R-15

Code: 5G311

I B.Tech. I Semester Supplementary Examinations May 2018
Electronic Devices and Circuits –I
(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)

UNIT–I

1. a) Construct the parallel plate capacitor and 1nterpret the area capacitance.   10M

    b) List out applications of Potentiometers.   4M

OR

2. a) Interpret the types of Resistors with near diagrams.   10M

    b) Compare the characteristic of Capacitor and Inductor.   4M

UNIT–II

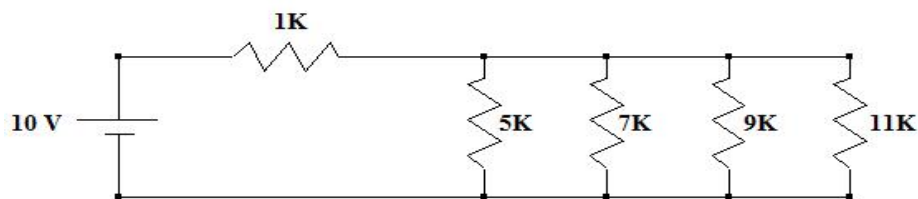3. a) State Ohm's law and prove with example   6M

    b) Identify the current flowing through and voltage across 4K   resistor.

                                                                                        8M
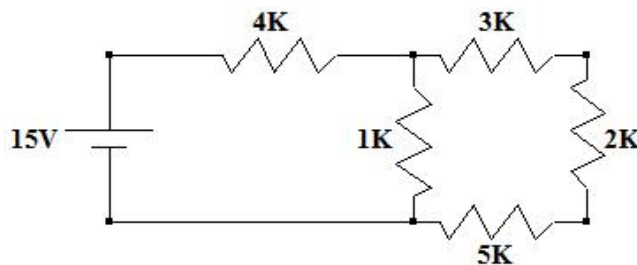
OR

4. a) Find the current flowing through 11K   resistor and voltage across 1K
        resistor.

                                                                                        7M

    b) State and explain Thevenin's theorem with an example.   7M

UNIT–III

5. a) Compose the current components of a PN junction diode   7M

    b) Outline the Energy Band Diagram of PN junction   7M

OR

6. a) Recall the formation of Junction and junction potential   10M

    b) What are the applications of PN junction diode   4M

7. a) An AC supply of 230V is applied to a centre tapped full wave rectifier circuit through a transformer with a turns ratio of 10:1, Assume the diode to an ideal and secondary winding resistance is negligible, and at the load resistance of 1K .

   Find (i) Voltage across secondary (ii) DC output voltage (iii) DC output current (iv) rectifier efficiency, (v) PIV. 10M

   b) Draw the Capacitor filter and explain 4M

OR

8. a) How AC can be converted to DC, interpret with the help of circuit and wave forms. 8M

   b) Compare Half wave rectifier and full wave rectifier 6M

UNIT–V

9. a) Infer the working principle of NPN transistor with neat diagram 10M

   b) List out the applications of BJT 4M

OR

10. a) Construct, explain CB configuration and discuss I/P and O/P characteristics. 8M

   b) A transistor has the leakage current is 0.1 µA in Common Emitter configuration, while Base current of 16µA, Estimate collector current and Emitter current at a given = 99. 6M

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Code: 5GC14

I B.Tech. I Semester Supplementary Examinations May 2018

Engineering Mathematics-I

(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) Solve the differential equation $(1 + y^2)dx + (x - \tan^{-1} y)dy = 0$ **7M**

   b) Show that the system of confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$, where is a parameter, is self-orthogonal. **7M**

OR

2. a) Solve $\frac{dy}{dx} + \frac{y}{x\log x} = \frac{\sin 2x}{\log x}$. **7M**

   b) The temperature of a body drops from 80^0C to 60^0C in 20 minutes when the temperature of the surrounding air is 25^0C. Find the temperature after 40 minutes. **7M**

UNIT–II

3. a) Solve $(D^2 + 9)y = \sec 3x$, by using method of variation of parameters. **7M**

   b) Solve $(D^2 + 4)y = x\sin x + (1 + x^2)e^x$ **7M**

OR

4. a) Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$. **7M**

   b) Solve $(D + 2)(D - 1)^2 y = e^{-2x} + 2\sinh x$. **7M**

UNIT–III

5. a) Find the series solution of the equation $2x(1 - x)\frac{d^2y}{dx^2} + (1 - x)\frac{dy}{dx} + 3y = 0$. **7M**

   b) Find the Taylor's series expansion of $f(x) = \log(1 + x)$, about $x = 0$. **7M**

OR

6. a) Solve in series the equation $\frac{d^2y}{dx^2} - y = 0$. **7M**

   b) Prove that $\frac{v-u}{1+v^2} < \tan^{-1}v - \tan^{-1}u < \frac{v-u}{1+u^2}$ by using LMV theorem. **7M**

UNIT–IV

7. a) If $u = e^{x^2+y^2+z^2}$, then find $\frac{\partial^3 y}{\partial x^3}$ **7M**

   b) Find the maximum value of $x^2 + y^2 + z^2$, given that $xyz=a^3$. **7M**

OR

8. a) Find the maximum and minimum values of $\sin x + \sin y + \sin(x + y)$. **7M**

   b) If $u = f(x,y)$, where $x = u + v$ and $y = uv$ then show that **7M**

$$u\frac{\partial z}{\partial u} + v\frac{\partial z}{\partial v} = x\frac{\partial z}{\partial x} + 2y\frac{\partial z}{\partial y}.$$

UNIT–V

9.   Trace the curve $y^2(a+x) = x^2(3a-x)$.   14M

OR

10.   Trace the curve $r = a(1+cos\theta)$.   14M

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Code: 5G111

I B.Tech. I Semester Supplementary Examinations May 2018
Problem Solving Techniques and Introduction to 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 briefly about different computer languages.   7M
   b) Explain the software development method in detail.   7M

OR

2. a) What is algorithm? What are the main steps followed in the development of an algorithm?   8M
   b) Draw flowchart and write algorithm to find sum of the digits in a given number.   6M

UNIT–II

3. a) Explain about the basic data types in C language with examples   8M
   b) Write a C program to swap (exchange) the values of two variables without using temporary variable.   6M

OR

4. a) What is meant by type conversion? Why is it necessary? Explain about implicit and explicit type conversion with examples.   9M
   b) Write a program to enter two numbers and find the largest of them. Use conditional operator.   5M

UNIT–III

5. a) Explain various selection statements available in C language with examples.   8M
   b) Write a program to print whether a given number is prime or not.   6M

OR

6. a) Explain various iterative statements available in C language with examples.   8M
   b) Write a program to find out whether the given number is Armstrong or not?   6M

UNIT–IV

7. a) What is Array? Discuss about the initialization and accessing of array elements in one dimensional and two dimensional arrays.   8M
   b) Write a program to find the maximum element of an array.   6M

OR

8. a) Explain the following string handling functions with examples:
   (i) strcpy( ) (ii) strcat( ) (iii) strrev( ) (iv) strlen( )   8M
   b) Write C program to concatenate two strings without using strcat( ) function   6M

UNIT–V

9. a) Explain about call by value and call by reference mechanisms with examples   8M
   b) What are the standard header files used in 'C'? Explain their functions.   6M

OR

10. Explain about different storage classes with examples   14M

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I B.Tech. I Semester Supplementary Examinations May/June 2018
Engineering 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) Derive the expression of wave length of monochromatic light using Newton's rings setup?   11M
    b) A parallel beams of light with wavelength 5893Å is incident on a glass plate (μ=1.5) such that an angle of refraction into plate is 60^0. Calculate the smallest thickness of the plate which will make it appear dark by reflection.   3M

OR

2. a) With the help of suitable diagram, explain the construction and working of Ruby laser.   10M
    b) Mention the applications of lasers in different fields   4M

UNIT–II

3.   Derive the packing fractions for SC, BCC and FCC. Show that FCC is the most closely packed of three cubic structures..   14M

OR

4. a) Explain the working and construction of piezoelectric method of ultrasonic wave production.   10M
    b) Explain the different detection methods of Ultrasonic waves.   4M

UNIT–III

5. a) Show that the energies of a particle in a potential box are quantized.   10M
    b) Explain the Physical significance of wave function.   4M

OR

6. a) What are the salient features of classical free electron theory? Mention its merits and demerits.   7M
    b) On the basis of band theory, explain how the solids are classified into metals, semiconductors and insulators.   7M

UNIT–IV

7. a) Distinguish between intrinsic and extrinsic semiconductors.   4M
    b) Explain the I-V characteristics of p-n Junction diode.   6M
    c) Explain the direct and indirect band gap semiconductor   4M

OR

8. a) Explain Hysteresis Curve.   7M
    b) Distinguish between soft and hard magnetic materials   7M

UNIT–V

9. a) What is a superconductor? Write the general properties of superconductors   6M
    b) Explain the BCS theory of Superconductivity in detail.   8M

OR

10. a) Describe the method of chemical vapour deposition in nano materials preparation   6M
    b) Write the optical, thermal, mechanical and magnetic properties of Nanomaterials.   8M

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I B.Tech. I Semester Supplementary Examinations May 2018
Engineering Drawing- I
(Common to EEE, ECE, CSE and IT)

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) Divide a line length 125 MM in the ratio 1 : 3 : 4.

   b) Inscribe a hexagon in a circle of Radius 20 MM.

OR

2. a) Construct a Pentagon, given the length of the side is Equal to 30 MM.

   b) Draw a tangent to a circle with convenient radius.

UNIT–II

3. a) A plot of ground is in the shape of a rectangle of size 100 x 60m. Inscribe an elliptical lawn in it.

   b) Draw a parabola whose focus is at a distance of 50 mm from the directrix. Draw a tangent and normal at any point on it

OR

4. a) A vertex of a hyperbola is 50 mm from its focus. Draw two parts of the hyperbola; if the eccentricity is *3/2*.

   b) Draw a parabola if the longest ordinate of it is 50 mm and abscissa is 120 mm. Locate its focus and directrix

UNIT–III

5. a) Construct a cycloid having a rolling circle of 60 mm diameter. Also draw a tangent and normal at any point P on the curve

   b) Draw a hypocycloid having a generating circle of r1iameter 50 mm and directing circle of radius 10 mm. Also draw a normal and a tangent at any point M on tile curve

OR

6. a) Draw a hypocycloid for a rolling circle of diameter 75 mm and a base circle of 250 mm diameter. Draw a tangent and a normal at any point on the curve.

   b) Construct an epicycloid having a generating circle of diameter 75mm and a directing curve of radius 200 mm. Also draw a normal and a tangent at a point P on the curve

UNIT–IV

7. a) Draw the projections of the following points on the same ground line, keeping the distance between projectors equal to 25 mm.
   (i)Point A, 20 mm above HP, 25 mm behind VP; (ii) Point B, 25 mm below HP, 20 mm behind VP; (iii)Point C, 20 mm below HP, 30 mm in front of VP;

   b) A straight line AB of 40 mm length has one of its ends A, at 10 mm from the HP and 15 mm from the VP. Draw the projections of the line if it is parallel to the VP and inclined at 30°to the HP. Assume the line to be located in each of the four quadrants by turns

OR

8. a) A line AB 45 mm long is in H.P. and inclined to V.P. The end A is 15 mm in front of V.P. The length of the front view is 35 mm. Draw the projections of the line. Determine its inclination with V.P.

   b) A line 75 mm long is inclined at 50° to VP and one of the ends is on it. It is parallel to HP and 40 mm below it. The line is behind VP. Draw its projections.

UNIT–V

9. a) Line AB is 75 mm long and it is 30^0& 40^0 inclined to HP & VP respectively. End A is 12mm above HP and 10 mm in front of VP. Draw projections. Line is in 1st quadrant.

   b) A straight line AB 70mm long has one of its ends 25 mm behind VP and 20 mm below HP. The line is inclined at 30° to HP and 50° to VP. Draw its projections

OR

10. a) A line AB, 50mm long, has its end A in both the H.P. and the V.P. It is inclined at 300 to the H.P. and at 450 to the V.P. Draw its projections

   b) A top view of a 75 mm long line AB measures 65 mm, while the length of its front view is 50 mm. Its I.-lie end A is in the H.P. and 12 mm in front of the V.P. Draw the projections of AB and determine its inclination with H.P. and the V.P.

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