

Hall Ticket Number :

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R-11 / R-13

Code: 1GC13

B.Tech. I Year Supplementary Examinations December 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) How are the temporary hardness and permanent hardness of water determined? 7M
b) What is desalination? Mention some methods available for desalination. With a neat diagram explain desalination by reverse osmosis. 7M
2. a) Explain acid-base titration conduct metrically. 7M
b) Explain the construction and working of H₂-O₂ fuel cells. 7M
3. a) Explain the mechanism of chemical and electrochemical corrosion. 7M
b) What is sacrificial anode? Mention its role in the prevention of corrosion. 7M
4. a) Describe the free radical mechanism of addition polymerization with a suitable example. 7M
b) Describe the preparation, properties and uses of following polymers.
(i) Bakelite,
(ii) Teflon. 7M
5. a) Explain the classification of explosive.
(i) Primary or initiating explosives,
(ii) Low explosives or propellants. 7M
b) Explain the following properties of lubricants.
(i) Flash and Fire points,
(ii) Cloud and Pour points. 7M
6. a) What is phase rule? Explain the various terms involved in it. 6M
b) With a neat diagram explain lead- silver system. 8M
7. a) Describe the Otto-Hoffman method of coke manufacture and the recovery of various by product. 7M
b) Explain Orsat method of flue gas analysis. 7M
8. a) Write notes on
(i) White cement
(ii) Water proof cement 8M
b) What are the characteristics of a good refractory? Write a note on carborundum. 6M

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Code: 1GC12

B.Tech. I Year Supplementary Examinations December 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) Explain interference in thin films by reflected light. 3M
b) Explain an experimental method of determination of wavelength of spectral lines of a given source of monochromatic light using plane diffraction grating. 7M
c) Explain construction and working of a Nicol prism with neat diagram. 4M
2. a) What are Miller Indices? Explain the steps involved in calculation of it with an example. 4M
b) With a neat sketch, explain the Powder method to determine the crystal structure. 6M
c) Derive an expression for interplanar spacing in orthogonal system. 4M
3. a) Derive time-independent Schrodinger's wave equation. 6M
b) Give the classification of solids into conductors, semiconductors and insulators on the basis of band theory of solids. 4M
c) An electron is bound in one-dimensional box of size 4×10^{-10} m. Find the minimum energy, second and third existed states? 4M
4. a) Explain how a PN junction diode acts as a Light Emitting Diode. 4M
b) What is Hall effect? Derive an expression for Hall coefficient for n-type semiconductor. Mention its applications. 7M
c) Differentiate direct and indirect band gap semiconductors with examples. 3M
5. a) What are soft and hard magnetic materials? Give their characteristic properties and applications. 4M
b) Describe Lorentz method to calculate the local field in dielectrics. 7M
c) Write short note on Ferroelectric materials. 3M
6. a) What are Type-I and Type-II superconductors? Explain. 4M
b) With neat diagrams, describe the construction and working of Ruby laser. 6M
c) Mention applications LASERS in industry and Medical field. 4M
7. a) Derive the expression for acceptance angle and Numerical Aperture of an Optical fibre 5M
b) Derive the expression for acceptance angle and Numerical Aperture of an Optical fibre 5M
c) Draw the block diagram of optical fibre communication system and explain the function of each block. 4M
8. a) In detail explain one of the method of fabrication of Nanomaterials. 5M
b) Discuss about surface to volume ratio and quantum confinement. 4M
c) Mention applications of carbon nanotubes and nanomaterials. 5M

Code: 1GC14

B.Tech. I Year Supplementary Examinations December 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 $\cos^2 x \frac{dy}{dx} + y = \tan x$ 4M
- b) Find the orthogonal trajectories of the family of cardioids $r = a(1 - \cos \theta)$ where a is the parameter. 5M
- c) A body originally at $80^\circ C$ cools down to $60^\circ C$ in 20 minutes, the temperature of the air being $40^\circ C$. What will be the temperature of the body after 40 minutes from the original? 5M
2. a) Solve $\frac{d^2 y}{dx^2} - 6 \frac{dy}{dx} + 9y = 6e^{3x} + 7e^{-2x} - \log 2$. 7M
- b) Solve by the method of variation of parameters $\frac{d^2 y}{dx^2} + y = \operatorname{Cosec} x$ 7M
3. a) Verify Rolle's Theorem for $f(x) = x(x+3)e^{-\frac{x}{2}}$ in $[-3, 0]$ 7M
- b) Find the maximum and minimum values of $x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$. 7M
4. a) Trace the curve $y^2(a-x) = x^2(a+x)$ 7M
- b) The part of the parabola cut off by the latus rectum is rotated (i) about the latus rectum (ii) about the axis. Show that the volumes generated are in the ratio 16:15 7M
5. a) Change the order of integration in $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy dx$ and hence evaluate. 7M
- b) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} dz dy dx$ 7M
6. a) Find the Laplace transform of $f(t) = |t-1| + |t+1|$, $t \geq 0$ 7M
- b) Find the inverse Laplace transform of $\frac{2s-5}{4s^2+25} + \frac{4s-18}{9-s^2}$ 7M
7. Solve the differential equation $y^{11} + y = t$, $y(0) = 1$, $y^1(0) = 2$ using Laplace transform 14M
8. Verify Stokes theorem for the vector field $\vec{F} = (2x-y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over the upper half of the sphere $x^2 + y^2 + z^2 = 1$ bounded by its projection on xy -plane. 14M

Code: 1GC15

B.Tech. I Year Supplementary Examinations December 2017

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) Reduce the matrix to Echelon form and find the rank of $A = \begin{bmatrix} -1 & -3 & 3 & -1 \\ 1 & 1 & -1 & 0 \\ 2 & -5 & 2 & -3 \\ -1 & 1 & 0 & 1 \end{bmatrix}$ 7M
- b) Solve the equations $x + y + z = 9$, $2x + 5y + 7z = 52$ and $2x + y - z = 0$ 7M

2. Find the Eigen values and corresponding Eigen vectors of the matrix $A = \begin{bmatrix} 2 & 2 & 0 \\ 2 & 5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ 14M

3. a) Prove that the Eigen values of a real symmetric matrix are real. 6M
- b) Reduce the quadratic form to $7x^2 + 6y^2 + 5z^2 - 4xy - 4yz$ to the canonical form. 8M

4. a) Find the roots $e^x \sin x = 1$ using the Newtonian Raphson's method 7M
- b) Find $y(54)$ given that $y(50) = 205$, $y(60) = 225$, $y(70) = 248$ and $y(80) = 274$ using Newton's forward difference formula 7M

5. a) Find the parabola of the form $y = ax^2 + bx + c$ passing through the points $(-1, 2)$, $(0, 1)$ and $(1, 4)$ 7M
- b) Use the method of least squares then find the best fitting straight line to the data given below:

X:	5	10	15	20	25
Y:	15	19	23	26	30

7M

6. a) Evaluate $\int_0^f t \sin t \, dt$ using the Trapezoidal rule 7M
- b) Evaluate $\int_0^1 \frac{1}{1+x} \, dx$ using Simpson's $\frac{3}{8}$ rule 7M

7. a) Using modified Euler method find $y(0.2)$ and $y(0.4)$ given $y' = y + e^x$, $y(0) = 0$. 7M
- b) Using the Range-Kutta method, find $y(0.2)$ for the equation $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$. take $h = 0.2$ 7M

8. a) Express $f(x) = e^x$ as Fourier series in $(-f, f)$ 7M
- b) Find the half range cosine series of a function of $f(x) = x$ $0 \leq x \leq f$ 7M

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R-11 / R-13

Code: 1G111

B.Tech. I Year Supplementary Examinations December 2017

Programming in C and Data Structures

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

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

1. a) Explain the advantages and disadvantages of using high level languages over machine level languages.
b) What is an algorithm? Write an algorithm for reversing the digits of an integer and checking for palindrome or not?
2. What is the purpose of a printf() and scanf() statements? Write a C program to find area of a circle.
3. a) Explain function with arguments and no return value with an example.
b) What is a built in function? Explain any two built in functions.
4. a) What is pointer to an array? Explain with an example.
b) Write a program to compute the largest number and its position using pointer.
5. Write a C program to demonstrate the use of array of structures.
6. What is Stack? Write operations of stack and Write a program to implement stack using linked list.
7. Discuss the insertion and deletion operations of a singly linked list.
8. What is sorting? Write an algorithm for recursive quick sort and perform quick sort on the following list? 38 81 22 48 13 69 93 14 45 58 79 72

Code: 1G513

B.Tech. I Year Supplementary Examinations December 2017

Engineering Drawing

(Common to EEE, ECE, CSE and IT)

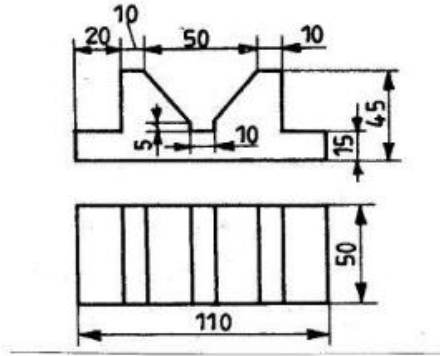
Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

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

1. The vertex of a hyperbola is 65 mm from its focus. Draw the curve if the eccentricity is $\frac{3}{2}$. Draw a normal and a tangent at a point on the curve, 75 mm from the directrix. 14M
2. 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. 14M
3. The front view of a line AB, 80 mm long, measure 55 mm while its top view measures 70 mm. End A is in both HP and VP. Draw the projections of the line and find its inclinations with the reference planes. Also locate the traces. 14M
4. A regular hexagonal lamina with its edge 50 mm has its plane inclined at 45° to HP and lying with one of its edges in HP. The plane of one of its diagonals is inclined at 45° to XY. The corner nearest to VP is 15 mm in front of it. Draw its projections 14M
5. Hexagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the VP Such that the axis is inclined at at 30° to the VP and Parallel to the HP. Draw its Projections? 14M
6. Draw isometric view of a hexagonal prism having a base with 30 mm side and a 70mm long axis resting on its base on the HP. With an edge of the base parallel to the VP when (a) using Box Methods (b)using Off-set Method? 14M
7. Draw the isometric view of the given orthographic projection of the object? 14M



8. Draw the front view, top view and right side view of the object shown below (dimensions in mm).

