

Roll. No.: _____

Total No. of Pages: **2****2E2001****2E2001****B.Tech. I Year II Sem. Main / Back June-July
Examination, 2015****201 Communication Techniques***Time: 3 hours**Maximum Marks: 80**Min. Passing Marks: 26*

Note: 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. (Mentioned in form No. 205).

1. NIL2. NIL**UNIT-I**

Q. 1 Describe any two qualities of good communication. 16

OR

Q. 1 What are the various path of communication? 16

UNIT-II

Q. 2 What is non-verbal communication? How does it differ from verbal communication? 16

OR

Q. 2 What are the qualities of good communication? 16

UNIT-III

Q. 3 Discuss the barriers to communication. 16

OR

Q. 3 Mention the grapevine with pros and cons. 16

UNIT-IV

Q. 4 Rewrite the following sentences with proper subject-verb agreement: 16

- (i) The great writer and the editor is dead.
- (ii) One of my sisters have a red scooty.
- (iii) Their first innings were disappointing.
- (iv) You as well as I am fond of tea.

OR

Q. 4 Identify the underlined parts of speech in the following sentences: 16

- (i) My brother has joined Police.
- (ii) She wears a red saree on Monday.
- (iii) I play cricket besides tennis.
- (iv) Don't be after me.

UNIT-V

Q. 5 Write a cover letter for applying to an MNC against the post of senior engineer. 16

OR

Q. 5 Considering yourself as Amit Kumar of the Hindu College, write an e-mail to the Principal requesting him to arrange extra classes for Mathematics. 16

— x —

Roll. No.: _____

Total No. of Pages: **4****2E2002****2E2002**

**B.Tech. I Year II Sem. (Main) Back June-July
Examination, 2015
202 Engg. Mathematics-II**

Time: 3 hours

Maximum Marks: 80

Min. Passing Marks: 26

Note: 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. (Mentioned in form No. 205).

1. NIL2. NIL

UNIT-I

- Q. 1 (a) Find the equation of the sphere which has its centre at the origin and which touches the line $2(x+1) = 2-y = z+3$. 8
- (b) If a right circular cone has three mutually perpendicular generator. Show that the semi-vertical angle is $\tan^{-1} \sqrt{2}$. 8

OR

- Q. 1 (a) A plane passes through a fixed point (a, b, c) and cuts the axes in A, B, C . Show that the locus of the centre of sphere $OABC$ is $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 2$. 8
- (b) Obtain the equation of right circular cylinder described on the circle through three points $(1, 0, 0)$; $(0, 1, 0)$ and $(0, 0, 1)$ as guiding circle. 8

UNIT-II

- Q. 2 (a) Show that the three equations $-2x + y + z = a$, $x - 2y + z = b$ and $x + y - 2z = c$ have no solution unless $a + b + c = 0$, in which case they have infinitely many solutions. Find these solutions when $a = 1$, $b = 1$, $c = -2$. 8

- (b) Find the characteristic equation of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$. Hence find the value of $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + Z$ 8

OR

- Q. 2 (a) Find the eigenvalues and eigenvectors of the matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$. 8

- (b) Find the rank of the matrix by reducing it to normal form $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ 8

UNIT-III

- Q. 3 (a) Derive radial and transverse velocities and accelerations of a particle describing a plane curve, with the help of vectors. 8

- (b) Show that the field defined by $\vec{a} = (x^2 + xy^2)\hat{i} + (y^2 + x^2y)\hat{j}$ is irrotational. Find its scalar potential.

OR

Q. 3 (a) If $\vec{r}$ and r have usual meaning, then show that:

$$(i) \quad \text{div } r^n \vec{r} = (n+3)r^n$$

$$(ii) \quad \text{curl } r^n \vec{r} = 0 \quad 8$$

(b) Evaluate $\iint_S \vec{F} \cdot \hat{n} \, ds$; where $\vec{F} = x^2 \hat{i} + y^2 \hat{j} + z^2 \hat{k}$ and S is the part of plane $x + y + z = 1$; which is located in first octant. 8

UNIT-IV

Q. 4 (a) If $f(x) = |\cos x|$, expand $f(x)$ as a Fourier series in the interval $(-\pi, \pi)$. 8

(b) Using Green's theorem, find the area of the region in the first quadrant bounded by the curves $y = x$, $y = \frac{1}{x}$ and $y = \frac{x}{4}$. 8

OR

Q. 4 (a) Obtain the first three cosines terms and the constant terms in the Fourier series of y , where: 8

x	0	1	2	3	4	5
y	4	8	15	7	6	2

(b) Find the Fourier series to represent: 8

$$f(x) = x \cos x, \quad -\pi \leq x \leq \pi$$

UNIT-V

Q. 5 Solve:

$$(i) \quad (x + 2z)p + (4zx - y)q = 2x^2 + y \quad 4$$

(ii) $pq = x^m y^n z^{2l}$

(iii) Solve in series:

8

$$x^2 \frac{d^2 y}{dx^2} + (x + x^2) \frac{dy}{dx} + (x - 9)y = 0$$

OR

Q. 5 (a) Solve in series:

8

$$4x \frac{d^2 y}{dx^2} + 2 \frac{dy}{dx} + y = 0$$

(b) Solve:

(i) $(y^2 + z^2 - x^2)p - 2xyq = -2xz$

(ii) $z = p^2 x + q^2 y$

— x —

2006

2E2003

Roll. No.: _____

Total No. of Pages 2

2E2003

B.Tech. I Year II Sem. Main / Back June-July Examination, 2015**203 Engg. Physics-II**

Time: 3 hours

Maximum Marks: 80

Min. Passing Marks: 26

Note: 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) What is Compton effect? Deduce an expression for shift in wavelength of scattered X-rays by Compton scattering. 2+5
- (b) Derive Schrödinger time dependent wave equation. 4
- (c) Find the probability that a particle in a box of width a can be found between $x = 0$ and $x = a/n$ when it is in the n th state? 5

OR

- Q. 1 (a) Write down Schrödinger wave equation for a particle enclosed in one dimensional box of size ' a '. Solve it to get eigenvalues and eigenfunctions. 8
- (b) Show that the value of energy which a photon must have so that it may transfer half of its energy to an electron at rest is about 256 KeV in a Compton scattering experiment. 8

UNIT-II

- Q. 2 (a) Answer the following questions with respect to a particle in a cubic box of side ' a ':
- (i) Is $n_x = n_y = n_z = 1$ state degenerate? 2
- (ii) What is the order of degeneracy for $n_x + n_y + n_z = 4$? 2
- (iii) What shall happen to the degeneracies for $n_x + n_y + n_z = 4$, if the box is not cubical but rectangular parallelopiped with sides a , b and c such that $a = b \neq c$. 3
- (b) What is tunnel effect? Write down Schrödinger equation for potential barrier problem and steps to find out the transmission coefficient of a particle having less energy than the height of potential barrier? 2+3+4

OR

- Q. 2 (a) Write down basic postulates of Sommerfield's free electron gas model. Obtain an expression for the density of states for free electron gas in metal and hence find expression for the Fermi energy. 4+4+2
- (b) Consider an electron whose total energy is 5 eV approaching a barrier whose height is 6 eV and width is 7 Å. Find out de Broglie wavelength of incident electron and probability of transmission through the barrier. 2+4

UNIT-III

- Q. 3 (a) What is coherence? Explain temporal and spatial coherence. Show that visibility is a measure of a degree of coherence. 2+3+3
- (b) Write two prominent applications of optical fiber. 2+2
- (c) Calculate the refractive indices of core and cladding materials of an optical fiber if its numerical aperture is 0.22 and relative refractive index difference is 0.012. 2+4

OR

- Q. 3 (a) Describe the construction of an optical fiber. What do you mean by numerical aperture of an optical fiber? Find an expression for the numerical aperture of an optical fiber 4+2+4
- (b) A laser operates at wavelength of 6000 Å and its spectral line width ($\Delta\nu$) is 10^2 Hz. for this laser, calculate:
- (i) Coherence length (ii) Quality factor 3+3

UNIT-IV

- Q. 4 (a) Derive the relation between Einstein's coefficients and discuss the results. 5+2
- (b) Explain the construction and working of a He-Ne laser. Draw necessary diagram. What is the role of He in this laser? 3+4+2

OR

- Q. 4 (a) Write short notes on the following: 3+3
- (i) Population inversion (ii) Pumping
- (b) What is holography? How it is different from photography? Explain with suitable diagram, how a hologram is recorded and then reconstructed? 2+2+3+3

UNIT-V

- Q. 5 (a) What do you mean by 'dead time' in Geiger Muller counter? Draw a neat diagram of Geiger Muller Counter and explain its working. Mention some of its applications. 2+5+3
- (b) An α -particle is stopped in an ionization chamber in which it produces 15×10^4 ion pairs. Each time the α -particle produces an ion pair, it loses 35 eV of energy. What is the kinetic energy of the α -particle? Calculate the amount of charge collected by each plate. 6

OR

- Q. 5 (a) Describe the construction, working and applications of Scintillation counter. 4+4+2
- (b) In a Geiger Muller counter, on an average 10^8 electron/count are collected if the count rate is 600 per minute, then find the ionization current. 6

2009

Roll. No.: _____

Total No. of Pages: **2****2E2004****2E2004**

**B.Tech. I Year II Sem. Main / Back June-July
Examination, 2015**

204 Chemistry and Environmental Engg.

Time: 3 hours

Maximum Marks: 80

Min. Passing Marks: 26

Note: 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. (Mentioned in form No. 205).

1. NIL2. NIL

UNIT-I

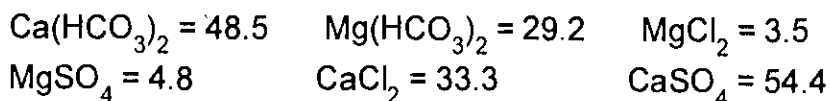
- Q. 1 (a) Explain temporary and permanent hardness of water. Discuss various chemical methods of disinfection of water. 8
- (b) Explain EDTA method for determination of hardness of water. 8

OR

- Q. 1 (a) Discuss Clark's method for determining the Hardness of water. 8
- (b) What are the requirements of drinking water? How is turbid water clarified on a large scale? Explain the principle involved. 8

UNIT-II

- Q. 2 (a) Describe lime-soda process for water softening. Give the chemical reaction involved during the softening. 8
- (b) A sample of water on analysis has been found to contain the following impurities in ppm.



Calculate the quantity of lime and soda required for softening of one million litres of water. 8

OR

- Q. 2 (a) Explain scale formation and Caustic Embrittlement in boilers. 8
- (b) Calculate the amount of lime and soda required for softening 10,000 litres of water which analysed as follows: 8

Analysis for raw water

 $\text{Ca}^{+2} = 380 \text{ ppm}$ $\text{Mg}^{+2} = 144 \text{ ppm}$ $\text{HCO}_3^- = 1500 \text{ ppm}$ Dissolved $\text{CO}_2 = 120 \text{ ppm}$ $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} = 278 \text{ ppm}$

Analysis of treated water

 $\text{OH}^- = 36 \text{ ppm}$ $\text{CO}_3^{2-} = 32 \text{ ppm}$

UNIT-III

- Q. 3 (a) Define the term pollution, pollutants and contaminants, particulates, primary and secondary pollutants. 8
- (b) Give Environmental Acts and Regulations in India. 8

OR

- Q. 3 (a) Define EIA. Explain Methodology of Environmental Impact Assessment (EIA). 8
- (b) What are the major sources of Renewable Energy in India? Explain solar energy. 8

UNIT-IV

- Q. 4 (a) What is Noise pollution? What are its major sources? What are the adverse effects of noise pollution? How can noise pollution be minimized? 8
- (b) Discuss Acid Rain and Green House Effect. 8

OR

- Q. 4 (a) What is air pollution? What are its major sources? What are the Adverse Effects of Air Pollution? How can Air Pollution be minimized? 8
- (b) Discuss the mechanism of depletion of ozone layer. What are the harmful effects due to the formation of 'ozone hole'? Discuss the substitutes of chlorofluoro carbons (CFCs). 8

UNIT-V

- Q. 5 What is Corrosion? Discuss the mechanism of Electrochemical Corrosion. Explain sacrificial anodic protection method to minimize corrosion. 16

OR

- Q. 5 What is water pollution and how is it caused? How can water pollution be minimized? Explain methodology of waste water treatment. 16

2E2005

2E2005

**B.Tech. I Year II Sem. Main/ Back June-July
Examination, 2015**

205 Engg. Mechanics

Time: 3 hours

Maximum Marks: 80

Min. Passing Marks: 26

Note: 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) Determine the magnitude and direction of the resultant a system of four coplanar concurrent forces as shown in figure-1. 8

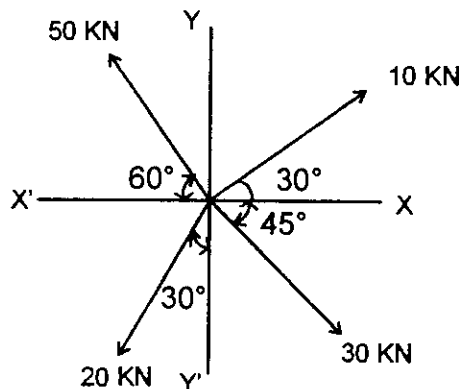


Figure-1

- (b) Determine the support reactions for the beam loaded as shown in figure-2. 8

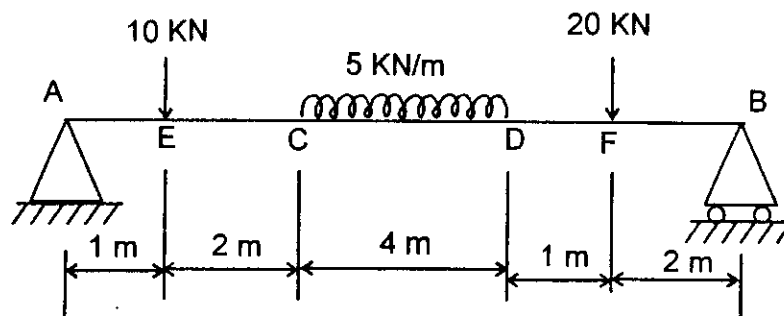


Figure-2

OR

- Q. 1 (a) Use the principle of virtual work to determine the support reactions for the beam loaded as shown in figure-3. 8

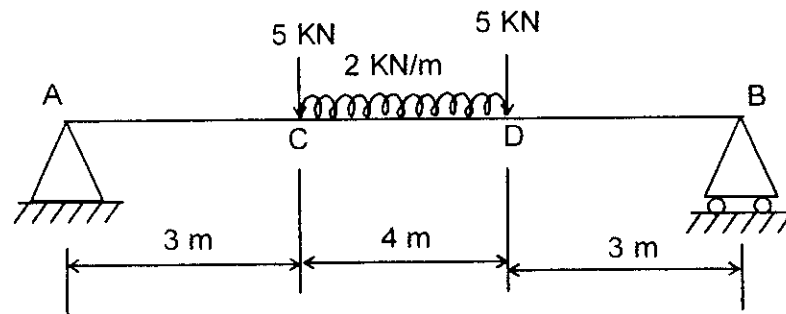


Figure-3

- (b) Write short notes on the following:

(i) Lami's theorem

(ii) Varignon's theorem

4×2 = 8

UNIT-II

- Q. 2 Determine the polar moment of inertia of the I-section given in figure-4, about X-X axis and Y-Y axis both. (All dimensions are in mm.) 16

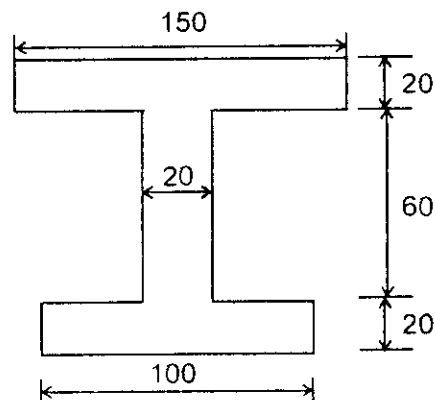


Figure-4

OR

- Q. 2 (a) An effort of 200 N is applied through a distance of 6 m to lifting machine to raise a load through a distance of 60 cm. If the efficiency of the lifting machine is 80%, determine

- (i) Load lifted by the machine
 - (ii) Mechanical advantage
 - (iii) Velocity ratio 8
- (b) There are four pulleys in a third system of pulleys. An effort of 200 N is required to lift an unlock weight. If the efficiency of this machine is 70%, find the weight lifted. 8

UNIT-III

- Q. 3 (a) A ladder of 5 m length and 50 N weight rest on a horizontal ground and against a smooth vertical wall at an angle of 60° with the vertical. when a man of 100 N stands on a ring 2 m from the foot of the ladder, it is on the point of slipping. Determine the coefficient of friction between the ladder and ground. 8
- (b) A flat belt transmits 20 kW power from a pulley of 100 cm diameter running at 300 rpm. The angle of lap on the pulley is 160° . Find the width of the belt if the maximum tension is limited to 200 N/cm. Take $\mu = 0.3$. 8

OR

- Q. 3 (a) Derive an expression the total length of the belt required for open belt drive. 8
- (b) Write short notes on the following:
- (i) Angle of Repose
 - (ii) Effect of Slip on Belt Drive 4×2 = 8

UNIT-IV

- Q. 4 (a) A stone is projected with such an angle with horizontal, the range is 4 times the greatest height attained by the body. (Range is 200 m) Find:
- (i) Angle of projection
 - (ii) Velocity of projection
 - (iii) Time of flight 8
- (b) A parachute of 300 N weight falling with uniform acceleration from rest descends 5 m in first 3 second. Determine the resultant air force on the parachute. 8

OR

- Q. 4 (a) A ball is dropped from a building of great height. Another ball is dropped from the same point exactly one second later. Find the separation between the balls after three seconds of the drop second ball. 8
- (b) Find the acceleration and tension in the string of the system shown in figure-5. Coefficient of the friction $\mu = 0.2$ for all planes of the contact. Pulley is smooth. Also determine the velocity of the system in 5 seconds after starting from rest. 8

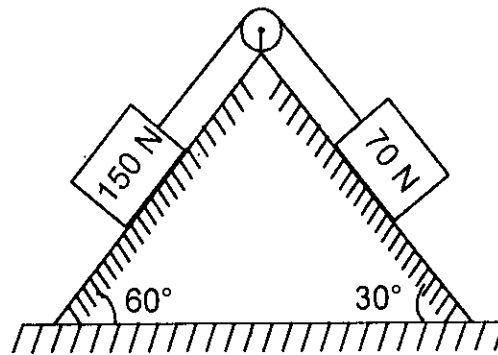


Figure-5

UNIT-V

- Q. 5 (a) A block of weight 100 N slides along an inclined plane making an angle 30° with horizontal having initial velocity of 2 m/s. The distance travelled by the body along the plane is 2 m and after that it strikes the spring whose stiffness is 50 N/mm. Taking $\mu = 0.2$. Find the compression of the spring. 8

(b) Write short notes on the following:

(i) Principle of work and energy

(ii) Principle of linear impulse and momentum

4×2 = 8

OR

- Q. 5 (a) Two balls *A* and *B* of mass 200 gm each, moving in opposite direction with their velocities 3 m/sec. and 2 m/sec. respectively, collide elastically. If no energy is lost during the collision, determine their velocities after collision. 8

(b) Write short notes on the following:

(i) Law of Conservation of Energy

(ii) Principle of angular momentum

4×2 = 8

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2013

2E2006

Roll. No.: _____

Total No. of Pages: 2

2E2006

B.Tech. I Year II Sem. Main / Back June-July Examination, 2015**206 Fundamentals of Computer Programming***Time: 3 hours**Maximum Marks: 80**Min. Passing Marks: 26*

Note: 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) Explain the concept of preprocessor? Also describe the preprocessor directives in detail. 8
- (b) What are identifiers? Explain the rules for identifiers declaration. 8

OR

- Q. 1 (a) Explain the storage classes used in 'C' language with the help of examples. 6
- (b) What is scope of variable in 'C' meant? Explain type casting in detail also. 5
- (c) Explain the difference between automatic and static variable. 5

UNIT-II

- Q. 2 (a) Write a program to pass a matrix as an argument to a function and display the matrix in the function. 10
- (b) Write a C language program to SWAP two numbers using pointers and function. 6

OR

- Q. 2 (a) Write a program to read the coordinates of vertices of a triangle and evaluate and display in length of all the sides and the area. Use a function to retain all the required values in a structure. 12
- (b) Write a short note on typedef declaration. 4

38r

UNIT-III

- Q. 3 (a) Explain Array of structure with the help of a suitable program also describe structure within structure with an example. 10
- (b) Write a program which explains pointers in one dimensional array. 6

OR

- Q. 3 (a) With the help of a program explain pointer as function parameters. 8
- (b) Explain file handling functions in 'C'. 8

UNIT-IV

- Q. 4 (a) Write and explain string handling function and user defined functions. 5
- (b) Write and explain a program for passing parameter by value. 5
- (c) Write a program to copy one string into another and count the number of characters copied. 6

OR

- Q. 4 (a) Write and explain a program which demonstrate the array of structures in detail. 6
- (b) Write a program which specifies to access the elements of structure using pointer variable. 6
- (c) Write short note on the void pointer. 4

UNIT-V

- Q. 5 (a) Give classification for the types of language working in computer programming environment. 8
- (b) Write short notes on:
- (i) Pseudo Code 4
- (ii) Flow chart and algorithms 4

OR

- Q. 5 Perform the following:
- (i) $(89D)_{16} + (259)_{10}$ 4
- (ii) $(263)_8 + (100100101)_2$ 4
- (iii) $(10101)_2 - (01110)_2$ 4
- (iv) Multiply $(101)_2$ with $(011)_2$ 4

— x —

2003

Roll. No.: _____

Total No. of Pages: 4

2E1022

2E1022

**B.Tech. I Year II Sem. (Old Back) 2007-08 and
2008-09 Batch June-July Examination, 2015
Common to all Branches of Engg.
202 Engineering Mathematics-II**

Time: 3 hours

 Maximum Marks: 80
 Min. Passing Marks: 24

Note: 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. (Mentioned in form No. 205).

1. NIL2. NIL**UNIT-I**

- Q. 1 (a) Obtain the equation of a sphere which passes through the points (1, 0, 0), (0, 1, 0) and (0, 0, 1) and has its centre on the plane: 8

$$x + y + z = 6$$

- (b) Find the radius and centre of the circle: 8

$$x^2 + y^2 + z^2 - 8x + 4y + 8z - 45 = 0, \quad x - 2y + 2z = 3$$

OR

- Q. 1 (a) Find the equation to the right circular cone with vertex at the origin, axis the line

$$\frac{x}{2} = \frac{y}{-4} = \frac{z}{3} \text{ and which passes through the point } (1, 1, 2). \quad 8$$

- (b) Find the equation of a right circular cylinder whose axis is $\frac{x-2}{2} = \frac{y-1}{1} = \frac{z}{3}$ and which passes through (0, 0, 1). 8

UNIT-II

Q. 2 (a) Find the rank of the following matrix:

8

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

(b) Solve the system of non-homogeneous equations:

$$x + y + z = 8$$

$$2x + 3y + 2z = 19$$

$$4x + 2y + 3z = 23$$

using elementary row-transformation.

8

OR

Q. 2 (a) Find the eigenvalues and the corresponding eigenvectors of the following matrix:

8

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

(b) Reduce the following matrix to the diagonal form. Obtain the matrix which helps do so:

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

UNIT-III

Q. 3 (a) If $\vec{r} = a \cos t \hat{i} + a \sin t \hat{j} + t \hat{k}$, find the following:

(i) $\frac{dr}{dt}$

(ii) $\frac{d^2 r}{dt^2}$

(iii) $\left| \frac{d^2 r}{dt^2} \right|$

(b) Find the directional derivative of:

$$f = xy + yz + zx$$

in the direction of the vector $\hat{i} + 2\hat{j} + 2\hat{k}$ at the point $(1, 2, 0)$.

8

OR

Q. 3 (a) Show that the vector field defined by:

$$\vec{V} = 2xyz^3\hat{i} + x^2z^3\hat{j} + 3x^2yz^2\hat{k}$$

is irrotational. Find scalar potential ϕ such that $\vec{V} = \text{grad } \phi$.

8

(b) Using Stoke's theorem, evaluate:

$$\int_C^\lambda (xydx + xy^2dy)$$

where C is the square in the xy-plane with vertices respectively:

$$(1, 0), (-1, 0), (0, 1), (0, -1)$$

8

UNIT-IV

Q. 4 (a) The radial and transverse velocities of a particle are λr and $\mu\theta$. Find its path and show that its radial and transverse components of acceleration are respectively:

$$\lambda^2 r - \frac{\mu^2 \theta^2}{r} \text{ and } \mu\theta \left(\lambda + \frac{\mu}{r} \right)$$

8

- (b) A particle moves in a curve so that its tangential and normal accelerations are equal and the angular velocity of the tangent is constant. Find the equation of the curve. 8

OR

- Q. 4 (a) A torpedo moving in still water is subject to a retardation k times the velocity. If u be its initial velocity, show that the velocity v and distance s after time t are given by:

$$v = ue^{-kt}, \quad s = \frac{u}{k} (1 - e^{-kt}) \quad 8$$

- (b) A particle of mass m is falling under the influence of gravity through a medium whose resistance equal μ times the velocity. If the particle be released from rest, show that the distance fallen through in time t is:

$$g \frac{m^2}{\mu^2} \left\{ e^{-\mu t/m} - 1 + \frac{\mu t}{m} \right\} \quad 8$$

UNIT-V

- Q. 5 (a) Solve in series the following differential equation:

$$\frac{d^2 y}{dx^2} + x^2 y = 0$$

- (b) Solve the following partial differential equation:

$$(xy - zx)p + (yz - xy)q = xz - yz$$

OR

- Q. 5 (a) Solve the following partial differential equation:

$$pq = xy$$

- (b) Solve the following partial differential equation by Charpit's method:

$$px + qy = pq$$

— x —

2005

2E1003	Roll. No.: _____	Total No. of Pages: 3
	2E1003	
	B.Tech. II Sem. Old Back Examination June-July, 2015 Common for All Branch 203 Physics	

Time: 3 hours

Maximum Marks: 80

Min. Passing Marks: 24

Note: 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. _____

2. _____

UNIT-I

- Q. 1 (a) Write down Schrödinger's equation for a particle confined in 3D Box. Obtain the wave function for a particle confined in this box. 2+6
- (b) What is the density of energy states in metals? Obtain an expression for the density of states for free electron gas in metals? 2+6

OR

- Q. 1 (a) What do you mean by quantum mechanical tunneling? Show that the tunneling probability is given by:

$$T = \frac{16E(V_0 - E)}{V_0^2} e^{-2\alpha a}$$

when $\alpha a \gg 1$, $\alpha = \sqrt{\frac{8\pi^2 m}{h^2}(V_0 - E)}$ and $V_0 > E$. Symbols have usual meaning.

2+6

- (b) For Potassium, Fermi energy is 2.14 eV and the density of electron is $1.4 \times 10^{28} / \text{m}^3$. Find the electron density of a metal for which Fermi energy is 4.72 eV.

8

UNIT-II

- Q. 2 (a) Explain the term absorption, spontaneous emission and stimulated emission and derive a relation between Einstein coefficient. 2+2+2+4
- (b) What is holographic microscopy? With illustrative diagram show outley of a holographic interferometer and explain its working. 2+2+2

OR

- Q. 2. (a) Laser action occurs by stimulated emission from an excited state to a state of energy 30.5 eV. If the wavelength of laser light emitted is 690 nm. What is the energy of excited one. 8
- (b) State the principle of holography? Discuss construction and reproduction of a hologram. 4+4

UNIT-III

- Q. 3 (a) Explain coherence length and coherence time. Show the visibility is a measure of coherence. 4+4
- (b) Calculate the refractive indices of the core and cladding materials of a fibre from the following data:

$$NA = 0.22 \text{ and } \Delta = 0.012$$

8

OR

- Q. 3 (a) Derive an expression for the maximum acceptance angle and numerical aperture of an optical fibre. 4+4
- (b) Light of wavelength 6000 Å have average wave train length of 20 waves. Determine its coherent time and 'Q' value. 8

UNIT-IV

Q. 4 (a) Describe the basic principle of gas filled detector with the help of suitable diagram.

6+2

(b) The efficiency of a GM counter is 90%. If it counts maximum 6000 counts/minute, then calculate the paralysis time of counter.

8

OR

Q. 4 (a) How will you differentiate between three types of gas detectors viz. ionization chamber, proportional counter and GM counter.

8

(b) Explain construction, working and application of scintillation counter.

3+3+2

UNIT-V

Q. 5 (a) Derive Maxwell's equation from the basic law of electrodynamics.

8

(b) Show that for an electromagnetic field, the energy density $U = \frac{1}{2} \left(\epsilon_0 E^2 + \frac{1}{2} \mu_0 H^2 \right)$

and poynting vector $\vec{P} = \vec{E} \times \vec{H}$.

8

OR

Q. 5 (a) Derive the solution of Electromagnetic wave equation for free space.

8

(b) Show that $\text{div} \left(r^n \vec{r} \right) = (n+3)r^n$, where $r = \left| \vec{r} \right|$ and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$.

8

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2008

Roll. No.: _____

Total No. of Pages **2****2E1024****2E1024****B.Tech. II Sem. (Old/Back) Examination June-July 2015****Common for All Branches****204 Environmental Engg. & Disaster Management***Time: 3 hours**Maximum Marks: 80**Min. Passing Marks: 24*

Note: Attempt any **five questions**, selecting one question from each unit. Marks of questions are indicated against each question. Draw neat and comprehensive sketches wherever necessary to clearly illustrate your answer. Assume missing data suitably if any and specify the same.

Use of following supporting material is permitted during examination.

1. NIL2. NIL**UNIT-1**

Q. 1 (a) What is the importance of protection of Environment? What are the control strategies for environmental Protection? 10

(b) Describe biotic and abiotic environment. What is their inter-relation? 6

Or

Q. 1 (a) How biodiversity is classified. Discuss briefly. 7

(b) Write notes on - 3×3

(i) Solar energy

(ii) Ecosystem

(iii) Population dynamics

UNIT-2

Q. 2 (a) Write the chemical, physical & bacteriological standards of drinking water with their acceptable limits. 10

[Contd.]

(b) Discuss various sources of water. 6

Or

Q. 2 (a) What is the necessity & methodology of EIA. 10

(b) Write the short note on **water quality standards**. 6

UNIT-3

Q. 3 What are the main sources of air pollution? How these can affect the human health. 16

Or

Q. 3 Write short notes on - 4×4

- i) Ozone depletion
- ii) Green house effect
- iii) Global warming
- iv) Acid Rain

UNIT-4

Q.4 Write short notes on - 8×2

- (a) Mitigation measures for cyclone & drought
- (b) Difference between hazards & vulnerability

Or

Q.4 Write short notes on - 8×2

- (a) Types of landslide
- (b) Nuclear disaster

UNIT-5

Q.5 (a) What are earthquakes? List out the some causes of earthquake. 10

(b) Write note on seismic wave.

Or

Q.5 (a) Discuss about Plate Tectonic theory of earthquake. 8

(b) Write note on epicenter & epicentral distance. 8

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2E1015**2E1015**

**B.Tech. I Year II Sem. (Old Back) 2007-08 and 2008-09
Batch June-July Examination, 2015**

Common to all branches of Engg.

205 (C) Instrumentation

Time 3 hours

Maximum Marks: 80

Min. Passing Marks: 24

Note: 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. (Mentioned in form No. 205).

1. NIL

2. NIL

UNIT-I

- Q. 1 (a) What is the need for statistical analysis of measured values and when does it arise? Suggest a measurement process when the results are subjected to this analysis. 8
- (b) A recorder is specified accurate to ± 2 percent of full scale and full scale is set to 50 mV. Determine the deviation that can be anticipated. Compute the probable error when the instrument is used at $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ scale. 8

OR

- Q. 1 (a) List several source of error that must be considered in the design of an instrumentation system. 8
- (b) A set of independent current measurements are by five persons as 65.6 mA, 65.8 mA, 66.3 mA, 65.1 mA, 65.3 mA. Calculate (i) Average deviation (ii) Standard deviation. 4+4

UNIT-II

- Q. 2 (a) With the aid of block diagram, describe the working of Hall effect type A.C. current probe. 8
- (b) With the neat circuit diagram explain the working of chopper type voltmeter. 8

OR

- Q. 2 (a) Explain multirange ammeter with the neat circuit diagram. 8
- (b) Design a aytion shunt for a ammeter with the range of 20A, 50A, 100A. The meter having internal resistance of $15\ \Omega$ and full scale deflection current of 1.75 mA. Also draw the circuit arrangement. 8

UNIT-III

- Q. 3 (a) What are the major components of cathode ray tube? Draw the CRT schematic diagram. 8
- (b) Why probe is used with oscilloscope? Explain passive and active probe for CRO. 8

OR

- Q. 3 (a) Explain time base generator with suitable circuit diagram and waveforms. 8
- (b) How is the vertical section of CRO is deflected? How does this differ from the horizontal axis? 8

UNIT-IV

- Q. 4 (a) Explain swept frequency generator with the help of block diagram. 8
- (b) Explain frequency synthesized signal generator. 8

OR

- Q. 4 (a) Discuss with the help of neat block diagram the elements of standard signal generator. 8
- (b) With the help of circuit diagram, explain radio frequency signal generator. 8

UNIT-V

- Q. 5 (a) Explain different types of displacement transducer. 8
- (b) How we can select best transducer? Explain selection criteria of transducer. 8

OR

- Q. 5 Write short notes on any two of the following:

- (i) Acceleration Transducer
- (ii) Flow Transducer
- (iii) Torque Transducer

8+8

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2015

Roll. No.: _____

Total No. of Pages: 3

2E1026

2E1026

**B.Tech. I Year II Sem. (Old/Back) June-July
Examination, 2015
Common to all branches of Engg.
206 Engineering Chemistry**

*Time: 3 hours**Maximum Marks: 80**Min. Passing Marks: 24*

Note: 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) Describe the Otto-Hoffman's process for preparing Coke. (excluding recovery of by-products). What are the advantages of this method? 8
- (b) What is the difference between low temperature and high temperature carbonization? 8

OR

- Q. 1 (a) Explain the moving bed catalytic cracking method to obtain petrol from heavy oil. 8
- (b) Write short notes on any two of the following:
- (i) Octane number
 - (ii) Catalytic reforming
 - (iii) Requisites of good metallurgical coke
 - (iv) Oil gas 4+4

UNIT-II

Q. 2 (a) Explain with the help of labelled diagram, principle, construction and working of a Bomb-Calorimeter. 8

(b) The following data were obtained in a bomb calorimeter experiment.

Weight of coal burnt = 0.994 g

Weight of water in calorimeter = 2592 g

Water equivalent of the apparatus = 386.12 g

Rise in temperature of water = 2.732° C

Find the gross calorific value of the fuel. If the fuel contains 8% hydrogen, calculate its lower calorific value. 8

OR

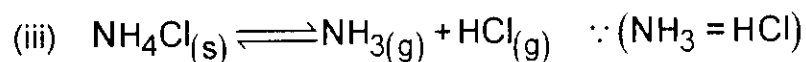
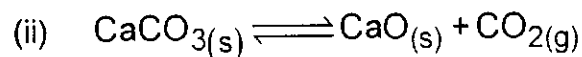
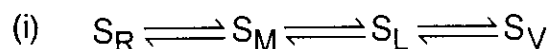
Q. 2 (a) Explain how carbon and hydrogen are estimated during ultimate analysis of coal. Calculate the gross and net calorific value of a coal sample having the following composition, using Dulong formulae. C = 82%, H₂ = 8%, O₂ = 5%, S = 2.5%, N₂ = 1.4%, Ash = 2.1%. 4+4

(b) Calculate the volume of air required for complete combustion of 1 m³ of gaseous fuel having the composition CO = 48%, CH₄ = 8%, H₂ = 40%, C₂H₂ = 2%, N₂ = 1.0 and remaining ash. If 25% excess air is used, find the volume of air actually supplied. 8

UNIT-III

Q. 3 (a) State phase rule and explain its application to ice-water-vapour system. 8

(b) Calculate the number of phases, degree of freedom and number of components in following systems and explain:



(iv) Mixture of H₂O and chloroform 8

OR

- Q. 3 (a) Draw a neat diagram of sulphur system. Explain the application of phase rule to this system. 8
- (b) Explain the following:
- (i) Desilverisation of lead
 - (ii) Eutectic point 8

UNIT-IV

- Q. 4 (a) Describe the phenomenon of superconductivity. 4
- (b) Explain Meisner effect in superconductors. 4
- (c) Discuss the preparation, properties and applications of fullerenes. 8

OR

- Q. 4 What is optical fibre? Describe the construction, properties and applications of optical fibre. 16

UNIT-V

- Q. 5 (a) Explain the rusting of iron by electrochemical theory (H_2 evolution and O_2 absorption). 8
- (b) Explain the sacrificial anodic method to minimize corrosion. 8

OR

- Q. 5 (a) Explain the dry theory of corrosion. Discuss the various types of oxides formed. 8
- (b) Explain why:
- (i) Bolt and nut made of same metal is preferred?
 - (ii) A part of nail inside the wood corrodes easily?
 - (iii) Welded joints are preferred over bolted joints?
 - (iv) Copper equipment should not possess a small steel bolt? 8

— x —

