

B.Tech I Year Regular & Supplementary Examinations May/June- 2013**Engineering Chemistry
(Common to All Branches)**

Max. Marks: 70

Time: 03 Hours

Answer any five questions

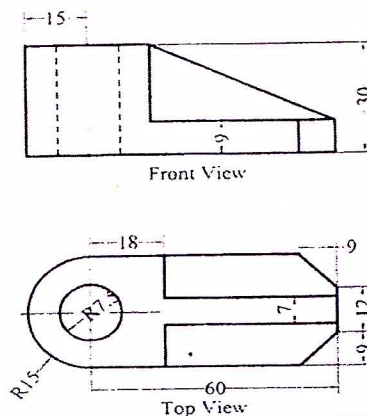
All Questions carry equal marks (14 Marks each)

1. a) Describe any two methods of internal conditioning of boiler feed water. 4M
 b) Write notes on the following
 - (i) Disinfection 3M
 - (ii) Caustic embrittlement 4M
 - (iii) Scale and sludge 3M
2. a) What is standard electrode potential? What is the significance of Nernst equation? 7M
 b) Write the characteristics of thermal insulators. 7M
3. a) What is electrochemical theory (wet) of corrosion? Explain the mechanism of it. 8M
 b) What is galvanic series and give its significance. 6M
4. a) What is functionality?. Distinguish between additional and condensation polymerization with examples. 5M
 b) Give the manufacture and uses of the following
 - (i) Bakelite 3M
 - (ii) Nylons 3M
 - (iii) Silicone rubber 3M
5. Write short notes on the following
 - (i) Viscosity index 4M
 - (ii) Flash and fire points 3M
 - (iii) Aniline point 3M
 - (iv) Propellants 4M
6. a) What is phase rule and explain the terms with suitable examples. 7M
 b) Discuss the phase diagram of two-component, lead-silver system. 7M
7. a) What is metallurgical coke? Describe the process of the manufacture of metallurgical coke 7M
 b) A fuel found to contain C-75%, H-5.2%, O-12.8%, S-1.2%, N-3.7% and rest is ash. Calculate the amount of air required for the complete combustion of 1 kg of fuel, if 20% excess air is used for combustion. Calculate the amount of dry products in the flue gas. 7M
8. Write short notes on the following.
 - (i) Refractoriness-under-load 4M
 - (ii) Thermal spalling 3M
 - (iii) Dimensional stability of refractory. 3M
 - (iv) Setting and hardening of cement 4M

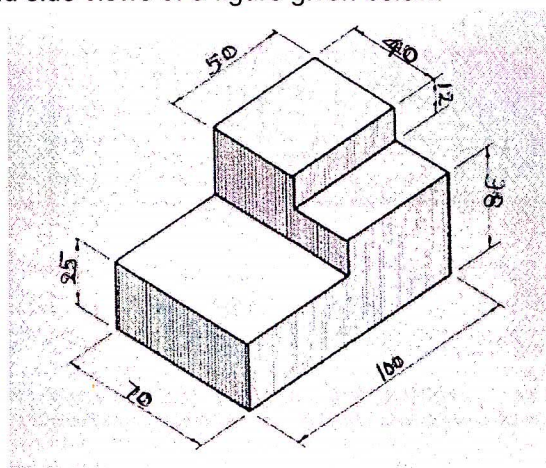
Answer any five questions

All Questions carry equal marks (14 Marks each)

1. The Major Axis of an Ellipse is 100 mm and the Minor Axis is 55mm. Find the foci and construct the Ellipse by 'Arc of Circles Method'. Draw a tangent to the Ellipse at a point 20mm above the Major Axis.
2. A circle of 40mm diameter rolls along a line for one revolution (without slipping). Draw the locus of a point on the circle which is in contact with the line. Name the curve. Draw a normal and tangent to the curve at any point on the curve.
3. A line PQ 75mm long has its end P in both HP and VP. It is inclined at an angle of 30° to HP and 45° to VP. Draw the projections of the line.
4. A regular pentagon of 30mm side has an edge in the HP, which is inclined at 30° to the VP. The plane of the pentagon is inclined at 60° to the HP. Draw its projections.
5. Draw the projections of a regular hexagonal prism side of base 25 mm and axis 50 mm long resting with its base on HP such that one of its edges of the base is inclined at an angle of 20° to VP.
6. Draw the isometric view of pentagonal prism, with side of base 30 mm and axis 65 long. The prism is resting on its base on HP with an edge of the base parallel to VP.
7. Draw the isometric view of an object using the details furnished in the following figure.



8. Draw the front, top and side views of a figure given below.



B.Tech I Year Regular & Supplementary Examinations May/June– 2013**Engineering Physics
(Common to All Branches)**

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (12 Marks each)

1. a) Explain the formation along with its features of the grating spectrum. 4M
- b) Describe the working principle of Nicol prism with neat diagram. 6M
- c) Find the minimum thickness of half and quarter wave plates for a light of wavelength 589nm, if $\mu_o = 1.658$ and $\mu_e = 1.486$. 4M
2. a) Show that FCC crystal is closely packed than BCC crystal based on the packing fractions of the corresponding crystals. 4M
- b) Describe Powder method for determination of crystal structure along with its merits. 7M
- c) For a simple cubic lattice find the ratios of interplanar separation $d_{111} : d_{110} : d_{100}$ 3M
3. a) Explain the origin of energy bands in solids 4M
- b) Describe the behavior of a particle in one dimensional potential box in terms of normalization of wave function and possible Eigen energy values. 7M
- c) Find the wavelength of an electron moving with a velocity of 500 m s^{-1}
Given $h = 6.626 \times 10^{-34} \text{ J-s}$, $m = 9.1 \times 10^{-31} \text{ Kg}$ 3M
4. a) Distinguish between the drift and diffusion process of charge carriers in a semiconductor. 4M
- b) State and explain Hall effect in semiconductors. 6M
- c) Mention the important applications of Photo diode. 4M
5. a) Distinguish between soft and hard magnetic materials. 4M
- b) Derive Clausius-Mossotti equation for a dielectric. 6M
- c) Explain the dependence of dielectric polarisability on the frequency of the applied alternating field. 4M
6. a) What is population inversion? Mention its significant role in LASER emission. 4M
- b) Explain the behavior of type I and II superconductors in the presence of varying magnetic field. 6M
- c) Mention the applications of laser in medical field. 4M
7. a) Explain the basic principle of optical fiber. 4M
- b) Describe graded index optical fiber along with its refractive index profile. Mention its merits. 6M
- c) Mention the applications of holography in various fields. 4M
8. a) Describe the synthesis of nanomaterials by plasma arching method. 7M
- b) Explain the important variations in properties of nanomaterials based on surface to volume ratio and quantum confinement effects. 7M

B.Tech I Year Regular & Supplementary Examinations May/June– 2013**English**
(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 do we come to know that Miss Krishna is a kleptomaniac of good taste?
b) "Miss Krishna was an irritating guest". How did she irritate the writer?
2. Do you think the administration of Cuddalore has done a commendable job in reacting to the disaster? Illustrate.
3. "Keep the joy of loving the poor and share this joy with all you meet." Illustrate how Mother Teresa practiced it.
4. a) The day when Raman walked into the IACS was a historic moment. Give reasons to support this.
b) Give an account of C.V Raman's work at the University of Calcutta.
5. Describe Sam Pitroda's accomplishments.
6. Describe the versatile genius of Visvesvaraya.
7. a) Your district collector is concerned about the rapid increase in the number of road accidents in the district. You as the Commissioner of local Municipality have been asked to submit a report investigating the causes and suggesting measures to improve the situation.
b) Write a letter to the editor of a news paper about the condition of open drains in your locality.
8. a) **Correct the following sentences and rewrite them:**
 - i) Do you know what is her name?
 - ii) Have you taken your meals?
 - iii) It costed me five hundred rupees.
 - iv) He is better than any student.
 - v) It took me an hour to fill the application.
- b) **Give one word substitutes for the following:**
 - i) An award given after one's death.
 - ii) One who has many talents.
 - iii) A paper written by hand.
 - iv) A remedy for all diseases.
 - v) That which cannot be read.
- c) **Use the following idioms in your own sentences:**
 - i) a feather in one's cap
 - ii) black sheep
 - iii) a cock and bull story
 - iv) like a fish out of water

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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) Define the rank of a matrix and find the rank of the matrix $A = \begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$ 7M

- b) Solve the system of equations $3x + y - z = 3$; $2x - 8y + z = -5$; $x - 2y + 9z = 8$ using Gauss elimination method 7M

2. a) Find the Eigen values and the corresponding Eigen vectors of the matrix

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

7M

- b) Show that the matrix $A = \begin{bmatrix} 1 & -2 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & 2 \end{bmatrix}$ satisfies its characteristic equation.

Hence find A^{-1}

7M

- 3 Find the rank, signature and index of the quadratic form $2x_1^2 + x_2^2 - 3x_3^2 + 12x_1x_2 - 4x_1x_3 - 8x_2x_3$ by reducing it to canonical form or normal form. Also write the linear transformation which brings out the normal reduction. 14M

4. a) Find a real root of $xe^x = 3$ using the Regula - Falsi method. 7M

- b) Using Lagrange's interpolation formula find the value of $y(10)$ from the following table

x	5	6	9	11
y	12	13	14	16

7M

5. a) Fit a straight line for the following data

x	6	7	7	8	8	8	9	9	10
y	5	5	4	5	4	3	4	3	3

7M

- b) Fit the curve of the form $y = ae^{bx}$ to the following data

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

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 thousands)	19.96	39.65	58.81	77.21	94.61

Estimate the rate of growth of the population in the year 1981

7M

- b) Given that

x	4.0	4.2	4.4	4.6	4.8	5.0	5.2
log(x)	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

Evaluate $\int_4^{5.2} \log x \, dx$ by Simpson's 3/8 rule.

7M

- 7 a) Find $y(0.1)$ and $y(0.2)$ using Taylor's series method given that $y' = y^2 + x$ and $y(0) = 1$

7M

- b) Find $y(0.1)$ and $y(0.2)$ using Runge - Kutta 4th order formula given that $y' = x^2 - y$ and $y(0) = 1$

7M

- 8 a) Obtain the Fourier series expansion of $f(x)$ given that $f(x) = (\pi - x)^2$ in $0 \leq x \leq 2\pi$

and deduce the value of $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots = \frac{\pi^2}{6}$

7M

- b) Obtain the half-range cosine and sine series for $f(x) = x$ in the interval $(0, l)$.

7M

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***Mathematics-I
(Common to All Branches)***

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Solve $x \frac{dy}{dx} + y = x^3 y^6$ 7M
 b) If the temperature of a body is changing from 100°C to 70°C in 15 minutes, find when the temperature will be 40°C , if the temperature of air is 30°C 7M
2. a) Solve $(D^2 + 5D - 6)y = \sin 4x \sin x$ 7M
 b) Solve $\frac{d^2y}{dx^2} + 9y = \tan 3x$, by the method of variation of parameters 7M
3. a) Verify Lagrange's mean value theorem for $f(x) = \log_e x$ in $[1, e]$ 7M
 b) If $x = r \sin \theta \cos \Phi$, $y = r \sin \theta \sin \Phi$, $z = r \cos \theta$, show that $\frac{\partial(x,y,z)}{\partial(r,\theta,\Phi)} = r^2 \sin \theta$ 7M
4. a) Trace the curve $r = a + b \cos \theta$, $a > b$ 7M
 b) Find the surface area of the solid generated by the revolution of astroid $x^{2/3} + y^{2/3} = a^{2/3}$ about the y-axis 7M
5. a) Evaluate $\int_0^5 \int_0^{x^2} x(x^2 + y^2) dy dx$ 7M
 b) Evaluate the integral $\int_0^a \int_{x^2/a}^{2a-x} xy^2 dy dx$ by changing the order of integration 7M
6. a) Find the Laplace transform of $\cosh^2 2t$ 4M
 b) Find the Laplace transform of $t e^{-t} \sin t$ 5M
 c) Find $L^{-1} \left[\frac{1}{(s-1)(s+3)} \right]$ 5M
7. Solve the Differential equation by Laplace transform $x^{11}(t) + 4x^1(t) + 4x(t) = 4e^{-2t}$, $x(0) = -1$, $x^1(0) = 4$ 14M
8. Verify Green's theorem in the plane for $\oint_c (3x^2 - 8y^2) dx + (4y - 6xy) dy$, where 'c' encloses the region bounded by $y = \sqrt{x}$ and $y = x^2$ 14M

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***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) What is an input device? Mention at least five input device.
b) What is main memory? Explain two types of main memory.
2. a) What is difference between break and continue statements? Explain with examples
b) Write a program to find out the average of the even numbers by using continue statement
3. a) Write a program to accept N numbers and print whether the number is even or odd using array.
b) Write a short on the following storage class
 - i) Automatic
 - ii) Register
4. a) Write a program to reverse the strings stored in array of pointers.
b) What library functions are available to simplify string processing?
5. a) Write a program in to display the size of structure elements using size of operator?
b) Explain the following file handling function in detail with example.
 - i) fopen()
 - ii) fclose()
6. a) Write a program implementing stack.
b) What is a circular queue? Write a program implementing circular queue
7. Explain briefly description about linked list without header. Write a program to create a linked list without header.
8. a) Why quick sort is said to be the most efficient sorting method? Discuss with example.
b) Write a program, in c to perform quick sort in a given list of integers.
