

UNIT–III

5. a) State and prove Stoke's theorem for curl. 7M

   b) Derive expression for propagation of electromagnetic waves in non-conducting media. 7M

OR

6. a) With the help of block diagram, explain an optical fiber communication system and discuss the function of each block. 8M

   b) Illustrate various attenuation mechanisms in optical fibers. 6M

UNIT–IV

7. a) Distinguish among conductors, semiconductors and insulators based on band diagrams. 6M

   b) What are intrinsic semiconductors? Derive expression for electron concentration in intrinsic semiconductors. 8M

OR

8. a) What is Hall effect? Obtain expression for Hall voltage and discuss applications of Hall effect. 10M

   b) Distinguish between direct and indirect band gap semiconductors. 4M

UNIT–V

9. a) Define superconductivity and explain important properties of superconductors. 10M

   b) Discuss dc and ac Josephson effects in superconductors. 4M

OR

10. a) What are nano materials? Discuss mechanical, optical and magnetic properties of nano materials. 7M

    b) Discuss what top-down approach is and describe synthesis of nano particles using ball mill method. 7M

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

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

Hall Ticket Number :										

R-19

Code: 19AC11T

I B.Tech. I Semester Regular Examinations January 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) Reduce the matrix $A=\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$ to Echelon form and hence find its rank. **7M**

b) Show that the system of equations $x+2y+2z=2$, $3x-2y-z=5$, $2x-5y+3z=-4$, $x+4y+6z=0$ is consistent and hence solve it. **7M**

OR

2. Find the eigen values and eigen vectors of the following matrix

$$A=\begin{bmatrix} 5 & -2 & 0 \\ -2 & 6 & 2 \\ 0 & 2 & 7 \end{bmatrix}.$$

14M

UNIT–II

3. Verify Cayley-Hamilton theorem for $A=\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$ and hence find A^{-1} and A^4 of the matrix. **14M**

OR

4. Reduce the Quadratic form $3x^2+5y^2+3z^2-2xy-2yz+2zx$ to canonical form by an orthogonal transformation and state the nature of the quadratic form. Also find matrix of the transformation. **14M**

UNIT–III

5. a) If $z=f(x+ay)+¤(x-ay)$, prove that $\frac{\partial^2 z}{\partial y^2}=a^2\frac{\partial^2 z}{\partial x^2}$. **7M**

b) Discuss the maxima and minima of $f(x,y)=x^3y^2(1-x-y)$. **7M**

OR

6. a) If $x=r\sin^{-}\cos¤$, $y=r\sin^{-}\sin¤$, $z=r\cos^{-}$ show that $\frac{\partial(x,y,z)}{\partial(r,^{-},¤)}=r^2\sin^{-}$. **7M**

b) A rectangular box open at the top is to have volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction. **7M**

UNIT–IV

7. a) Obtain the Taylor's series expansion of sin2x about $x = \frac{®}{4}$. **7M**

   b) Trace the curve $x^3 + y^3 = 3axy$. **7M**

OR

8. a) Obtain the Maclaurin's series expansion of $\log(1+\sin^2 x)$ up to the term containing x^6. **7M**

   b) Trace the curve $r^2 = a^2 \cos 2^{-}$. **7M**

UNIT–V

9. a) Evaluate $\iint_R ydxdy$ where R is the region bounded by the parabolas $y^2 = 4x$ and $x^2 = 4y$. **7M**

   b) Prove that $(m, 1/2) = 2^{2m-1}\ (m, m)$. **7M**

OR

10. a) By changing the order of integration of $\int_0^{\infty}\int_0^{\infty} e^{-xy} \sin px\, dxdy$, show that $\int_0^{\infty} \frac{\sin px}{x} dx = \frac{®}{2}$. **7M**

    b) Show that $\Gamma(1/2) = \sqrt{®}$. **7M**

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		CO	Blooms Level
1.	a)	CO1	L3
	b)	CO1	L3
2.		CO1	L3
3.		CO2	L3
4.		CO2	L3
5.	a)	CO3	L3
	b)	CO3	L6
6.	a)	CO3	L3
	b)	CO3	L3

		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 Regular Examinations January 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) Distinguish between ideal and practical sources. 7M

   b) State and explain Ohm's law, mention the limitations. 7M

OR

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

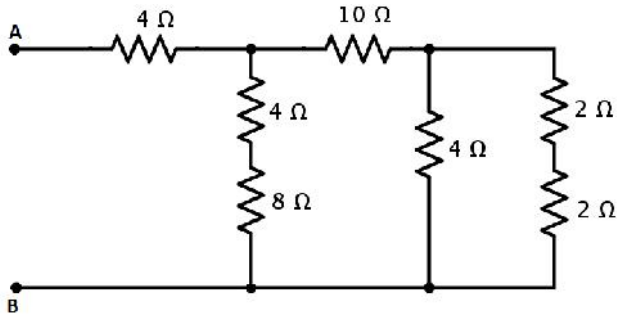
   b) Determine the color coding of following resistors.

   i) 560Ω ii)1kΩ iii) 2.2kΩ iv) 10kΩ 8M

UNIT–II

3. a) State and explain Kirchhoff's laws with an example. 7M

   b) Determine the equivalent resistance between A and B terminals in the following network.

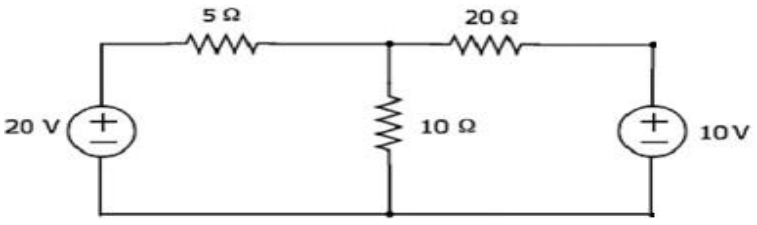


7M

OR

4. a) Explain about the source transformation technique with an example. 7M

   b) State Superposition theorem and determine the current flowing through 10Ω resistor in the following circuit using Superposition theorem.



7M

UNIT–III

5. a) Explain the operation of P-N Junction diode with neat diagrams. 8M

   b) Differentiate between Avalanche breakdown and Zener breakdown. 6M

OR

6. a) Explain about the diffusion capacitance and transition capacitance. 7M

   b) Explain how Zener diode can be used as voltage regulator. 7M

UNIT–IV

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

   b) A 60Ω load resistance is connected across a half wave rectifier. The input supply voltage is 230V (rms) at 50 Hz. Determine the average output voltage, RMS output voltage, average load current and PIV rating. 7M

OR

8. a) Explain the working of center tapped full wave rectifier with capacitor filter. 7M

   b) A 230V,50Hz voltage is applied to the primary of a 5:1 step down center tapped transformer used a in the full wave rectifier having a load of 900Ω.If the diode resistance and the secondary coil resistance together has a resistance of 100Ω, Determine :

   i) Average output voltage ii) RMS output voltage iii) Rectifier Efficiency. 7M

UNIT–V

9. a) Explain the construction and operation of NPN transistor. 7M

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

OR

10. a) With block diagram explain the operation of function generator. 7M

    b) Explain the operation of CRO with neat block diagram. 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-A

I B.Tech. I Semester Regular Examinations January 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. Construct a parabola whose base is 90 mm and axis is 80 mm using Rectangular method and Tangent method 14M

OR

2. Construct a rectangular hyperbola when a point P on it is at a distance of 30 mm and 40 mm respectively from the two asymptotes. 14M

UNIT–II

3. A circle of 40 mm diameter rolls along a straight line without slipping. Draw the curve traced by a point on the circumference, for one revolution of the circle. Name the curve. Draw a normal and tangent to the curve at a point 25 mm from the straight line. 14M

OR

4. a) Draw the involute of square of sides 20 mm. 7M

   b) Draw the involute of a circle of radius 25 mm. 7M

UNIT–III

5. a) Two points P and Q lying in the VP are 90 mm apart. The horizontal distance between the points is 60 mm. Point P is 15 mm above the HP. Find the height of the point Q above the HP and the inclination of the line joining P and Q with the HP. 6M

   b) A 60 mm long line AB is parallel to and 20 mm in front of the VP the ends A and B of the line are 10 mm and 50 mm above the HP, respectively. Draw the projections of the line and determine its inclination with the HP. 8M

OR

6. A line AB of 70 mm long, has its end A at 10 mm above HP and 15 mm in front of VP. Its front view and top view measure 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with HP and VP. 14M

UNIT–IV

7. A regular pentagon ABCDE, of side 25 mm side has its side BC on ground. Its plane is perpendicular to HP and inclined at 45° to the VP. Draw the projections of the pentagon when its comer nearest to VP is 15 mm from it. 14M

OR

8. a) A rectangular plane with 50mm and 30mm sides is perpendicular to both HP and VP. The longer edges are parallel to the HP and the nearest one is 20mm above it. The shortest edge nearer to VP is 15mm from it. Draw the projections. 7M

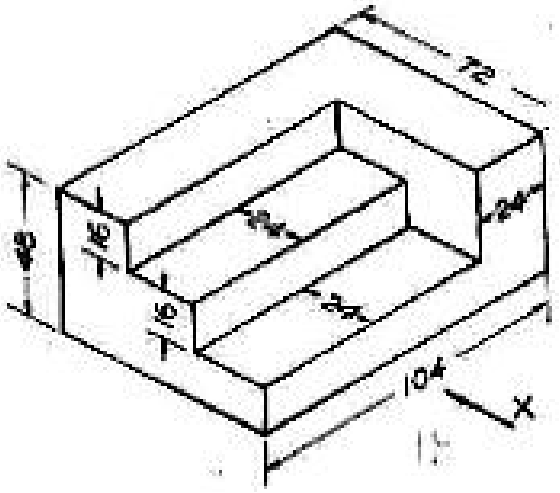
   b) A Hexagon of 3 cm side is resting on a corner in HP and its surface is 30^{o} inclined to HP and perpendicular to VP. Draw the projections. 7M

UNIT–V

9. A pentagonal prism with side of base 30mm and axis 60mm long is resting with an edge of its base on HP, such that the rectangular face containing that edge is inclined at 60° to HP. Draw the projections of the prism when its axis is parallel to VP. 14M

OR

10. Convert the following isometric view to orthographic view



14M

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

Hall Ticket Number :										

R-19

Code: 19A511T

I B.Tech. I Semester Regular Examinations January 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) Define Algorithm. Explain the characteristics of algorithm 7M

   b) List and explain briefly about various computer languages 7M

OR

2. a) What is meant by flow chart? Explain the symbols used in flowchart with an example. 7M

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

UNIT–II

3. Write a program in C language to perform the matrix multiplication. 14M

OR

4. a) Explain conditional statements with an example. 7M

   b) Write a c program to find whether the number is prime number or not. 7M

UNIT–III

5. a) Define string. Explain declaration of string. Explain any three string handling functions with neat syntax and example 6M

   b) What is recursion? Explain with an example 8M

OR

6. Explain all types of preprocessor directives with example 14M

UNIT–IV

7. a) What is pointer? How to initialize and declare pointer variables? Explain with examples. 7M

   b) Write a program to swap to numbers using pointers and functions. 7M

OR

8. a) What are the functions for dynamic memory management? Explain. 7M

   b) How do you use a pointer as a formal parameter of a function which is designed to manipulate an array? Explain. 7M

UNIT–V

9. a) Distinguish between structures and unions. 8M

   b) Write a C program to maintain a record of n students with four fields (Roll no, name, marks and grade). Print the student details 6M

OR

10. a) Define file. Write a C program to write character to a file and reading character from file. 8M

    b) Give brief description about the various modes of a file opening. 6M

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

		CO	Blooms Level
6.		CO3	L2
7.	a)	CO4	L1
	b)	CO4	L3
8.	a)	CO4	L2
	b)	CO4	L1
9.	a)	CO5	L4
	b)	CO5	L3
10.	a)	CO5	L3
	b)	CO5	L1