Hall Ticket Number :										

R-15

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) $(1+y^2)+\left(x-e^{\tan^{-1}y}\right)\frac{dy}{dx}=0$ 7M

   b) The temperature of a body drops from 100^{0}C to 75^{0}C in ten minutes when the temperature of the surrounding air is 20^{0}C. When will be the temperature is 25^{0}C. 7M

OR

2. a) Uranium disintegrates at a rate proportional to the amount present at any instant. If M_1 and M_2 are games of uranium that are present at times T_1 and T_2 respectively, find half life of uranium. 7M

   b) Solve $\frac{dy}{dx}+y\,tanx=y^2\,secx$. 7M

UNIT–II

3. a) Solve $(D^3+2D^2-D-2)y=1-4x^3$. 7M

   b) Solve $(D^3-4D^2-D+4)y=e^{3x}cos2x$. 7M

OR

4. a) Solve $(D^2+4D+20)y=23sint-15cost$. 7M

   b) Solve $(D^2-1)y=xsinx+x^2e^x$. 7M

UNIT–III

5. a) Solve in series the equation $(1+x^2)\frac{d^2y}{dx^2}+x\frac{dy}{dx}-y=0$. 7M

   b) Verify Rolle's theorem for the function $f(x)=(x-a)^m(x-b)^n$, where *m* and *n* are positive integers, in [a, b]. 7M

OR

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

   b) Obtain the Maclaurin's series expansion of *f(x) = tanx.* 7M

UNIT–IV

7. a) If $x=r\,sin\theta\,cos\phi, y=rsin\theta\,sin\phi, y=rcos\theta,$ then show that

   $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}=r^2\,sin\theta$. 7M

   b) Find the maximum and minimum values of

   $f(x,y)=x^3+3xy^2-15x^2-\quad 15y^2+72x.$ 7M

OR

8. a) Find a point on the plane *3x+2y+z-12=0*, which is nearest to the origin. 7M

   b) If $u=\log(x^3+y^3-x^2y-xy^2)$, then show that

   $\frac{\partial^2u}{\partial x^2}+2\frac{\partial^2u}{\partial x\partial y}+\frac{\partial^2u}{\partial y^2}=\quad -\frac{4}{(x+y)^2}$ 7M

UNIT–V

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

OR

10. Trace the curve $r^2=a^2\,Cos\,2\theta$ 14M

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Hall Ticket Number :										

R-15

Code: 5GC13

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Engineering Physics

(Common to EEE and ECE)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. Describe the Newton's Rings formation experiment 14M

OR

2. Explain the terms interference, diffraction and reflection 14M

UNIT–II

3. Prove that FCC is more closely packed than BCC and SC. 14M

OR

4. Describe with suitable diagram the laue method for determination of crystal structure. 14M

UNIT–III

5. a) What is Fermi energy level and explain Fermi-Dirac distribution function in detail 7M
   b) Write the postulates of Lorentz- Drude free electron model 7M

OR

6. a) How energy band theory helps in classification of solids 6M
   b) Define resistivity and explain sources of resistance in metals 8M

UNIT–IV

7. a) Explain the constructions and working of light emitting diode (LED). 7M
   b) Discuss advantages and applications of LED. 7M

OR

8. Write about the following
   (a) Hall effect and their applications 5M
   (b) Ferromagnetism and their properties 5M
   (c) Distinguish between soft and hard magnetic materials 4M

UNIT–V

9. a) What are cooper pairs? 4M
   b) Explain the theory of formation of cooper pairs 10M

OR

10. a) Discuss about the critical parameters that affects superconductivity 8M
    b) Explain how the flux exclusion principle is used to store the magnetic field 6M

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Hall Ticket Number :										

R-15

Code: 5G111

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) What is Programming Language? Explain about Computer Programming Languages with example. 7M

b) Explain different phases in Software Development method. 7M

OR

2. a) Define flowchart. Draw flowchart to find biggest of three numbers 7M

b) Define algorithm. Write an algorithm to find roots of a quadratic equation. 7M

UNIT–II

3. a) Describe the various steps involved in executing a C program 6M

b) Define operator. Describe different types of operators used in c language with example. 8M

OR

4. a) Describe the structure of c program with suitable example. 8M

b) Explain typedef AND enumerated type with suitable example. 6M

UNIT–III

5. a) Write a program to display the even numbers between 1 and 100 6M

b) Explain break, continue and goto statements with suitable example. 8M

OR

6. Write a c program to print the following pattern using while, do-while and for loop.

```
1
1  2
1  2  3
1  2  3  4
```

14M

UNIT–IV

7. a) Write a c program for sorting the elements of an array in ascending order. 8M

b) Define string. Explain declaration and initialization of string variables. 6M

OR

8. a) What is an array? How one-dimensional arrays are declared and initialized. Give suitable example. 6M

b) Explain String handling functions with suitable example programs. 8M

UNIT–V

9. a) What is function? Describe different categories of functions with suitable example programs. 9M

b) Explain in detail about Preprocessor Commands. 5M

OR

10. a) Explain the scope, visibility and lifetime of variables with suitable examples. 8M

b) Describe the two parameter passing methods with suitable examples 6M

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Hall Ticket Number :										

R-15

Code: 5G513

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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 straight line of 125 mm into a 9 equal parts.
   b) Inscribe a regular pentagon of side length equal to 30 mm in a circle.

OR

2. a) Draw a tangent from any point outside the circle with suitable radius
   b) Construct a hexagon, given the length of the side is equal to 25 mm

UNIT–II

3. a) A cricket ball thrown reaches a maximum height of 9 m and falls on the ground at a distance of25 m from the point of projection. Draw the path of the ball. What is the angle of projection?
   b) Construct an ellipse when a pair of conjugate diameters AB and CD are equal to 120 mm and 50 mm respectively. The angle between the conjugate diameters is *60°.*

OR

4. a) Draw a parabola with the distance of the focus from the directrix at 50mm using Eccentricity method
   b) Two fixed point A and B are 120 mm apart. Trace the locus of a point moving in such a way that the difference of its distances from the fixed points is 80 mm. Name the curve after plotting it.

UNIT–III

5. a) A circular wheel of diameter 100 mm rolls over a straight surface without slipping. Draw the curve traced by a point P for one revolution of the wheel. Assume that the critical position of the point P is at the top of the vertical centre line of the wheel. Name the curve.
   b) 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

OR

6. a) Draw an epicycloid of rolling circle of diameter 40 mm which rolls outside another circle (base circle) of 150 mm diameter for one revolution. Draw a tangent and normal at any point on the curve.
   b) Construct a conic when the distance of its focus from its directrix is equal to 50 mm and its eccentricity is 2/3.Name the curve, mark its major axis and minor axis. Draw a tangent at any point, P on the curve.

UNIT–IV

7. a) Draw the projections of points for the following cases
   (i) A point P is lying at 30 mm behind VP and 60 mm below HP
   (ii) Point Q, 20 mm above HP, 25 mm in front of VP;
   (iii) Point R, on HP, 25 mm behind VP;
   (iv) Point S, on VP, 30 mm above HP;

   b) Draw the projections of a straight line 70 mm long when it is parallel to both HP and VP. It is 15 mm in front of VP and 40 mm above HP.

OR

8. a) The length of the front view of a line CD which is parallel to HP and inclined 30° to VP, is 50 nun. The end C of the line is 15 mm in front of VP and 25 mm above HP. Draw the projections of the line and find its true length

   b) A line EF 60 mm long is parallel to VP and inclined 30° to HP. The end E is 10 mm above HP and 20 mm in front of VP. Draw the projections of the line

UNIT–IV

9. a) Draw the projections of a point A which is at 40 mm above HP and 25 mm in front of VP.

   b) A line of length 70 mm is parallel and 20 mm in front of VP. It is also inclined at 45° to HP and one end is on it. Draw its projections

OR

10. a) A line AB, 90 mm long, is inclined at 300 to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P.

    b) A line AB of 70 mm long, has its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measure 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with H.P. and v.P.

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Hall Ticket Number :										

R-15

Code: 5G311

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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)

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UNIT–I

1. a) i) Outline the importance of tolerance band in colour code resistors. 3M

   ii) Write the colour code for the given resistors 5.5KΩ, 10KΩ. 4M

   b) List out the types of capacitors and explain. 7M

OR

2. a) Interpret the symbolic representations of

   i) DC voltage source ii) AC voltage source

   iii) Dependent current source iv) Variable resistor 8M

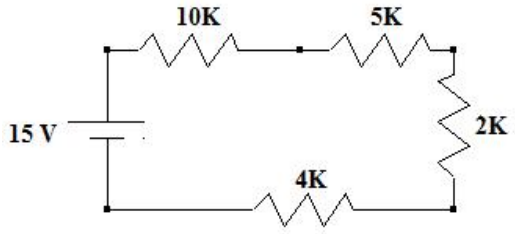
   b) i) Define the passive components 3M

   ii) Write the application of Inductors 3M

UNIT–II

3. a) Describe Maximum power transfer theorem with an example 8M

   b) Identify the voltage across 2KΩ resistor.

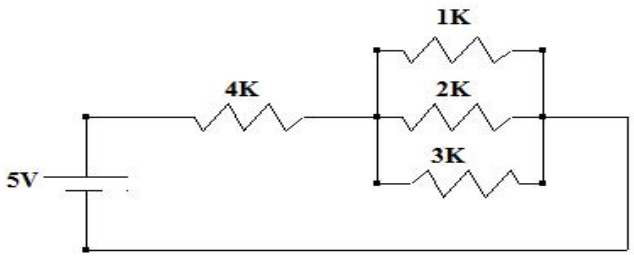


6M

OR

4. a) State Kirchhoff's Current law and prove with an example 6M

   b) Estimate the current flowing through 3KΩ resistor



8M

UNIT–III

5. a) Find the value of DC resistance of Ge diode at 25^{o} C with leakage current 25 µ A at an applied voltage of 0.2 V 6M

   b) Justify, how Zener diode is suitable as voltage Regulator and not rectifier 8M

OR

6. a) Outline the operation of Diode in Forward and reverse bias. 7M

   b) Illustrate Breakdown Mechanisms in semiconductor diodes 7M

UNIT–IV

7. The Half wave rectifier circuit is supplied with a 230V AC through 3:1 Step down Transformer with a resistive load of 10KΩ, the diode forward resistance is 75Ω and transformer secondary winding resistance 10Ω. Calculate step-down voltage, V_{DC}, I_{DC}, V_{RMS}, I_{RMS}, Rectifier efficiency, and $P_{DC.}$ 14M

OR

8. a) Develop centre tapped full wave rectifier with its operation. 10M

   b) Compare the advantages of capacitor filter over Inductor filter 4M

UNIT–V

9. a) Elaborate the current components of NPN transistor and explain 6M

   b) Construct Common Emitter configuration and derive Output characteristics 8M

OR

10. a) Prioritize the types of transistor configuration based on current gains, and voltage gains 6M

    b) For a transistor the leakage current is 0.2 μ A in CB configuration, while it is 18 μ A when it is connected in CE configuration. Calculate α, and β of the same transistor 8M

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