

Code: 4G513

B.Tech. I Year Supplementary Examinations May 2017

Engineering Drawing

(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)

UNIT-I

1. Construct a hyperbola, with the distance between the focus and the directrix as 50mm and eccentricity as $3/2$. Also, draw normal and tangent to the curve at a point 30 mm from the axis.

OR

2. Draw an epicycloid of rolling circle 40mm diameter, which rolls outside another circle of 150 mm diameter for one revolution.

UNIT-II

3. Draw the projections of the following points on a common reference line.

- i) P 35mm behind the VP and 20mm below the HP
 ii) Q 40mm in front the VP and 30mm above the HP
 iii) R 50mm behind the VP and 15mm above the HP
 iv) S 40mm below the HP and in the VP
 v) T 30 mm in front of the VP and 50mm below the HP

OR

4. A line PQ 70 mm long has its end P 10 mm above H.P and 15 mm in front of V.P. Its top view and front view measure 60 mm and 40 mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P

UNIT-III

5. A hexagonal plate of side 20 mm rests on the HP on one of its sides inclined at 45° to the VP. The surface of the plate makes an angle of 30° with the H.P. Draw the front and top views of the plate.

OR

6. A regular pentagonal lamina ABCDE of side 30 mm has one of its edges parallel to the VP and inclined at 30° to the HP. The pentagon is inclined at 45° to the VP. Draw the projections.

UNIT-IV

7. A Square pyramid of base side 30 mm and axis length 50 mm has one of its triangular faces in the VP and the axis parallel to and 25 mm above the HP. Draw its top and front views.

OR

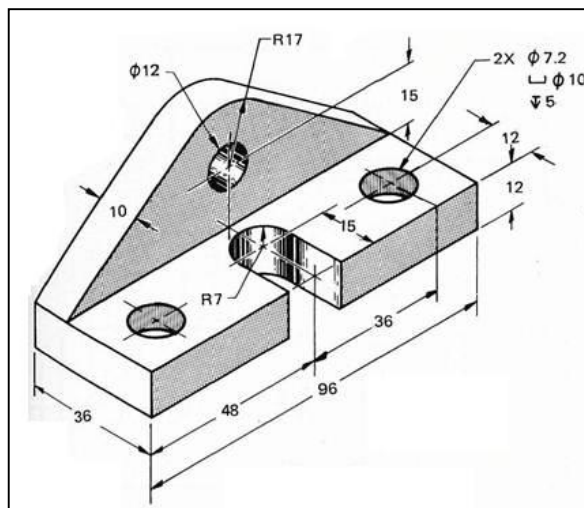
8. Draw the projections of a hexagonal prism of base 25 mm side and axis 60 mm long resting on one of its corners of the base on HP. The axis of the solid is inclined at 45° to HP.

UNIT-V

9. A pentagonal prism, 30 mm edge of base and 65 mm height, stand on HP such that an edge of the base is parallel to VP and nearer to it. Draw the isometric view of the prism.

OR

10. Sketch the front view and top view of the object given in figure below.



Code: 4GC14

B.Tech. I Year Supplementary Examinations May 2017

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)

UNIT-I

1. a) Solve $(x+1) \frac{dy}{dx} - y = e^{3x}(x+1)^2$. 7M

b) Solve $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + 2y = x + e^x \cos x$. 7M

OR

2. a) A body cools at 80°C initially and 60°C after 20 minutes, the temperature of the air being 40°C. What will be the temperature of the body after 40 minutes from the original? 7M

b) Using the method of variation of parameters Solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$. 7M

UNIT-II

3. a) Verify Lagrange's mean value theorem for the function $f(x) = (x-1)(x-2)(x-3)$ in $(0, 4)$, and find the appropriate value of 'c'. 7M

b) If $x = 2 + 3t, y = 4 - 2t, z = 3 - t$ in $(2, 4, 3)$, then evaluate $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ at $(1, -1, 0)$. 7M

OR

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

b) Expand $e^{\sin x}$ by Maclaurin's series upto the term containing x^4 . 7M

UNIT-III

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

b) Change the order of integration in $I = \int_0^1 \int_{4a^2x^2}^{2\sqrt{ax}} dx dy$ and hence evaluate. 7M

OR

6. a) Evaluate $\int_0^1 \int_0^1 \int_0^{x+y} e^{x+y+z} dz dy dx$. 7M

b) Evaluate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} dx dy$ by changing to polar co-ordinates and hence show that $\int_0^{\infty} e^{-x^2} dx = \frac{\sqrt{\pi}}{2}$. 7M

UNIT-IV

7. a) If a periodic function of period '2a' is defined by $f(x) = \begin{cases} t, & 0 \leq t \leq a \\ a-t, & a \leq t \leq 2a \end{cases}$, then show that $L\{f(t)\} = \frac{1}{s^2} \tanh\left(\frac{2s}{2}\right)$. 7M

b) Find $L\left\{\frac{\cos at - \cos bt}{t} + t \sin t\right\}$. 7M

OR

8. a) Apply convolution theorem to evaluate $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$. 7M

b) Use Laplace transform method to solve $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + y = e^t$, given $y(0) = 2, y'(0) = -1$. 7M

UNIT-V

9. a) Find $\text{div} \vec{F}$ and $\text{curl} \vec{F}$, where $\vec{F} = \text{grad}(x^3 + y^3 + z^3 - xyz)$. 7M

b) Verify Green's theorem for $\int_C (x^3 + 2y^3 + z^3 - e^{xyz}) dx + (xy + y^2) dy + x^2 dz$, where C is the curve bounded by x and $y = x^2$. 7M

OR

10. a) Verify Divergence theorem for $\vec{F} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$ taken over the rectangular parallelepiped $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$. 7M

b) Show that $\text{div}(\text{grad } r^n) = n(n+1)r^{n-2}$. 7M

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R-14

Code: 4G113

B.Tech. I Year Supplementary Examinations May 2017
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)

UNIT-I

- 1 a) Define
- i) Algorithm. 4M
 - ii) Flowchart 4M
- b) Explain the structure of a C program with example 6M
- c) Write a C program to find average of six subject marks. 4M

OR

- 2 a) Explain in details about computing environments 7M
- b) Write a C program to swap two integer numbers. 7M

UNIT-II

- 3 a) Explain in detail about switch statement. 7M
- b) Write a C program to generate multiplication table. 7M

OR

- 4 a) How do you declare a one dimensional array? Write a C program to find sum the sum of elements initialized in one dimensional array. 7M
- b) Describe the purpose of break and continue statements in C 7M

UNIT-III

- 5 a) Define Pointer. List the features of Pointers 7M
- b) Explain in detail about call by value and call by reference. 7M

OR

- 6 a) List the names of the functions supported in the header file "stdio.h" and specify the purpose of at least three functions. 8M
- b) Explain about malloc() and calloc() 6M

UNIT-IV

- 7 a) Write a program in C to search for an element using binary search technique 7M
- b) Define Structures. Explain with an example how structure members are initialized and accessed 7M

OR

- 8 a) Explain merge sort with an examples 8M
- b) Differentiate between structures and unions. 6M

UNIT-V

- 9 a) Write a program in C to evaluate postfix expression. 7M
- b) Define Stack. Explain the push and pop operation of Stack 7M

OR

- 10 a) When we will use circular queues instead of queues. Explain the insert and delete operation of circular queue 9M
- b) What are the applications of queues? 5M

Code: 4G311*B.Tech. I Year Supplementary Examinations May 2017***Electronic Devices & Circuits**

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

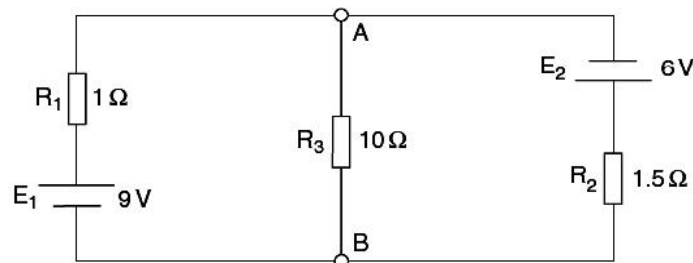
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) State and explain Kirchoff voltage and current law with an example 8M
b) Explain about Maximum Power transfer theorem 6M

OR

2. a) State the Norton's theorem 4M
b) From the circuit shown below determine the current through the 10 resistor using Thévenin's theorem 10M

**UNIT-II**

3. a) What do you understand by depletion region at PN junction? What is the effect of forward and reverse biasing of PN junction on the depletion region? Explain with necessary diagrams. 8M
b) Derive the expression for rectification efficiency of Full wave rectifier circuit 6M

OR

4. a) Sketch the energy band diagram of an open-circuited PN-junction. Explain the terms: 'depletion region', 'potential barrier', and 'barrier energy'. 8M
b) Explain how Zener diode acts as a voltage regulator 6M

UNIT-III

5. a) Explain the input and output characteristics of the transistor in CE configuration with diagrams. 6M
b) Draw the Transistor biasing circuit using fixed bias arrangement and explain its principle with suitable analysis. 8M

OR

6. a) Explain the operation of NPN transistor with neat diagrams 6M
b) Draw the Transistor biasing circuit using Voltage divider bias arrangement and explain its principle with suitable analysis. 8M

UNIT-IV

7. a) Draw fixed biasing circuit of N-Channel FET and explains the function of each component in the circuit in fixing the quiescent operating conditions of amplifiers 8M
b) Explain the principle of MOSFET in depletion mode. 6M

OR

8. What are the biasing schemes available to achieve the required bias in a junction field effect transistor? Explain any one of the biasing schemes. 8M
Explain the operation of enhancement mode MOSFET 6M

UNIT-V

9. a) Sketch the four-layer construction of an SCR and the two-transistor equivalent circuit. Explain the device operation 7M
b) Explain the principle and working of phototransistor with diagrams 7M

OR

10. a) Draw the circuit diagram to obtain the UJT characteristics between the Emitter voltage 'VE' and the Emitter current 'IE' for a fixed value of 'VBB'. 9M
b) List any five applications of LEDs 5M

Hall Ticket Number :

R-14

Code: 4GC13

B.Tech. I Year Supplementary Examinations May 2017

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)

UNIT-I

1. a) What is meant by hardness of water? Give its units 7M
b) What is meant by carbonate and non-carbonate hardness of water? Explain with examples. 7M

OR

- 2 a) Write brief account on Priming and foaming. 7M
b) 0.5 g of CaCO₃ was dissolved in dil.HCl and diluted to 1000 mL. 50 mL of this solution required 48 mL of EDTA solution for titration. 50 mL of hard water sample required 15 mL of EDTA solution for titration. 50 mL of same water sample on boiling, filtering etc, required 10 mL of EDTA solution. Calculate the different kinds of hardness in ppm. 7M

UNIT-II

3. Define galvanic cell. Why the anode of galvanic cell is -ve and cathode is +ve. Write the different electrode reactions occur at the electrodes. 14M

OR

4. a) Discuss the how the nature of the metal influences the rate of corrosion. 7M
b) Explain the rusting of iron with the help of electrochemical theory of corrosion. 7M

UNIT-III

5. Write notes on
(a) Tacticity
(b) Vulcanization of rubber. 14M

OR

6. What are the polymers? Explain the applications of polymers in different fields. 14M

UNIT-IV

7. a) Explain the difference between gross calorific value and net calorific value. 7M
b) What is the difference between proximate analysis and ultimate analysis of coal? 7M

OR

8. a) What are the major constituent of LPG and Natural gas? 7M
b) Why excess air is required for complete combustion? 7M

UNIT-V

9. Define refractories? What are the characteristics of good refractory? Give the classification of refractories with examples. 14M

OR

10. Define Viscosity? How is it determined by Redwood Viscometer? 14M

Hall Ticket Number :

R-14

Code: 4GC12

B.Tech. I Year Supplementary Examinations May 2017

Engineering Physics

(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)

UNIT-I

1. a) Write few applications of lasers 4M
b) Describe the newton's rings formation experiment. 10M

OR

2. a) Explain the characteristics of lasers. 4M
b) Explain the construction and working of optical fibre 10M

UNIT-II

3. a) What are Miller indices? Explain the procedure for finding Miller indices. Give one example 10M
b) Draw the planes (211), (100) and (220) 4M

OR

4. a) What are properties of ultrasonics? 4M
b) Describe any one method for the detection of ultrasonics. 10M

UNIT-III

5. a) State and explain Heisenberg uncertainty principle 6M
b) Define de-Broglie dual nature of energy and derive its wavelength 8M

OR

6. a) Give the salient features of Kronig-Penny model. 10M
b) Discuss the origin of formation of energy bands 4M

UNIT-IV

7. a) With symbol explain the construction and working of Photo diode. Discuss its characteristics. 10M
b) Explain the role of LED & Photo diode in optical fibre communication systems. 4M

OR

8. a) Describe different types of magnetic materials in terms of their spin dipole alignment and its temperature dependence. 10M
b) Define magnetic dipole moment. List out various sources of magnetic dipole moment in magnetic materials. 4M

UNIT-V

9. a) What is Meissner effect? 4M
b) Explain about the flux exclusion principle exhibited by the superconductors 10M
- OR**
10. a) What are nanomaterials? Why do they exhibit different properties? 8M
b) Explain the types of nanomaterials based on dimensionalities 6M
