

Code: 1G513

B.Tech. I Year Supplementary Examinations May 2018

Engineering Drawing

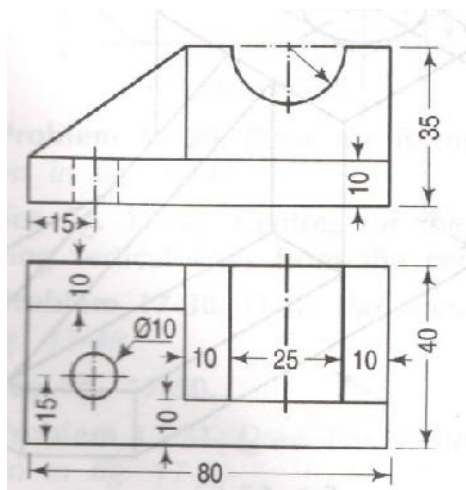
(Common to EEE, ECE, CSE and IT)

Max. Marks: 70

Time: 3 Hours

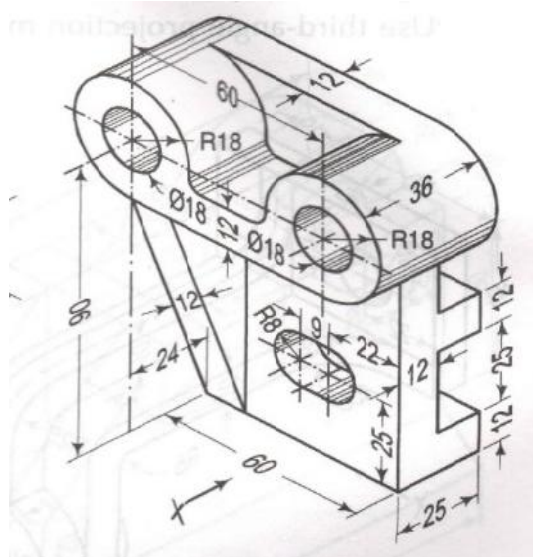
Answer any **Five** questionsAll Questions carry equal marks (**14 Marks** each)

1. The foci of an ellipse are 90 mm apart and the minor axis is 65 mm long. Determine the length of the major axis and draw half the ellipse by concentric-circles method and the other half by oblong method. 14M
2. Construct a hypocycloid, rolling circle 50 mm diameter and directing circle 175 mm diameter. Draw a tangent to it at a point 50 mm from the center of the directing circle. 14M
3. The ends of a line PQ are on the same projector. The end P is 30 mm below the H.P. and 12 mm behind the V.P. The end Q is 55 mm above the H.P. and 45 mm in front of the V.P. Determine the true length and traces of PQ and its inclinations with the two planes. 14M
4. A thin circular plate of 70 mm diameter is resting on its circumference such that its plane is inclined 60° to the H.P. and 30° to the V.P. Draw the projections of the plate. 14M
5. A square pyramid, base 38 mm side and axis 50 mm long, is freely suspended from one of the corners of its base. Draw its projections, when the axis as a vertical place makes an angle of 45° with the V.P. When a pyramid is suspended freely from a corner of its base, the imaginary line joining that corner with the center of gravity of the pyramid will be vertical. 14M
6. A pentagonal pyramid, base 30 mm side and axis 65 mm long, has its base horizontal and an edge of the base parallel to the V.P. A horizontal section plane cuts it at a distance of 25 mm above the base. Draw the isometric projection of retained part. 14M
7. Draw isometric view of given orthographic views. 14M



8. Draw front view, top view and side view of given isometric view.

14M



Code: 1GC14

B.Tech. I Year Supplementary Examinations May 2018

Mathematics-I

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

1. a) Solve $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$ 7M
- b) The number N of bacteria in a culture grew at a rate Proportional to N. The value of N was initially 100 and increased to 332 in one hour. What would be the value of N after $1\frac{1}{2}$ hours? 7M
2. a) Solve $\frac{d^3y}{dx^3} - 6\frac{d^2y}{dx^2} + 11\frac{dy}{dx} - 6y = e^{-2x} + e^{-3x}$ 7M
- b) Solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$ by the Method of variation of Parameter 7M
3. a) If $x = r \sin \theta \cos \phi$, $y = r \sin \theta \sin \phi$ and $z = r \cos \theta$ then find $\frac{\partial(x, y, z)}{\partial(r, \theta, \phi)}$ 7M
- b) Find the minimum value of $x^2 + y^2 + z^2$, given that $ax + by + cz = P$ 7M
4. a) Trace the curve $x^3 + y^3 = 3axy$ 7M
- b) Find the surface area of solid generated by the revolution of an arc of the catenary $y = c \cosh \frac{x}{c}$ about the x - axis. 7M
5. a) By changing the order of integration to evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 dy dx$ 7M
- b) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} dx \cdot dy \cdot dz$ 7M
6. a) Evaluate $L\left\{e^t \left(\cos 2t + \frac{\sinh 2t}{2}\right)\right\}$ ii) Find $L^{-1}\left\{\frac{s+3}{s^2-10s+29}\right\}$ 7M
- b) Using convolution theorem find $L^{-1}\left\{\frac{s}{(s^2+1)(s^2+4)}\right\}$ 7M
7. a) Find $L\left\{\int_0^t e^t \cos 2t dt\right\}$ 4M
- b) Solve the differential equation $\frac{d^2x}{dt^2} - 4\frac{dx}{dt} - 12x = e^{3t}$ given that $x(0) = 1$ and $x'(0) = -2$ by using Laplace transform 10M
8. a) If $\vec{F} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$ then find $\text{div}\vec{F}$ and $\text{curl}\vec{F}$ 7M
- b) Evaluate $\int_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$ where C is the region bounded by $x=0$, $y=0$ and $x+y=1$ by Green's Theorem 7M

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R-11 / R-13

Code: 1GC12

B.Tech. I Year Supplementary Examinations May/June 2018

Engineering Physics
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)

1. a) Discuss various methods by which polarized light can be produced. 6M
b) What are Quarter and Half wave plates? Explain 5M
c) Calculate the thickness of half wave plate of Quartz for a wavelength 500nm. Here $\mu_e = 1.553$ and $\mu_o = 1.544$. 3M
2. a) Derive the expression for Interplanar Spacing in terms of Miller Indices and lattice constant. 6M
b) Explain Bragg's law of X-ray diffraction. 5M
c) The Bragg's angle for reflection from (1 1 1) plane in a FCC crystal 19.2° for an X-ray of wave length 1.54\AA . Compute the cube edge of the unit cell. 3M
3. a) Explain the De Broglie hypothesis of matter waves. 4M
b) Assuming the Schrodinger's time independent wave equation, discuss the behaviour of a particle in one-dimensional potential well of infinite height. 10M
4. a) Describe the Drift and Diffusion currents in a Semiconductor. 7M
b) Mention some applications of Hall effect. 3M
c) The R_H of a specimen is $3.66 \times 10^{-4} \text{ m}^3 \text{ c}^{-1}$. Its resistivity is $8.93 \times 10^{-3} \text{ m}$. Find the mobility and charge carrier concentration 4M
5. a) Explain the classification of magnetic materials in detail with its properties. 10M
b) A magnetic material has a magnetization of 3300A/m and flux density of 0.0044 Wb/m^2 . Calculate magnetizing force and relative permeability of the material. 4M
6. a) Explain the characteristics of Lasers. 4M
b) With necessary theory and energy level diagram, explain the working of a He-Ne Laser. Write its applications 10M
7. a) Derive the expressions for Critical angle and Acceptance angle in an optical fiber? 5M
b) Describe the function of Multimode Step Index optical fiber along with its refractive index profile. 5M
c) Calculate the Fractional refractive index change and Numerical aperture of an optical fiber with refractive indices of core and cladding as 1.563 and 1.498 respectively. 4M
8. a) Why nanomaterials exhibit different properties? Explain 6M
b) How the physical and chemical properties of nano-particles vary with their size? Explain 5M
c) Mention the important applications of nanomaterials in medicine 3M

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R-11 / R-13

Code: 1GC15

B.Tech. I Year Supplementary Examinations May 2018

Mathematical Methods

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions
 All Questions carry equal marks (**14 Marks** each)

1. a) Find the rank of the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ 7M

b) Solve the system $-2x_1 + 3x_2 - 4x_3 + x_4 = -17$; $8x_1 - 5x_2 + 2x_3 - 4x_4 = 47$;
 $-5x_1 + 9x_2 - 13x_3 + 3x_4 = -44$ and $-4x_1 + 3x_2 - 2x_3 + 2x_4 = -25$ 7M

2. a) Using Cayley-Hamilton theorem find A^4 if $A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ 7M

b) Reduce the matrix A to Diagonal form where $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ 7M

3. a) Reduce the Quadratic form $3x^2 + 3y^2 + 3z^2 + 2xy + 2zx - 2yz$ to the canonical form by Orthogonal transformation and give the matrix of transformation 8M

b) Define Hermitian, skew-Hermitian, Unitary Matrices and give example for each 6M

4. a) Find a real root of the equation $x^3 - 2x - 5 = 0$ using the Bisection method correct to three decimal places 7M

b) Construct the table of differences for the following data

x	0	1	2	3	4
f(x)	1.0	1.5	2.2	3.1	4.6

Evaluate $\Delta^3 f(2)$ 7M

5. a) By the method of least squares, find the straight line that best fits the following data

x	1	2	3	4	5
y	14	27	40	55	68

b) Fit the curve of the form $y = ae^{bx}$ to the following data by the method of least squares.

x	77	100	185	239	285
y	2.4	3.4	7.0	11.1	19.6

6. a) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at (a) $x = 1.1$ (b) $x = 1.6$

7M

b) Evaluate $\int_0^1 \frac{dx}{1+x}$ by using (i) Trapezoidal rule (ii) Simpson's 1/3 rule
(iii) Simpson's 3/8 rule

7M

7. a) Find by Taylor's series method the value of y at $x = 0.1$ and $x = 0.2$ to five places of decimals from $\frac{dy}{dx} = x^2 - 1, y(0) = 1$

7M

b) Using Runge-Kutta fourth order method, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, y(0) = 1$ at $x = 0.2$
and $x = 0.4$

7M

8. a) Express $f(x) = x - f$ as a Fourier series in the interval $(-f, f)$

7M

b) Find the Half range sine and cosine series for the function $f(x) = x$ in the range $0 \leq x \leq f$

7M

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R-11/R-13

Code : 1G111

B.Tech. I Year Supplementary Examinations May 2018

Programming in C and Data Structures

(Common to CSE & IT)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Define the flow chart? Draw and explain different symbols used flowchart? 8M
b) Write an algorithm to perform the greatest of three numbers. 6M
2. a) Explain briefly the structure of 'c'? Write a program to calculate simple interest. 7M
b) Write a program to check that the entered year is a leap year or not. 7M
3. a) Explain one-dimensional array within an example? 7M
b) Write a program to find sum of n numbers using arrays. 7M
4. a) Explain in detail about pointers. 8M
b) Write a program to display array elements and their address using pointers? 6M
5. a) Explain about structures with an example. 6M
b) Explain the operation of sequential access File with an example? 8M
6. a) Explain stack operations (Push and Pop) with an example? 7M
b) Explain the operations of Circular Queue. 7M
7. a) Explain breadth first search (BFS) algorithms with an example. 7M
b) Explain Tree Traversal techniques with an example. 7M
8. a) Write and explain binary search with suitable example and discuss the various time complexities of binary search. 7M
b) Explain the algorithm for bubble sort and give a suitable example. 7M

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R-11 / R-13

Code: 1GC13

B.Tech. I Year Supplementary Examinations May/June 2018

Engineering Chemistry

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Describe conversion of hard water into soft water by ion exchange method along with neat diagram. 7M
b) An sample of water on analysis containing the following salts in mg/lit, $MgSO_4$: 6.0, $Mg(HCO_3)_2$: 2.0, $Ca(HCO_3)_2$: 12.2, $CaCl_2$: 8.0. Calculate carbonate and noncarbonated hardness in ppm units. 7M
2. Write the following in detail
(a) Conductometric titrations (b) $H_2 - O_2$ fuel cell 14M
3. a) What is corrosion? Explain electrochemical corrosion in detail. 7M
b) Write the factors influencing corrosion reaction in detail 7M
4. a) What are plastics how they are classified? Write the difference between Thermoplastics and thermosetting plastics. 8M
b) Explain preparation properties and application of Silicone rubber. 6M
5. a) Define explosives? How they are classified? What are the precautions to be taken during storage? 8M
b) What are lubricants? Write the functions of lubricants 6M
6. a) For one component system, the triple point is an invariant system? Discuss 7M
b) Discuss the number of phases, components and degree of freedom in the two component (Lead - Silver) System. 7M
7. a) Explain analysis of flue gas by Orsat's apparatus with neat diagram. 9M
b) Define fuel? Write the characteristics of good fuel. 5M
8. a) Explain setting and hardening of cement with suitable reactions? 7M
b) Define Refractories? How they are classified give suitable examples. 7M
