

1E2004

Roll No. _____

Total No of Pages: **3**

1E2004

B. Tech I Sem. (Main/Back) Exam. Jan. 2016

104 Engineering Chemistry

Common to all Branches

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) What is reforming? Explain various reforming process of gasoline. [8]
(b) Describe Fisher-Tropsch with neat and labelled diagram. How this process differs from the Bergius process? [8]

OR

- Q.1 (a) Explain the process of converting coal into coke. [8]
(b) Describe manufacturing methods of metallurgical coke, with neat and labelled diagram. [8]

UNIT-II

Q.2 Write short notes on following-

- (a) Flue gas analysis by Orsat's Apparatus. [8]
(b) Elemental analysis of fuel. [8]

OR

- Q.2 (a) A gas used in an internal combustion engine had, 40% of H_2 , 30% of CH_4 , 17% of CO , 5% of N_2 , 3% of C_3H_8 and 5% of C_2H_2 . Find the volume of air needed for combustion of gas. If air supplied is 45% excess, find the volume analysis of dry products. [8]
- (b) How is HCV and LCV of gaseous fuel determined? Describe giving neat and labelled diagram. [8]

UNIT-III

Q.3 Write short notes on:

- (a) Organic Electronic Materials. [8]
- (b) Types of polymerization with mechanism. [8]

OR

- Q.3 (a) What are elastomer? Why vulcanization of rubber so important? Explain giving suitable examples. [8]
- (b) What are fullerenes? Write preparation, properties and uses fullerenes. [8]

UNIT-IV

- Q.4 (a) What is the importance of annealing in glass making process? [6]
- (b) Write effect of different constituents in glass. Describe the manufacturing process of glass with chemical reaction. [10]

OR

- Q.4 (a) Describe the process of setting and hardening of cement with chemical reaction. What is difference between setting and hardening? [8]
- (b) Give the composition of Portland cement with their significance. Write reactions involved in manufacturing of Portland cement. [8]

UNIT-V

- Q.5 (a) What are refractories? Discuss the Seger's pyrometric cone test and RUL test. [8]
- (b) What do you mean by Cloud and Pour point? What is significance of Cloud and Pour point of lubricating oil? [8]

OR

- Q.5 (a) Discuss the significance of viscosity in lubricating oils. How is viscosity of lubricating oil determined using redwood viscometer? [8]
- (b) Write short notes on (**any two**) - [2×4=8]
- (i) Silica Refractories
 - (ii) Neutralization Number
 - (iii) Fire Clay Refractories
 - (iv) Steam Emulsification Number (SEN)



1E2002

Roll No. _____

Total No of Pages: 3

1E2002

B. Tech I Sem. (Main/Back) Exam. Jan. 2016
102 Engineering Mathematics-I
Common to all Branches

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

Q.1 (a) Find the asymptotes of the curve

$$x^3 - 5x^2y + 8xy^2 - 4y^3 + 2y^2 + x^2 - 3xy - 1 = 0. \quad [8]$$

(b) Show that the radius of curvature at any point P on the parabola $y^2 = 4ax$, is

$$\frac{2(SP)^{3/2}}{\sqrt{a}}; \text{ where S is the focus of the parabola.} \quad [8]$$

OR

Q.1 (a) Prove that the curve $x^3 + y^3 = a^3$ has point of inflexion at the point of inflexion at the points where it crosses the co-ordinate axes. [8]

(b) Trace the curve $r=a(1+\cos\theta)$. (Cardioid). [8]

UNIT-II

Q.2 (a) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$, then show that

$$x^2 \frac{\partial^3 u}{\partial x^3} + 2xy \frac{\partial^3 u}{\partial x \partial y^2} + y^2 \frac{\partial^3 u}{\partial y^3} = \sin 2u (1 - 4\sin^2 u) \quad [8]$$

(b) If measurements of radius of base and height of a right circular cone are incorrect by -1% & 2% respectively, find the error in its volume. [8]

OR

Q.2 (a) Find the minimum value of $x^2 + y^2 + z^2$, given that $ax + by + cz = p$ [8]

(b) Find the volume of the greatest rectangular parallelopiped inscribed in the ellipsoid whose equation is $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ [8]

UNIT-III

Q.3 (a) Find the surface area of the solid formed by revolving the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \text{ about the major axis.} \quad [8]$$

(b) Find the volume of the solid generated by revolving the curve $(a-x)y^2 = a^2x$, about its asymptote. [8]

OR

Q.3 (a) Change the order of integration in the integral $\int_0^a \int_{\left\{a - \sqrt{a^2 - y^2}\right\}}^{\left\{a + \sqrt{a^2 - y^2}\right\}} xy \, dx \, dy$ and then evaluate it. [8]

(b) Show that $\int_0^\infty \frac{x^2 dx}{(1+x^4)^3} = \frac{5\pi\sqrt{2}}{128}$. [8]

UNIT-IV

Q.4 (a) Solve:-

(i) $(1+y^2) + \left(x - e^{-\tan^{-1}y}\right) \frac{dy}{dx} = 0.$ [5]

(ii) $x \frac{dy}{dx} + y = y^2 \log x.$ [5]

(b) $(D^2 + 1)^2 y = 24x \cos x$; $D = d/dx$, Solve it. [6]

OR

Q.4 (a) Solve:

(i) $(3x^2y + y/x) dx + (x^3 + \log x) dy = 0$ [5]

(ii) $(xy \sin xy + \cos xy) y dx + (xy \sin xy - \cos xy) x dy = 0.$ [5]

(b) Solve:

$\frac{d^2x}{dt^2} + 2n \cos \alpha \frac{dx}{dt} + n^2 x = a \cos nt$, such that $x = 0$ and $dx/dt = 0$ at $t = 0.$ [6]

UNIT-V

Q.5 (a) Solve:

$(1+x)^2 \frac{d^2y}{dx^2} + (1+x) \frac{dy}{dx} + y = 4 \cos \{\log(1+x)\}.$ [8]

(b) Solve:

$\frac{d^2y}{dx^2} + (3\sin x - \cot x) \frac{dy}{dx} + (2\sin^2 x)y = \sin^2 x e^{-\cos x}$ [8]

OR

Q.5 (a) Solve:

$(2x^2 + 3x) \frac{d^2y}{dx^2} + (6x + 3) \frac{dy}{dx} + 2y = (x+1)e^x.$ [8]

(b) Solve by the method of variation of parameters-

$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - y = x^2 e^x.$ [8]

1E2003

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1E2003

B. Tech I Sem. (Main/Back) Exam. Jan. 2016
103 Engineering Physics-I
Common to all Branches

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Describe the construction and working of Michelson interferometer. How may it be used to measure the wavelength of monochromatic light? [6+4=10]
- (b) Newton's rings are observed in reflected light of wavelength 5×10^{-5} cm. The diameter of 10th dark ring is 0.5cm. Find radius of curvature of lens and thickness of the air film at the ring. [6]

OR

- Q.1 (a) Write short notes on the following - [4+4=8]
- (i) Anti - reflection coating
- (ii) Interference filter

- (b) Explain Newton's ring method for determining the wavelength of monochromatic light. Why is the centre of the ring dark and how can we get a bright centre. [8]

UNIT-II

- Q.2 (a) Describe the construction and working of a Laurent's half shade polarimeter. [10]
- (b) Calculate the thickness of a half wave & quarter wave plate of quartz for a wavelength of $5000\text{\AA}$. Here $\mu_o = 1.553$ & $\mu_E = 1.544$. [6]

OR

- Q.2 (a) What is optical activity? Write the laws of optical activity of optically active solution. [6]
- (b) A retardation plate of thickness 8.56×10^{-7} m introduces a phase difference in the path of polarized light of wavelength of $5890\text{\AA}$. The principle refractive indices are $\mu_o = 1.658$ & $\mu_E = 1.486$. Find the nature of retardation plate. [6]
- (c) State and explain law of Malus. [4]

UNIT-III

- Q.3 (a) Derive an expression for the intensity of diffracted light in fraunhofer's diffraction due to single slit. [8]
- (b) The distance between the first and sixth minima in the diffraction pattern of a single slit is 0.5mm . The screen is 0.5m away from the slit. If the wavelength of light used is $5000\text{\AA}$, determine the slit width. [8]

OR

Q.3 (a) Explain Rayleigh Criteria of just resolution of two spectral lines of equal intensities giving suitable intensity distribution curve. Show how the resolving power of a plane transmission grating depends on -

(i) No. of ruled lines

(ii) Width of ruled space.

[8]

(b) Show that the intensity of light diffraction from a plane transmission grating is given by -

$$I = I_0 \frac{\sin^2 \alpha}{\alpha^2} \left(\frac{\sin N\beta}{\sin \beta} \right)^2$$

where symbols carry their usual meaning.

[8]

UNIT-IV

Q.4 (a) Explain the term bonding in crystals? What are the distinguishing characteristics of metallic bonding?

[8]

(b) What is Hall Effect? Briefly discuss the physical origin of Hall effect.

[8]

OR

Q.4 (a) The resistivity of doped Silicon sample is $8.9 \times 10^{-3} \Omega\text{m}$. The Hall coefficient was measured to be $3.6 \times 10^{-4} \text{ m}^3/\text{C}$. Assuming single carrier conduction, find the mobility and density of charge carriers.

[8]

(b) Classify the soil as Conductor, Semiconductor and Insulator according to band structure.

[8]

UNIT-V

- Q.5 (a) A Spaceship (at rest) of length 100m takes $3\mu\text{s}$ to pass an observer on earth.
What is its velocity relative to the earth? [8]
- (b) Derive an expression for the variation of mass with velocity. [8]

OR

- Q.5 (a) Write short notes on relativistic time dilation and examples. [4]
- (b) State the postulates of special theory of relativity and deduce the Lorentz transformation. [8]
- (c) What is the total energy of an electron at rest, mass 9.1×10^{-31} kg moving with speed of 0.956? [4]
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1E2001

Roll No. _____

Total No of Pages: **4**

1E2001

B. Tech I Sem. (Main/Back) Exam. Jan. 2016

101 Communicative English

Common to all Branches

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Transform the following conditional sentences as directed: [3]
- (i) I shall not leave unless I have your permission. (Use only 'if' for unless)
 - (ii) He failed, though he was clever. (Change by using the conjunction 'as')
 - (iii) If he works hard, he will pass. (Use of an Interrogative sentence)
- (b) Change from Active to Passive voice: [5]
- (i) Produce the witness.
 - (ii) One must do one's duty.
 - (iii) He lived a hard life.
 - (iv) Shall I ever forget those happy days?
 - (v) I ran a race.
- (c) Convert the following from direct to indirect speech: [4]
- (i) He said. "Alas! I am undone."
 - (ii) Rohit says, "I came here yesterday."
 - (iii) The accused said, "Sir, I am innocent."
 - (iv) He said to me, "you will be tired before you arrive".

- (d) Rewrite by using the appropriate form of verbs: [4]
- (i) He _____ (do) this work since morning.
 - (ii) I _____ (catch) the train, if I had walked fast.
 - (iii) He was _____ (elect) chairman of the college.
 - (iv) It is _____ (rain) for a week.

OR

- Q.1 (a) Transform the following conditional sentences as directed: - [2]
- (i) If you did not help me, I should have been ruined. (Change the sentence by the use of preposition 'but')
 - (ii) You can borrow the book, if you return it soon. (Change by the use of a participle phrase 'provided')
- (b) Fill up the blanks with suitable modals: [4]
- (i) _____ I borrow your notes please?
 - (ii) _____ we postpone the picnic to next week?
 - (iii) _____ I see you tomorrow again?
 - (iv) You _____ to report this matter to your senior immediately.
- (c) Change the sentences to passive voice: [5]
- (i) The old man told me a story.
 - (ii) Finish this work at once.
 - (iii) The book is printing.
 - (iv) My pocket has been picked.
 - (v) He will write a book.
- (d) Rewrite in Indirect speech: [5]
- (i) Ram says, "The earth moves round the sun."
 - (ii) Alok said, "I am too ill to speak now."
 - (iii) Shopkeeper said to his servant, "Go away at once."
 - (iv) Teacher said, "Be quiet and listen to my words."
 - (v) My brother says, "Someone has the book I was reading."

UNIT-II

- Q.2 (a) Complete the following dialogue between a garage mechanic and a customer. [4]
- Mechanic: Yes, Sir what can I do for you?
- Customer: (i) _____
- Mechanic: Are the brakes giving you some trouble?
- Customer: (ii) _____
- Mechanic: Very well, you will have to leave the car for a day with me.

Customer: (iii) _____

Mechanic: It will cost you about 500 rupees.

Customer: (iv) _____

Mechanic: Is your life less valuable than 500 rupees?

- (b) Write the precis of the following passage: - [6]

The man who is perpetually hesitating as to which of the two things he will do first, will do neither. The man who resolves, but suffers his resolution to be charged by the first counter-suggestion of a friend - who fluctuates from opinion to opinion and from plan to plan, can never accomplish anything, great or useful. Instead of being progressive in anything, he will be at best stationary, and more probably retrograde in all. It is only the man who first consults wisely, then resolves firmly and then carries out his purpose with inflexible perseverance undismayed by those petty difficulties which frighten a weaker spirit who can advance to any eminence in any line.

- (c) What is a report? Write a report, in 100-125 words for your college magazine, about the cultural activities organised for encouraging students in 'Talent Hunt Show' [2+4=6]

OR

- Q.2 (a) Write a paragraph of about 100 words on any one of the following - [6]

- (i) Internet: a Boon or a Curse.
- (ii) No pains no gains.
- (iii) India of my dreams.
- (iv) Terrorism - a Threat to Peace.

- (b) Write a report in about 100 words on 'No Tobacco Day' programme organized by your college on 4th June. [6]

- (c) Complete the dialogues: [4]

Father : Rohan, are you ready to go to collage?

Rohan : Yes, father. I _____.

Father : Good. Is someone coming to inspect your college?

Rohan : Yes, but _____.

Father : I heard you telling about it to your friend.

Rohan : Bye, I am getting late.

Father : What about your breakfast?

Rohan : I _____ breakfast already.

Father : Excellent. You _____.

UNIT-III

- Q.3 (a) What psychological disturbances are shown by O' Henry in his story 'The Last leafs'? [6]
(b) How does greed depict one's life and how can we relate this story to the present times? [5]
(c) Attempt a summary of the short story 'Luncheon.' [5]

OR

- Q.3 (a) Attempt a character sketch of Pahom. [5]
(b) Comment on the theme of the story 'Luncheon.' [5]
(c) 'The last leaf' is a story that entails the treasury of life and the existence of faith and hope. Discuss. [6]

UNIT-IV

- Q.4 (a) What did A.G. Gardiner say on his rules of road? Why do you observe the rules of the road? [5]
(b) Define Gandhiji as a practical universal man. [5]
(c) What are the defects of our civilization? What does being civilized mean? [6]

OR

- Q.4 (a) How important are order and safety? Why it is important to set up some form of world government? [6]
(b) What permanent solution does S. Radha Krishnan propose to the complex problems of today? [4]
(c) Do you agree that we have to preserve both the liberties - individual liberty and social liberty? Explain with examples. [6]

UNIT-V

- Q.5 (a) Write a character sketch of 'The unknown citizen.' [5]
(b) Attempt a summary of James Kirkup's 'No Men are Foreign.' [5]
(c) What is the central idea of the poem 'The character of a Happy Life?' [6]

OR

- Q.5 (a) Why the poet Rudyard Kipling wants us to dream and yet not make dreams our masters? [6]
(b) What does the poet W. H. Auden convey through his poem 'The Unknown Citizen.'? [5]
(c) Comment on the theme of the poem 'No Men are Foreign.' [5]

1E2005

Roll No. _____

Total No of Pages: **4****1E2005**

B. Tech I Sem. (Main/Back) Exam. Jan. 2016
105 Basic Electrical & Electronics Engineering
Common to all Branch

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL2. NIL

UNIT-I

- Q.1 (a) Find the current in branch AB is the unbalanced bridge using noble analysis, as shown in Fig 1.1(a) [8]

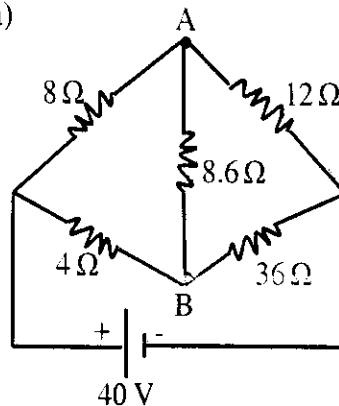
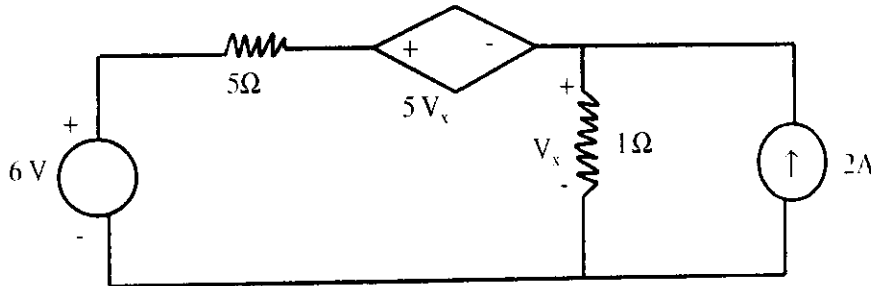


fig 1.1(a)

- (b) State and explain Theremins theorem with suitable example. [8]

OR

Q.1 (a) Find current in 5Ω resistance using superposition theorem in Fig 1.1 (b) [8]



(b) Find the values of unknown currents I_1 , I_2 , I_3 and unknown resistances R_1 and R_2 , as shown in Fig 1.(b) [8]

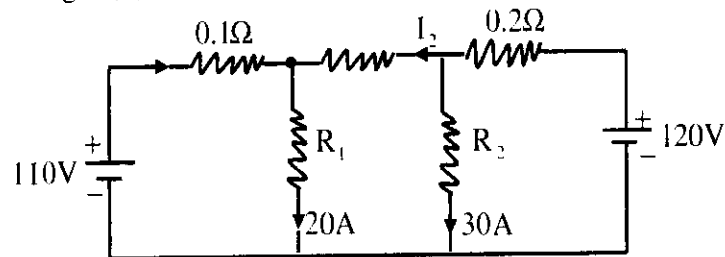


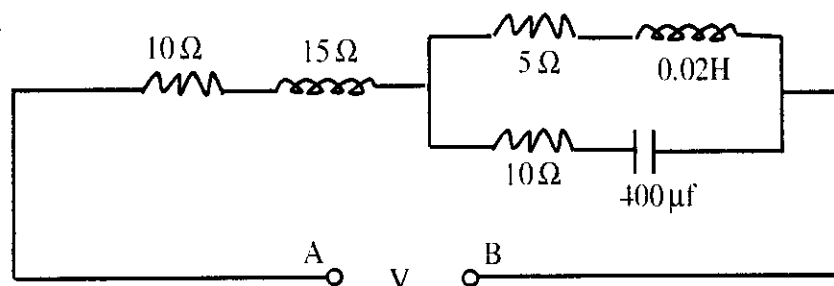
fig 1(b)

UNIT-II

Q.2 (a) Define the following with suitable diagram: [6]

- (i) RMS values
- (ii) Form factor
- (iii) Peak factor
- (iv) Phase angle

(b) In the act shown in fig (2). I determine the voltage at a frequency of 50Hz to be applied across AB in order that current in the circuit is 10A. Draw the phases dia. [10]



OR

Q.2 (a) Three sinusoidal voltages acting in series are given by:

$$V_1 = 10 \sin 440 t$$

$$V_2 = 10\sqrt{2} \sin (440 t - 45^\circ)$$

$$V_3 = 20 \cos 440 t$$

find :

- (a) The expression for resultant voltage
- (b) frequency and RMS value of resultant voltage [8]
- (b) How power can be measured using two wattmeter method for balance load?

Derive an expression – $\tan \phi = \sqrt{3} \frac{(w_1 - w_2)}{(w_1 + w_2)}$ [8]

UNIT-III

- Q.3 (a) Derive the EMF equation for a single phase transformer and deduce the expression for transformation ratio. [6+2=8]
- (b) Explain the principle of operation of 3- phase induction motor. [8]

OR

- Q.3 (a) Explain in detail the Applications of DC Machines. [8]
- (b) A 200 KVA, 6600/400 v, 50Hz single phase transformer has 80 turns on the secondary and cross sectional area of the core is 80sq.cm. Neglect losses, calculate: [8]
- (i) Full load primary and secondary current
 - (ii) The no. of primary turns
 - (iii) Peak flux density
 - (iv) Maximum flux value in the core

UNIT-IV

- Q.4 (a) Explain the working of a transistor as an amplifier. [8]
 (b) Explain the following gates: [8]
 (i) AND gate
 (ii) OR gate
 (iii) NOT gate
 (iv) EX-OR gate

OR

- Q.4 (a) Write short on (any one) [8]
 (i) Photovoltaic cell
 (ii) Rectifiers
 (b) Solve the following: - [8]
 (i) $(1057)_{10} = (X)_2$ find X
 (ii) $(375)_{10} = (Y)_8$ find Y
 (iii) $(11011.110)_2 = (Z)_{10}$ find Z

UNIT-V

- Q.5 (a) Derive the mathematical expression of modulation index for frequency modulated wave. Compare FM with AM [6+2=8]
 (b) Write short on: - [8]
 (i) RTD
 (ii) Strain Gauges

OR

- Q.5 (a) A sinusoidal carrier wave of frequency 2 MHz and amplitude 20mv is amplitude modulated by a sinusoidal wave of frequency 5 KHz. Determine the frequency and amplitude of side bands. Consider modulation index as 0.8. [8]
 (b) Write short note on: - (any one) [8]
 (i) Bimetallic strip
 (ii) Classification of IC's
 (iii) Thermo couple