

Hall Ticket Number : 

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**R-14**

**Code: 4GC13**

*B.Tech. I Year Supplementary Examinations May/June 2016*

**Engineering Chemistry**

( 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 hardness of water? Mention its units. Calculate the carbonate and non carbonate hardness of a sample of water contains the following salts per litre.  
 $Mg(HCO_3)_2 = 7.3$  mg,  $Ca(HCO_3)_2 = 16.2$  mg,  $MgCl_2 = 9.5$  mg,  $CaSO_4 = 13.6$  mg. 7M
- b) Describe the desalination process by reverse osmosis with a neat sketch 7M

**OR**

2. What are boiler troubles? How are they caused? Give suggestions to minimize the troubles. 14M

**UNIT-II**

3. a) Differentiate between cathodic protection and anodic protection 8M
- b) What is the emf of the following cell at 25°C  
 $Zn(s)/Zn^{++}(0.1M)||Cu^{++}(1.75M)/Cu(s)$ . The standard emf of the cell is 1.1 V 6M

**OR**

4. Define fuel cell. Explain the construction and working of  $H_2-O_2$  fuel cell. What are the advantages and limitations of fuel cell? Write the reactions involved. Why is water formed in this cell removed continuously? 14M

**UNIT-III**

5. What are silicones? Give preparation, properties and applications of silicones 14M

**OR**

6. Give an account of preparation, properties and engineering uses of the following
- (i) Bakelite 4M
  - (ii) PVC 4M
  - (iii) Styrene rubber 3M
  - (iv) Nitrile rubber 3M

**UNIT-IV**

7. What are the characteristics of metallurgical coke? Describe the manufacture for metallurgical coke by Otto-Hoffmann's method 14M

**OR**

8. a) With a neat diagram describe the Orsat's gas analysis method. 10M
- b) Define calorific value of a fuel. Distinguish gross and net calorific value of fuel. 4M

**UNIT-V**

9. What are rocket propellants? How are they classified? What are the requirements for the selection of a good propellant? 14M

**OR**

10. What is the composition of Portland cement? Explain how Portland cement is manufactured by wet process, with the help of chemical reactions involved in it 14M

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Hall Ticket Number :

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R-14

Code: 4G311

B.Tech. I Year Supplementary Examinations May/June 2016

**Electronic Devices & Circuits**

( Common to EEE and ECE )

Max. Marks: 70

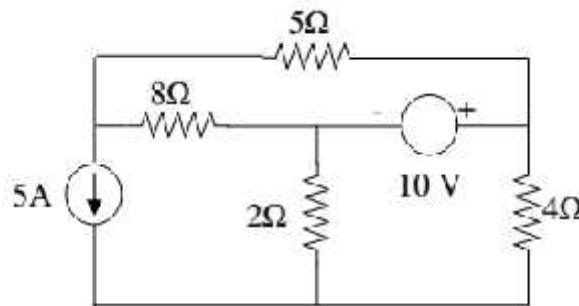
Time: 3 Hours

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

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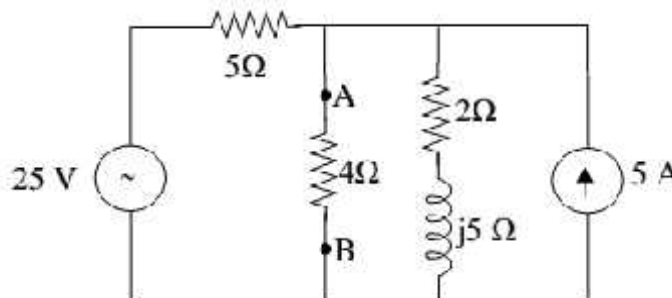
**UNIT-I**

- Explain the source transformation techniques with suitable circuits. 7M
  - Find mesh currents and determine voltage across each element in the circuit shown in below Figure. 7M



OR

- Explain and prove super position theorem. 7M
  - In the circuit shown in below figure, find the current through  $R_L$  connected across A-B terminals by utilizing Thevenin's theorem. 7M



**UNIT-II**

- Explain the operation of Full Wave Rectifier with Induction filter with necessary diagrams. 7M
  - A diode whose internal resistance is 20 is to supply power to a 100 load from 110V (R.M.S) source of supply. Calculate i) Peak Load Current ii) DC Load Current iii) AC Load Current iv) % Regulation from No load to given load 7M

OR

- Explain break down mechanisms in semiconductor diodes. 7M
  - Explain V-I characteristics of PN junction diode and compare with ideal diode. 7M

UNIT-III
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5. a) Explain the operation of CB Configuration of BJT and its input and output Characteristics briefly. 7M
- b) A transistor with  $\beta = 0.97$  has a reverse saturation current of  $1\mu\text{A}$  in CB configuration. Calculate the value of leakage current in the CE configuration. Also find the collector current and the emitter current if the value of base current is  $20\mu\text{A}$ . 7M

OR

6. a) Explain emitter feedback bias .In a Silicon transistor circuit with a fixed bias,  $V_{CC}=9\text{V}$ ,  $R_C=3\text{K}$  ,  $R_B=8\text{K}$  ,  $\beta=50$ ,  $V_{BE}=0.7\text{V}$ . Find the Stability factor. 7M
- b) Explain about Punch through and Base width modulation. 7M

UNIT-IV
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7. a) Explain JFET transfer characteristics. What are the values of  $I_D$  and  $g_m$  for  $V_{GS} = -0.8\text{V}$  if  $I_{DSS}$  and  $V_P$  are given as  $12.4\text{mA}$  and  $-6\text{V}$  respectively. 7M
- b) Explain Biasing in MOSFETS. 7M

OR

8. a) Explain construction and characteristics of MOSFET with neat diagram 7M
- b) Explain self-bias configuration of FET. 7M

UNIT-V
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9. a) Explain the working principle of Varactor diode with its characteristics. 7M
- b) Explain the basic principle and operation of PIN diode and also its applications. 7M

OR

- 10 a) Explain the principle and characteristics of Schottkey Diode with neat diagrams. 7M
- b) Explain the basic principle and operation of SCR . 7M

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**Code: 4G513***B.Tech. I Year Supplementary Examinations May/June 2016***Engineering Drawing**

( Common to EEE, ECE, CSE &amp; 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. The distance between two fixed points is 100mm. a point moves in a plane through these two points, such that the sum of its distances from these two fixed points is always 140mm. Trace the path of the point. Draw a tangent and a normal to the curve at a point on it at a distance of 45mm from one of the fixed points.

**OR**

2. Draw an epicycloid when the directing and generating circles are each 50mm dia. Draw a tangent and a normal to the curve at a point on it 60mm. from the centre of the directing circle.

**UNIT-II**

3. The front view of a 125mm long line PQ measures 75mm and its top view measures 110mm. The end P is at distances of 20mm each from the reference planes. Draw its projections and determine its inclinations with the reference planes.

**OR**

4. A line AB is inclined at  $40^\circ$  to H.P. A is 25mm above H.P. and 30mm in front of V.P. The top view of the line is 70mm long and is inclined at  $30^\circ$  to XY. Draw the projections and determine true length and also its inclination with V.P.

**UNIT-III**

5. Draw the projections of a regular hexagon of 30mm side, having one of its sides in the H.P. but inclined at  $60^\circ$  to V.P., and its surface making an angle of  $45^\circ$  with H.P.

**OR**

6. The top view of a plate, the surface of which is perpendicular to V.P. and inclined at  $60^\circ$  to H.P., is a circle of 60mm dia. Determine its true shape.

**UNIT-IV**

7. Draw the projections of a pentagonal prism, 30mm base edges & 65mm long axis, when it has a corner of its base in the V.P., axis inclined at  $30^\circ$  to V.P. and the front view of the longer edge passing through the corner in the V.P. making an angle of  $45^\circ$  with XY

**OR**

8. Draw the projections of a cube of 40mm long edges, resting on one of its corners in the H.P. and a solid diagonal perpendicular to V.P.

**UNIT-V**

9. Draw the isometric view of the frustum of the hexagonal pyramid, base 50mm long edges, top 25mm long edges & height 50mm.

**OR**

10. Draw the front view, side view and top view of the solid shown in figure.

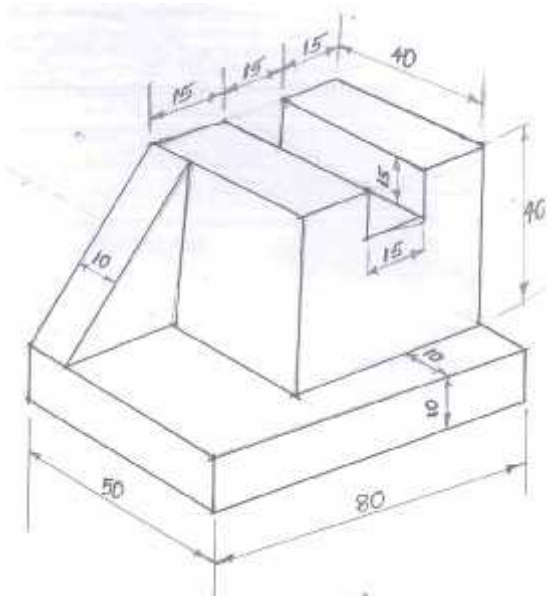


Figure (Not to scale)

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**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) Find the orthogonal trajectories of the family of curves  $r^n = a^n \cos n\theta$  7M
- b) Solve  $\frac{d^2y}{dx^2} + 4y = \tan 2x$  by the method of variation of parameters 7M

**OR**

2. a) If the temperature of a cup of coffee is 92°C when freshly poured in a room having temperature 24°C. In one minute it was cooled to 80°C. How long a period must elapse before the temperature of the cup becomes 65°C? 6M
- b) Solve  $(D^3 + 1)y = e^{-x} + \cos(2x - 1)$  8M

**UNIT-II**

3. a) Verify Rolle' theorem for  $f(x) = e^{-x} \sin x$  in  $[0, f]$ . 8M
- b) If  $u = x + y + z, uv = y + z, uvw = z$ , then prove that  $\frac{\partial(x, y, z)}{\partial(u, v, w)} = u^2 v$  6M

**OR**

4. a) Verify the Meclaurin's theorem for  $f(x) = (1-x)^{\frac{5}{2}}$  with Lagrange's form of remainder up to 3 terms with  $x=1$ . 7M
- b) Discuss the maxima and minima of  $f(x, y) = x^3 y^2 (1-x-y)$ . 7M

**UNIT-III**

5. a) Trace the curve  $y^2(2a-x) = x^3$  7M
- b) Evaluate  $\iint r \sin \theta \, dr d\theta$  over the cardioids  $r = a(1 - \cos \theta)$  above the initial line. 7M

**OR**

6. Change of order of integration and hence evaluate the double integral  $\int_0^1 \int_{x^2}^{2-x} xy \, dx dy$  14M

**UNIT-IV**

7. a) Evaluate  $L\{te^{3t} \sin 2t\}$  4M
- b) Find the Laplace transform of periodic function  $f(t) = \begin{cases} 1, & 0 < t < a/2 \\ -1, & a/2 < t < a \end{cases}$  And  $f(t+a) = f(t)$ . 10M

**OR**

8. Solve  $y'' + 2y' + 5y = e^{-t}$ ,  $y(0) = 0$ ,  $y'(0) = 1$  using Laplace transform technique. 14M

**UNIT-V**

9. a) Find the directional derivative of  $2xy + z^2$  at  $(1, -1, 3)$  in the direction of  $\bar{i} + 2\bar{j} + 3\bar{k}$ . 7M
- b) Prove that  $\text{div} \left( \frac{\bar{r}}{r} \right) = \frac{2}{r}$ , where  $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$  and  $r = |\bar{r}|$  7M

**OR**

10. Verify Gauss divergence theorem for  $\bar{F} = (x^3 - yz)\bar{i} - 2x^2y\bar{j} + z\bar{k}$  taken over the surface of cube bounded by the planes  $x=y=z=a$  &  $x=y=z=0$ . 14M

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**Code: 4G113***B.Tech. I Year Supplementary Examinations May/June 2016***Programming in C and Introduction to Datastructures**

( Common to CE, EEE, ME and 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) Differentiate high level language, assembly level language and machine level language 7M
- b) Define Flow chart. List some commonly used symbols and specify its purpose 7M

**OR**

2. a) Explain memory allocation for constant. How to assign range of values in 'C' Data types? 7M
- b) Define identifier. List the rules for identifier. Give valid and invalid examples 7M

**UNIT-II**

3. a) Define Array? Write the declaration of Multi Dimensional Array 7M
- b) Differentiate between while loop and do while loop 7M

**OR**

4. a) Give examples for postfix, prefix, unary and binary expressions. 7M
- b) Write a C program to check whether a given number is Armstrong number or not. 7M

**UNIT-III**

5. a) Write a C program to find GCD of two numbers using recursion 7M
- b) Describe the steps in writing a function in a C program? 7M

**OR**

6. a) Describe dynamic memory allocation functions 7M
- b) Define Function. Explain how to define User-Defined Functions. 7M

**UNIT-IV**

7. a) Write a program in C to copy the contents of one file to another file 7M
- b) Explain the functions supported to perform read operation on file 7M

**OR**

8. a) Write a program in C to merge two files into another file 7M
- b) Explain with an example how to pass structure variable as argument by value and by reference 7M

**UNIT-V**

9. a) Write the procedure for evaluation of postfix expression 7M
- b) Write a program in C to implement the insert and delete operation of queue using arrays/sequential representation 7M

**OR**

10. a) Discuss the procedure to convert infix expression to postfix expression 7M
- b) Write a program in C to implement the push and pop operation of Stack using arrays/sequential representation 7M

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