

Code: 1G513

B.Tech. I Year Supplementary Examinations May 2017

Engineering Drawing

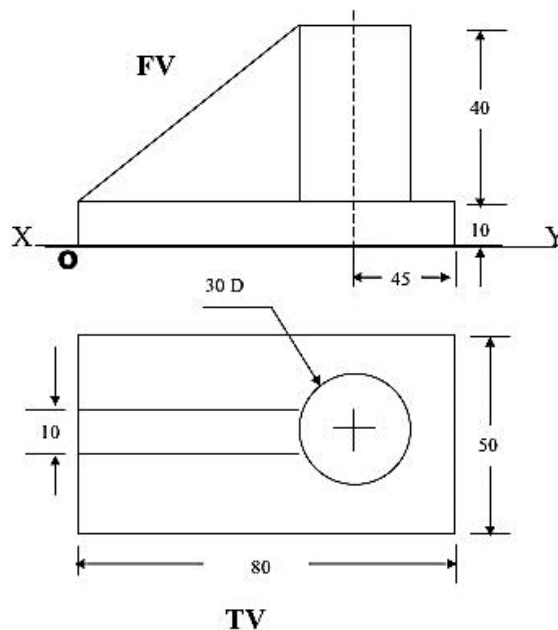
(Common to EEE, ECE, CSE & IT)

Max. Marks: 70

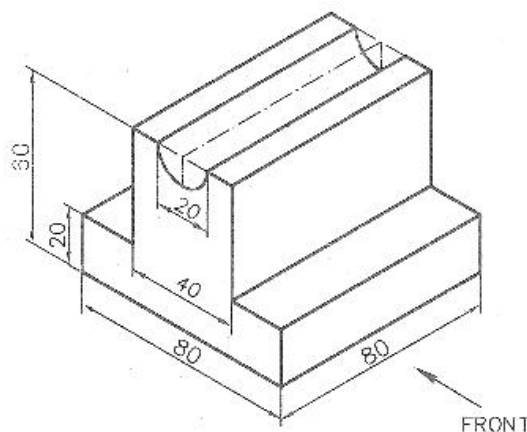
Time: 3 Hours

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

- Construct a parabola; with the distance between the focus and the directrix as 50mm. Draw the tangent to the curve at a point 20 mm from the axis.
- 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.
- The end P of a line PQ, 70 mm long is 15 mm above HP and 20 mm in front of VP. Q is 40 mm above HP. Its top view is inclined at 45° to the VP. Draw the projections of the line and find its true inclinations with the VP and HP.
- A square lamina PQRS of side 40 mm rests on the ground on its corner P in such a way that the diagonal PR is inclined at 45° to HP and apparently inclined to the VP. Draw its projections.
- Draw the projections of a pentagonal prism of base side 25 mm and axis 50 mm rests on H.P on one of its base edges with its axis inclined at 60° to the HP and parallel to the VP.
- A cylinder, with diameter of base 60 mm and axis 70 mm long, is resting on its base on HP. A section plane, perpendicular to VP and inclined at 45° to HP passes through the axis at a distance of 20mm from its top end. Draw the isometric projection of the truncated cylinder
- Draw the isometric view of the object from the given orthographic projections



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



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R-11 / R-13

Code: 1GC13

B.Tech. I Year Supplementary Examinations May 2017

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) Estimate the amount of hardness present in the water samples by EDTA method? 6M
b) What are scales? How are they formed? Give their disadvantages and prevention methods. 8M
2. a) Explain the chemical reactions involved in the working of a Methanol-Oxygen fuel cell? 7M
b) Discuss the general properties of insulating materials? 7M
3. a) Explain electrochemical theory of corrosion with necessary equations? 8M
b) Write in brief on sacrificial anodic protection method to control corrosion 6M
4. a) Distinguish between thermoplastic and thermosetting resins. 6M
b) Write the preparation, properties and uses of BUNA-S and Silicone rubber 8M
5. a) What are explosives? How are they classified? 7M
b) Discuss the significance of flash & fire point of a good lubricant? 7M
6. a) Explain the terms involved in Phase rule equation? 7M
b) Discuss the application of phase rule to water system? 7M
7. a) What is calorific value of a fuel? How calorific value of a solid fuel is determined using bomb calorimeter? 8M
b) Mention the characteristics of a good fuel. 6M
8. a) Define setting and hardening of cement. Explain the process using chemical reactions involved? 8M
b) What are the reasons for the failure of a refractory? 6M

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R-11 / R-13

Code: 1GC12

B.Tech. I Year Supplementary Examinations May 2017

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) Define interference and explain the formation of Newton rings with necessary theory. 8M
b) Give the construction and working of Nicol prism 6M
2. a) What is a Bravais lattice? What are the different space lattices in cubic system? Show that the packing factor of simple cubic is 52%. 8M
b) Describe Laue's method of determining crystal structure. 6M
3. a) Give the salient features of Kronig-Penny model. 7M
b) Show that the energies of a particle in a one dimensional potential box are quantized. 5M
c) Find the lowest energy of an electron confined in a one dimensional potential box of side 0.1nm. ($h=6.62 \times 10^{-34}$ Js and mass of electron = 9.1×10^{-31} kg) 2M
4. a) Obtain Einstein's relation between diffusion coefficient and mobility of charge carriers. 6M
b) Define Hall effect and give its applications. 5M
c) A silicon plate of thickness 1mm, breadth 10mm and length 100mm is placed in a magnetic field of 0.5 wb/m^2 acting perpendicular to its thickness. If 10^{-2} A current flows along its length, calculate the Hall voltage developed if the Hall coefficient is $3.66 \times 10^{-4} \text{ m}^3/\text{coulomb}$. 3M
5. a) Distinguish between Dia, Para and Ferro magnetic materials. 6M
b) Derive the expression for local field by Lorentz method and express Clausius-Mosotti equation 8M
6. a) Explain AC and DC Josephson effects. 6M
b) Give the construction and working of Ruby Laser. 8M
7. a) Derive the expression for numerical aperture of an optical fiber. 7M
b) Estimate the numerical aperture and acceptance angle of a fiber with core index of 1.54 and a cladding index of 1.50 when the fiber is inside water of refractive index 1.33 3M
c) Give some applications of Holography. 4M
8. a) Describe briefly (i) Chemical vapour deposition and (ii) Ball milling techniques used in fabricating nanomaterials. 8M
b) Define Carbon Nanotubes and give any four applications of nanomaterials. 6M

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Code: 1GC14

B.Tech. I Year Supplementary Examinations May 2017

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 $x \frac{dy}{dx} - y = x^2$ 6M
 b) Find the orthogonal trajectories of $r^n = b^n \sin n_\theta$, where b is parameter 8M
2. a) Solve $(D^2 + 25)y = \tan 5x$, using the method of variation of parameters. 9M
 b) Solve $(D^2 + 6D + 9)y = e^{-3x}$ 5M
3. a) Verify Rolle's theorem for $g(x) = 4 + x^{\frac{1}{3}}$ in $[-2, 2]$. 4M
 b) Discuss maxima and minima of $f(x) = \sin x \sin y \sin(x + y)$ 10M
4. a) Find the length of the arc of the parabola $y^2 = 4ax$ cut off by the straight line $y = x$. 7M
 b) Trace the curve $x^3 + y^3 = 3axy$, 'a' is a constant 7M
5. a) Change of order of integration and evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{xa}} 10 \, dx \, dy$ 7M
 b) Evaluate $\int_1^e \int_1^{\log y} \int_1^{e^x} \frac{\log z}{6} \, dz \, dx \, dy$. 7M
6. a) Find the Laplace transform of a triangular function $f(t) = \begin{cases} t & \text{if } 0 < t < 1 \\ 2-t & \text{if } 1 < t < 2 \end{cases}$ and $f(t+2) = f(t)$ 7M
- b) Using convolution theorem, evaluate $L^{-1} \left[\frac{s^2}{(s^2 + a^2)(s^2 + b^2)} \right]$ 7M
7. Using Laplace transform solve $y''(t) + 3y'(t) + 2y(t) = e^{-t}$, given $y(0) = 0$, $y'(0) = 1$ 14M
8. Verify Green's theorem for $\vec{F} = xy \vec{i} + x^2y^3 \vec{j}$ over a region C, where C is a triangle formed by vertices (0, 0), (1, 0) and (1, 2). 14M

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R-11/R-13

Code : 1GC15

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Mathematical Methods
(Common to CSE & IT)

Max. Marks: 70

Time: 03 Hours

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

1 a) Find the rank of the matrix $A = \begin{bmatrix} 2 & -2 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 0 & 3 \\ 1 & -2 & 1 & 2 \end{bmatrix}$ by reducing it into normal form. 7M

b) Show that the system of equations
 $x + 2y + z = 3$; $2x + 3y + 2z = 5$; $3x - 5y + 5z = 2$; $3x + 9y - z = 4$
is consistent and solve them. 7M

2. a) Find the Eigen values and the corresponding Eigen vectors
of the matrix $A = \begin{bmatrix} 5 & -2 & 0 \\ -2 & 6 & 2 \\ 0 & 2 & 7 \end{bmatrix}$ 7M

b) Find the characteristic equation of the matrix $A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 5 \end{bmatrix}$ verify
Cayley – Hamilton theorem and hence find the inverse of A 7M

3. Reduce the quadratic form $2x_1^2 + x_2^2 - 3x_3^2 + 12x_1x_2 - 4x_1x_3 - 8x_2x_3$ into canonical form and hence find its nature. Also specify the linear transformation which brings about the normal reduction

4. a) Using Newton-Raphson method find a root of the equation $f(x) = e^x - 3x$ which lies between 0 and 1 7M

b) Consider the following data for $f(x) = (\sin x) / x^2$

x	0.1	0.2	0.3	0.4	0.5
f(x)	9.9833	4.9696	3.2836	2.4339	1.9177

Calculate f(0.25) using newton's forward interpolation formula 7M

5. a) By the method of least squares fit a straight line of the form $y = a + bx$ to the following data

x	0	5	10	15	20	25
y	12	15	17	22	24	30

7M

- b) Find the constants a and b such that $y = ae^{bx}$ is fitted to the following data by the method of least squares

x	2	4	6	8	10
y	4.077	11.084	30.128	81.897	222.62

7M

6. a) The population of a certain town (as obtained from census data) is shown in the following table

year	1951	1961	1971	1981	1991
Population (in lakhs)	19.96	39.65	58.81	77.21	94.61

Estimate the rate of growth of population in the year 1981

7M

- b) Evaluate the value of $\int_0^6 \frac{1}{1+x} dx$ using Simpson's $\frac{1}{3}$ rule and compare the result with the actual value

7M

7. a) Using Euler's method, solve for y when $x = 2$ from $\frac{dy}{dx} = 3x^2 + 1$, $y(1) = 2$ taking step size $h = 0.5$

7M

- b) By Runge – Kutta method of fourth order, find $y(0.2)$ from the differential equation $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$ taking $h = 0.2$

7M

8. a) Obtain the Fourier series for the function $f(x) = e^x$ where $x \in (0, 2f)$

7M

- b) Find the half- range sine series for the function

$$f(x) = \frac{e^{ax} - e^{-ax}}{e^{af} - e^{-af}}, \text{ in } (0, f)$$

7M

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R-11/R-13

Code : 1G111

B.Tech. I Year Supplementary Examinations May 2017

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) Explain the categories of modern computers according to their size and performance. 5M
b) Explain the phases of the software development. 9M

2. a) Define various operators in C. 6M
b) Distinguish between getchar () & gets () and putchar () & puts () with suitable examples. 8M

3. a) Write a program to find the sum of two 2-dimensional matrix of 3 rows and 3 columns. 7M
b) What are different storage classes in C? Explain. 7M

4. a) What is a string variable? How to declare a string variable? 7M
b) Explain various operations on pointers with examples. 7M

5. Explain the three ways of passing a structure to a function. 14M

6. Write a C program to implement Queues using arrays 14M

7. Write a C program to insert a node at front, at end and at any position in a singly linked list. 14M

8. a) Differentiate Successful and unsuccessful search. 7M
b) Explain the algorithm for bubble sort with a suitable example. 7M
