USN ☐☐☐☐☐☐☐☐☐☐

First Semester B.E. Degree Examination, Dec.08/Jan.09
Engineering Mathematics - I

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer any FIVE full questions selecting at least two questions from each part.*
2. *Answer all objective type questions only in first and second writing pages.*
3. *Answer for Objective type questions shall not be repeated.*

1   a.   i)   If $y = x^{2n}$ then y_{n+1} is

A) $\dfrac{(2n)!}{(n-1)!} x^{n-1}$ B) $\dfrac{(2n)!}{n!} x^{n-1}$ C) $\dfrac{(n-1)!}{(2n)!} x^{n-1}$ D) Zero

ii)   If two curves intersect orthogonally in Cartesian form, the angle between the same two curves in polar form is,

A) $\pi/4$ B) Zero   C) 1 radian   D) None of these

iii)   If the angle between the radius vector and the tangent is constant, then the curve is,

A) $r = ae^{b\theta}$ B) $r = a\cos\theta$ C) $r^2 = a^2 \cos(2\theta)$ D) $r = a\theta$

iv)   The nth derivative of a constant function is,

A) n   B) 1   C) Zero   D) ∞ **(04 Marks)**

b.   Find the nth derivative of $\dfrac{x+3}{(x-1)(x+2)}$.   **(04 Marks)**

c.   If $y = \sin(m\sin^{-1}x)$ express $(1-x^2)y_{n+2} - (2n+1)xy_{n+1}$ in terms n^{th} derivative of y.

(06 Marks)

d.   Find the pedal equation of the polar curve $r = a(1+\cos\theta)$.   **(06 Marks)**

2   a.   i)   If $u = x^n + y^n$ then $\dfrac{\partial^n u}{\partial x^{n-1} \partial y}$ is equal to ($(n \geq 2)$

A) Zero   B) $(n!)x + ny^{n-1}$ C) $(n!)x$ D) $(2n)!$

ii)   If $u = \sin(x+ay) + g(x-ay)$ then the value of $\dfrac{\partial^2 u}{\partial^2 y}$ is

A) $\dfrac{\partial^2 u}{\partial x^2}$ B) $a\dfrac{\partial^2 u}{\partial x^2}$ C) $a^2 \dfrac{\partial^2 u}{\partial x^2}$ D) $-a^2 \dfrac{\partial^2 u}{\partial x^2}$

iii)   If $u = f(x^2 + y^2 + z^2)$ and $\dfrac{\partial u}{\partial x} = 2xf'$ then f' is derivative with respect to

A) x   B) y   C) z   D) $x^2 + y^2 + z^2$

iv)   If u and v are the two functions depending on the independent variables x and y then u and v are independent of each other if and only if, for $J = J\left(\dfrac{u,v}{x,y}\right)$

A) $J = 0$ B) $J \neq 0$ C) $J = 1$ D) $J = -1$ **(04 Marks)**

b.   If $u = x^2 y + y^2 z + z^2 x$ show that $u_x + u_y + u_z = (x+y+z)^2$.   **(04 Marks)**

c.   If $u = x\log(xy)$ where the implicit relation between x and y is $x^3 + y^3 + 3xy = 1$ find $\dfrac{du}{dx}$.

(06 Marks)

d.   Define 'relative error' and 'percentage error'. Find the error in calculating the power $\omega = \dfrac{V^2}{R}$ due to errors h and k respectively in measuring voltage V and reistance R.   **(06 Marks)**

3 a. i) The value of $\int_0^\pi \sin^4 x\,dx$ is

A) $\dfrac{3\pi}{8}$ B) $\dfrac{3\pi}{16}$ C) $\dfrac{3\pi^2}{8}$ D) zero

ii) The value of $\int_0^{\pi/2} \sin^{99}(x)\cos(x)\,dx$ is

A) $\dfrac{1}{99}$ B) $\dfrac{\pi}{100}$ C) $\dfrac{99}{100}$ D) None of these

iii) The tangents to the curve $x^3 + y^3 = 3axy$ at origin are

A) $y = x$ and $y = -x$ B) $x = 0,\ y = 0$

C) Line perpendicular to $y = x$ at $\left(\dfrac{3a}{2}, \dfrac{3a}{2}\right)$ D) Do not exist

iv) If the equation of the curve remains unchanged after changing r to −r the curve $r = f(\theta)$ is symmetric about

A) Initial line   B) A line perpendicular to initial line through pole

C) Radially symmetric about the point pole   D) Symmetry does not exist.

(04 Marks)

b. Evaluate $I = \int_0^\pi x \sin^7 x\,dx$.   (04 Marks)

c. Obtain the reduction formula for $\int \tan^n x\,dx$ and hence find the reduction formula for $\int_0^{\pi/4} \tan^n x\,dx$.   (06 Marks)

d. Trace the curve $r = a\sin(2\theta)$.   (06 Marks)

4 a. i) If the derivative of arc length $\dfrac{ds}{dr} = \phi(r)$ then $\phi(r)$ is

A) $\sqrt{r^2 + \left(\dfrac{dr}{d\theta}\right)^2}$ B) $\sqrt{r^2\left(\dfrac{d\theta}{dr}\right)^2 + 1}$ C) $\sqrt{\dfrac{r}{\left(\dfrac{dr}{d\theta}\right)^2}}$ D) $\sqrt{s^2 + r^2}$

ii) If S_1 and S_2 are surface areas of the solids generated by revolving the ellipses $\dfrac{x^2}{b^2} + \dfrac{y^2}{a^2} = 1$ about the y-axis and then

A) $S_1 > S_2$ B) $S_1 < S_2$ C) $S_1 = S_2$ D) Cant predict

iii) If V_1 = volume of the solid generated by revolving area included between x-axis and $x^2 + y^2 = a^2$ about x-axis

V_2 = volume of the solid generated by the entire area of the circle $x^2 + y^2 = a^2$ about x-axis then

A) $V_1 = V_2$ B) $V_2 = 2V_1$ C) $V_2 = 4V_1$ D) $V_2 = 16V_1$

4   iv)   The length of the arc in parametric form is

A) $s = \int_{t_1}^{t_2} \sqrt{1+\left(\dfrac{dy}{dt}\right)^2}\, dt$

B) $s = \int_{t_1}^{t_2} \sqrt{1+\left(\dfrac{dx}{dt}\right)^2}\, dt$

C) $s = \int_{t_1}^{t_2} \sqrt{\left(\dfrac{dx}{dt}\right)^2+\left(\dfrac{dy}{dt}\right)^2}\, dt$

D) $s = \int_{t_1}^{t_2} \sqrt{(dx)^2+(dy)^2}\, dt$ **(04 Marks)**

b.   Find the volume of the solid generated by revolving the part of the parabola $y^2 = 4ax$ lying between the vertex and the latus-rectum, about the x-axis.   **(04 Marks)**

c.   Find the surface area of the solid of revolution of the curve $r = 2a\cos\theta$ about the initial line.   **(06 Marks)**

d.   Evaluate $\int_0^1 \dfrac{x^\alpha -1}{\log x}\, dx$, $\alpha \geq 0$.   **(06 Marks)**

Part B

5   a.   i)   The order of the differential equation $\sqrt{\dfrac{dy}{dx}} = (4x+y+1)$ is

A) 1   B) ½   C) zero   D) does not exist

ii)   The differential equation $\dfrac{dy}{dx} = \sin(x+y+1)$ with $y(0) = 1$ is

A) zero value problem   B)   Infinite solution problem
C) Initial value problem   D)   None of these

iii)   By Replacing $\dfrac{dy}{dx}$ by $-\dfrac{dx}{dy}$ in the differential $f\left(x,y,\dfrac{dy}{dx}\right)=0$ we get the differential equation of,

A) Polar trajectory   B) Parametric trajectory
C) Orthogonal trajectory   D) Parallel trajectory

iv)   In the homogeneous differential equation $\dfrac{dy}{dx} = \dfrac{f(x,y)}{\phi(x,y)}$ the degrees of the homogeneous functions $f(x, y)$ and $\phi(x,y)$ are,

A)   Same   B)   Different   C) Relatively prime   D) Exactly one   **(04 Marks)**

b.   Solve $e^x \tan y\, dx + (1-e^x)\sec^2 y\, dy = 0$.   **(04 Marks)**

c.   Solve $x\log x \dfrac{dy}{dx} + y = 2\log x$.   **(06 Marks)**

d.   Find the orthogonal trajectory of $r^2 = a^2 \cos(2\theta)$.   **(06 Marks)**

6   a.   i)   The sum of infinite series $1+\dfrac{1}{2}+\dfrac{1}{3}+\dfrac{1}{4}+\dots\dots$ is

A) 9.999…   B) 99.999….   C) ∞ D) Indeterminate

ii)   If the positive term infinite series $\sum_{n=1}^{\infty} u_n$ and $\sum_{n=1}^{\infty} v_n$ are divergent then $\sum_{n=1}^{\infty} u_n - \sum_{n=1}^{\infty} v_n$ is

A) Convergent   B) Divergent   C) Oscillatory   D) Cant predict

iii)   If an arbitrary term infinite series $\sum_{n=1}^{\infty} u_n$ is divergent then its absolute term series $\sum_{n=1}^{\infty} |u_n|$ is,

A) Convergent   B) Divergent   C) Either convergent or divergent   D) Cant-predict

3 of 4

6   iv) If $\sum u_n$ is positive term infinite series and if $\underset{n \to \infty}{Lim} u_n = 0$ then $\sum u_n$ is

A) Convergent   B) Divergent   C) Either convergent or divergent   D) Oscillatory

(04 Marks)

b. Test the convergence of the series,

$$\frac{1}{(1)(4)(5)} + \frac{1}{(2)(9)(11)} + \frac{1}{(3)(14)(17)} + \frac{1}{(4)(19)(23)} + \ldots\ldots$$

(04 Marks)

c. Test the convergence of $\sum_{n=1}^{\infty} \frac{4.7\ldots\ldots(3n+1)}{1.2\ldots\ldots n} x^n$

(06 Marks)

d. Test the absolute and conditional convergence of the following series:

i) $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + \ldots..$ ii) $1 - \frac{1}{2^3} + \frac{1}{3^3} - \frac{1}{4^3} + \ldots\ldots$

(06 Marks)

7 a. i) If l, m, n are direction cosines of a straight line then,

A) $l + m + n = 1$ B) $l^2 + m^2 + n^2 = 1$ C) $l = m = n$ D) $\frac{l}{m} = \frac{m}{n} = \frac{n}{l}$

ii) Skew lines are,

A) Intersecting   B) Parallel   C) Planar   D) Not coplanar

iii) The angle between the two lines with direction ratios (1, 1, 2) (2, 0, -1) is

A) $0°$ B) $45°$ C) $90°$ D) $\cos^{-1}\frac{3}{5}$

iv) A point on the line $\frac{x+1}{2} = \frac{y-3}{3} = \frac{z}{-1}$ is

A) (1, 6, 1)   B) (1, 6, -1)   C) (-1, 6, -1)   D) (1, -6, 1)   (04 Marks)

b. Find the intercept form of a plane $2x + 3y + 4z + k = 0$ passing through a point (1, 1, 1).

(04 Marks)

c. Find the equation of a plane passing through the line of intersection of the planes $7x - 4y + 7z + 16 = 0$ and $4x + 3y - 2z + 13 = 0$ and perpendicular to the plane $x - y - 2z + 5 = 0$

(06 Marks)

d. Find the magnitude and the equations of the shortest distance between the lines $\frac{x}{2} = \frac{y}{-3} = \frac{z}{1}$

and $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$.

(06 Marks)

8 a. i) If $\vec{V} = x^2 i + y^2 j + z^2 k$ then $\vec{V}$ at (x, y, z) = (1, 1, 1) becomes

A) Unit vector   B) Constant vector   C) Scalar   D) Complex number

ii) If f is a scalar function then $\nabla f = grad f$ is

A) Scalar point function   B) Vector point function
C) Both A and B   D) Neither A nor B.

iii) div curl F is equal to

A) zero   B) unity   C) $i + j + k$ D) does not exist

iv) If a particle moves along a curve $\vec{R}(t) = x(t)i + y(t)j + z(t)k$ then $\frac{dR}{dt}$ is

A) Radial vector   B) Tangential vector   C) Normal vector   D) Unit vector

(04 Marks)

b. Find a unit vector normal to the surface $x^3 y^3 z^2 = 4$ at the point (-1, -1, 2).   (04 Marks)

c. Prove that div Curl $F = \nabla \cdot \nabla \times F = 0$.   (06 Marks)

d. If $\vec{V} = 3xy^2 z^2 i + y^3 z^2 j - 2y^2 z^3 k$ and $\overline{F} = (x^2 - yz)i + (y^2 - zx)j + (z^2 - xy)k$ then prove that $\vec{V}$ is solenoidal and F is irrotational.   (06 Marks)

* * * * *

USN ☐☐☐☐☐☐☐☐☐☐

First / Second Semester B.E. Degree Examination, Dec.08/Jan.09
Engineering Chemistry

Time: 3 hrs.   Max. Marks:100

Note:1. *Answer any FIVE full questions selecting*
at least two questions from each part.
2. Answer all objective type questions only in first and second
writing pages.
3. Answer for Objective type questions shall not be repeated.

Part A

1 a. i) Bomb calorimeter is used for determining the calorific value of,
        A) Solid fuel B) Liquid fuel   C) Gaseous fuel   D) Both solid fuel and liquid fuel
    ii) Octane number is related to the petroleum product
        A)   Diesel   B) Kerosine   C) Petrol   D)   Lubricating oil
    iii) The process by which the higher hydrocarbons are broken into lower hydrocarbons by
        the application of heat by,
        A)   Combustion   B) Cracking   C)   Sparking   D) Jetting
    iv) Quality of diesel fuel is determined by,
        A)   Octane rating   B)   Percentage of carbon
        C)   Length of hydrocarbon chain   D) Cetane number   **(04 Marks)**
   b. What is meant by cracking? Describe with a neat diagram fluidized bed catalytic cracking.
                                                                               (06 Marks)
   c. What is knocking? What are its ill-effects? Give the mechanism of knocking.   **(05 Marks)**
   d. What are chemical fuels? Give the classification of fuels with examples.   **(05 Marks)**

2 a. i) Calomel electrode is reversible with respect to
        A)   Mercury ion   B) Chloride ion   C) Both ions   D) None of these
    ii) A metal rod is dipped in a solution of its ions. Its electrode potential is independent of,
        A)   Temperature of the solution   B) Concentration of the solution
        C)   Area of the metal exposed   D) Nature of the metal
    iii) A galvanic cell converts
        A)   Electrical energy into chemical energy B) Chemical energy into electrical energy
        C)   Electrical energy into heat energy   D) Chemical energy into heat energy
    iv) The potential of the standard Hydrogen electrode is taken as
        A) 1 volt   B)   0 volt   C) 10 volt   D)   None of these   **(04 Marks)**
   b. Define single electrode potential and standard electrode potential and explain the origin of
       electrode potential.   **(06 Marks)**
   c. Explain the determination of electrode potential copper electrode dipped in 0.5 m $CuSO_4$
       using standard hydrogen electrode. What would be the measured emf? ($E°cu/cu^{++}= +0.34$ V)
                                                                                   (06 Marks)
   d. Write the cell reaction and calculate the emf of the following cell at 298 K, given
       $E°_{cell} = 0.46V$

       $Cu_{(s)} | Cu^{+2}(0.01M) \| Ag^+(0.1M) | Ag_{(s)}$ **(04 Marks)**

3 a. i) In which battery, a key component is separated from the rest of the battery prior to activation
    A) Primary battery   B) Secondary battery C) Reserve battery D) None of these
  ii) In hydrogen-oxygen fuel cell, which of the following electrolyte is used,
    A) KOH   B) NH_4OH C) CH_3COOH D) None of these
  iii) The reaction that lakes place at anode of a battery,
    C) Reduction   B) Oxidation C) Neutralisation   D) Addition
  iv) Which of the following is a rechargeable battery
    A) Zn-MnO2 battery   B) $Li - MnO_2$ battery
    C) Lead – acid battery   D) None of these   **(04 Marks)**

  b. Describe the construction and working of Zn-air battery.   **(06 Marks)**
  c. Describe the construction and working of methanol-oxygen fuel cell.   **(06 Marks)**
  d. Explain the following battery characteristics: i) Voltage ii) Power density **(04 Marks)**

4 a. i) Corrosion process is an example of ,
    A) Oxidation B) Reduction   C) Electrolysis   D) Both A and B
  ii) Caustic embrittlement is a classical example of ,
    A) Differential aeration corrosion   B) Stress corrosion
    C) Differential metal corrosion   D) None of these
  iii) Galvanising is the process of coating iron with
    A) Tin   B) Zinc   C) Copper   D) Nickel
  iv) Water-line corrosion is an example of
    A) Differential aeration corrosion   B) Stress corrosion
    C) Differential metal corrosion   D) None of these   **(04 Marks)**

  b. Define the term corrosion. Explain the rusting of iron based on electrochemical theory of corrosion.   **(06 Marks)**
  c. Discuss the anodic protection as a method of corrosion control.   **(06 Marks)**
  d. Write a note on Galvanisation.   **(04 Marks)**

Part B

5 a. i) Conductors and insulators can be plated by,
    A) Electroplating B) Electroless plating   C) Electropolishing   D) None
  ii) The phenomenon in which the back emf produced due to the products of electrolysis is
    A) Electroplating B) Electroless plating   C) Polarisation D) None of these.
  iii) When the metal structure to plated is irregular, the process employed is,
    A) Electroplating B) Electropolishing   C) Electrolessplating D) None of these
  iv) Addition of complexing agent to the plating bath is to,
    A) Increase the rate of electro deposition   B) Increase the metal ion concentration
    C) Decrease the metal ion concentration   D) None of these   **(04 Marks)**

  b. Explain the process of electroless plating of copper.   **(06 Marks)**
  c. Mention the differences between electroplating and electroless plating.   **(06 Marks)**
  d. Explain the following factors that affect the nature of electrodeposit,
    i) Throwing power   ii) Current density   iii) Metal ion concentration   **(04 Marks)**

6 a. i) An ion selective electrode used in the determination of pH is
    A) Calomel electrode   B) Silver – Silver chloride electrode
    C) Glass electrode   D) None of these
  ii) The class of compounds that exhibit liquid crystalline behaviour on variation of temperature alone are referred to as,
    A) Lyotropic liquid crystals   B) Thermotropic liquid crystals
    C) Isotropic liquids   D) None of these

6   iii) Instrumental methods of analysis are widely adopted when compared to classical methods of analysis because,

        A) The methods are much faster   B) Applicable at concentrations

        C) The analytical process can be automated   D) All the above

    iv) Colorimetry involves measurement of absorbance using monochromatic light in the,

        A) UV range   B) IR range   C) Visible range   D) All the above **(04 Marks)**

b. What are potentiometric titrations? Discuss the application of potentiometry in the estimation of FAS using standard $K_2Cr_2O_7$ solution. **(06 Marks)**

c. Explain, Nematic phase, Cholesteric phae and Smectic phase. **(06 Marks)**

d. Discuss the application of condctometry in the determination of the amount of hydrochloric acid using standard NaOH solution. **(04 Marks)**

7 a. i) Tettrafluoro ethylene is the monomer of,

        A) Nylon – 66   B) Neoprene   C) Teflon   D) PVC

    ii) Phenol-formaldehyde resin is commercially,

        A) PVC   B) Bakelite   C) Elastomer   D) Nylon

    iii) Suphur is used particularly in,

        A) Manufacture of Buna – S   B) Compounding of plastics

        C) Corrosion control   D) Vulcanisation of raw rubber

    iv) Isoprene is a monomer of,

        A) Natural rubber   B) Synthetic rubber   C) Starch   D) PVC **(04 Marks)**

b. Explain the free radical mechanism of addition polymerization, taking ethylene as an example. **(06 Marks)**

c. Differentiate between thermoplastics and thermosettings. Give one example each. **(04 Marks)**

d. Give the synthesis and uses of, i) Plexi glass   ii) Butyl rubber. **(06 Marks)**

8 a. i) The indicator used for the estimation of total hardness of a given water sample by EDTA method,

        A) Starch   B) Erichrome balck – T   C) Ferroin   D) Methyl orange

    ii) Temporary hardness of water is caused due to the presence of

        A) CaCO3   B) $CaCl_2$ C) $Mg(HCO_3)_2$ D) None of these

    iii) The method used for desalination of water is,

        A) Zeolite process   B) Lime-soda process

        C) Ion-Exchange process   D) Electrodialysis

    iv) The indicator used in the determination of chloride content of water sample by Mohr's method,

        A) Phenolpthalein   B) K_2CrO_4 C) Starch   D) Ferroin **(04 Marks)**

b. Define COD and explain the method of determining COD. **(06 Marks)**

c. What is hard water? Explain the estimation of total hardness of water by EDTA method. **(06 Marks)**

d. What is potable water? Give the characteristics of potable water. **(04 Marks)**

* * * * *

First / Second Semester B.E. Degree Examination, Dec 08 / Jan 09

Engineering Physics

Time: 3 hrs.   Max. Marks:100

Note : *1. Answer any FIVE full questions, selecting atleast two*
         questions from each Part.
      2. Answer all objective type questions only in first and second
         writing pages.
      3. Answer for objective type questions shall not be repeated.

Physical Constants : Electron mass m = 9.11× 10⁻³¹ kg.
Electron charge = 1.6× 10⁻¹⁹C, velocity of light C = 3× 10⁸m/s
Planks constants h = 6.63×10⁻³⁴J.S. Avagadros number N = 6.025×10⁻²⁸/ K mol
Permitivity of vaccum ∈₀ = 8.85×10⁻¹²F/m , Boltzman constant k = 1.38×10⁻²³ J/K.

PART – A

1 a. 1) The debroglic wave length associated with an electron of mass m and accelerated by a
       potential v is

       i) $\dfrac{h}{\sqrt{2mve}}$ ii) $\dfrac{\sqrt{2mve}}{h}$ iii) $\dfrac{h}{vem}$ iv) $\dfrac{h}{2vem}$.

   2) Davison and Gelmer were the first to demonstrate :
       i) The straight line propogation of light   ii) The diffraction of Photons
       iii) The effective mass of electron   iv) None of the these.
   3) Electron behaves as waves because they can be :
       i) Deflected by an electric field   ii) Diffracted by a crystal
       iii) Deflected by magnetic field   iv) They ionize a gas.
   4) In Davison – Gelmer experiment the hump is most prominent when the electron is
       accelerated by
       i) 34 volts   ii) 54 volts   iii) 60 volts   iv) 80 volts.   **(04 Marks)**
   b. Define Phase velocity and Group velocity. Show that Group velocity is same as particle
       velocity.   **(08 Marks)**
   c. Derive de – broglic wave length using Group velocity.   **(04 Marks)**
   d. Compare the energy of a photon with that of a neutron when both are associated with wave
       length of 1A⁰ given that the mass of neutron is 1.678×10⁻²⁷kg.   **(04 Marks)**

2 a. 1) The product of uncertainty between angular momentum and angular displacement is

       i) $\geq \dfrac{h}{2\pi}$ ii) $\geq \dfrac{h}{4\pi}$ iii) $\dfrac{h}{2\pi}$ iv) $\leq \dfrac{h}{4\pi}$.

   2) Kinetic energy of electron accelerated by a voltage 50Votls.
       i) 50ev   ii) 10ev   iii) 5ev   iv) 15ev.
   3) The energy of the lowest state in one dimensional potential box of length is

       i) Zero   ii) $\dfrac{2h^2}{8ma^2}$ iii) $\dfrac{h^2}{8ma^2}$ iv) $\dfrac{h}{8ma^2}$

4) The wave function for the motion of particles in one dimensional potential box of length a is given by $\psi_n = D\sin\dfrac{n\pi}{a}.x$. Where D is the normalization constant. The value of D is

   i) $\dfrac{1}{a}$ ii) $\sqrt{\dfrac{2}{a}}$ iii) a   iv) $\sqrt{\dfrac{a}{2}}$ **(04 Marks)**

b. Set up time independent schrodinger wave equation.   **(06 Marks)**

c. Write the physical significance of wave function.   **(04 Marks)**

d. A quantum particle confined to one dimensional box of width 'a' is in its first excited state. What is the probability of finding the particle over an interval of (a/2) marked symmetrically at the centre of the box?   **(06 Marks)**

3   a. 1) If the mobility of electron in a metal increases the resistivety.

      i) Decreases   ii) Increases   iii) Remains constant   iv) none of these

    2) Ohms law relates to the electric field E, conductivity σ and current density $\dot{J}$ as

      i) $\dot{J} = E/\sigma$ ii) $\dot{J} = \sigma.E^2$ iii) $\dot{J} = \dfrac{\sigma}{E}$ iv) $\dot{J} = \sigma.E$

    3) The average drift velocity Vd of electrons in a metal is related to the electric field E and collision time τ as

      i) $\sqrt{\dfrac{eE\tau}{m}}$ ii) $\sqrt{\dfrac{m}{eE\tau}}$ iii) $\dfrac{eE\tau}{m}$,   iv) $\dfrac{m}{eE\tau}$.

    4) Experimentally specific heat at constant volume CV is given by

      i) $\dfrac{3}{2}R$ ii) $10^{-4}RT$ iii) $\dfrac{2}{3}R$ iv) $10^{-4}R$.   **(04 Marks)**

b. Write down the assumptions of classical free electron theory.   **(04 Marks)**

c. Explain failure of classical free electron theory.   **(06 Marks)**

d. Find the temperature at which there is 1% probability that a state with an energy 0.5ev above fermi energy is occupied.   **(06 Marks)**

4   a. 1) The unit of dipole moment / unit volume is

      i) Coulomb / metre   ii) Coulomb / metre^2 iii) coulomb / metre^3 iv) Coulomb.

    2) The flux density is related to the electric field as

      i) $D = \varepsilon + E$ ii) $D = \varepsilon - E$ iii) $D = \varepsilon/E$ iv) $D = \varepsilon E$.

    3) In a solid or liquid dielectric with external applied electrical field, as the electronic polarizability α_c increases the interval field E_i.

      i) Increases   ii) Reduces   iii) Remains constant   iv) none of these.

    4) In a dielectric, the polarization is

      i) Linear function of applied field   ii) Square function of applied field

      iii) Exponential functions of applied field   iv) Logarithmic function of applied field.   **(04 Marks)**

b. Derive an expression for internal field in case of one dimensional array of atoms in dielectric solids.   **(06 Marks)**

c. Describe Ferro electrics.   **(04 Marks)**

d. Sulphur is elemental solid dielectric whose dielectric constant is 3.4. Calculate electronic plarizability if its density is 2.07×10^3 kg/m^3 and atomic wt is 32.07.   **(06 Marks)**

PART – B

5   a. 1) The emission of photon without being aided by any external agency is called

      i) Light amplification   ii) Induced absorption   iii) Stimulated emission

      iv) Spontaneous emission.

2) n, be the number density of lower energy E, and n_2 be the number density of higher energy E_2, if $n_2 > n_1$ is called
    i) Thick population   ii) Inverted population
    iii) Normal population   iv) No population.
3) Supply of energy to atoms for excitation is called
    i) Glowing   ii) Bombarding   iii) incidenting   iv) Pumping.
4) Important characteristic of Laser beam is
    i) Interference   ii) Diffraction   iii) Dispersion   iv) Coherence. **(04 Marks)**

b. Obtain an expression for energy density of radiation under equilibrium condition in terms of Einstein co-efficient.   **(08 Marks)**

c. Describe the construction and working of Semiconductor laser.   **(08 Marks)**

6 a. 1) The temperature at which super conductivity occurs is called :
    i) Low temperature   ii) Super temperature
    iii) Critical temperature   iv) High temperature.
2) Super conductivity phenomenon can be explained on the basis of :
    i) BCS theory   ii) CCS theory   iii) DCS theory   iv) MCS theory
3) Meissner effect will take place in
    i) Solid   ii) Super conducting magnet   iii) Magler vehicle   iv) MRI.
4) Loss of power during transmission through optical fiber is called.
    i) Power loss   ii) Energy loss   iii) Attenuation   iv) Modification. **(04 Marks)**

b. Explain Meissner effect.   **(06 Marks)**

c. Obtain an expression for numerical aperture and arrive the condition for propagation.
    (06 Marks)

d. The angle of acceptance of an optical fiber is 30^0 when kept in air. Find the angle of acceptance when it is in a medium of refractive index 1.33.   **(04 Marks)**

7 a. 1) The coordination number in the case of simple cubic crystal structure is
    i) 12   ii) 6   iii) 2   iv) 1.
2) Which of the following metal crystallizes in fcc structure
    i) Aluminium   ii) Zinc   iii) Sodium   iv) Calcium chloride
3) The number of molecules present in unit cell of sodium chloride is
    i) 5   ii) 2   iii) 4   iv) None of these.
4) The Miller indices of the plane parallel to x and y axis are
    i) (100)   ii) (010)   iii) (001)   iv) (111)   **(04 Marks)**

b. How do you find miller indices of a given plane.   **(04 Marks)**

c. Derive an expression for interplaner spacing in terms of miller indices.   **(08 Marks)**

d. Calculate the glancing angle for incidence of X rays of wave length $0.58A^0$ on the plane (132) of NaCl which results in second order diffraction maxima taking the lattice as $3.81A^0$.   **(04 Marks)**

8 a. 1) A constant testing of product without causing any damage is called   **(04 Marks)**
    i) Minute testing   ii) Destructive testing
    iii) Non destructive testing   iv) Random testing.
2) The state of matter around the nano size is known as
    i) Solid state   ii) Liquid state   iii) Plasma state   iv) Meroscopic state
3) If the reduction is in two direction the resultant structure will be in one dimension which is called
    i) Reduced structure   ii) Thin wire   iii) Quantum wire   iv) Enlarge structure.
4) The signal due to a reflected wave is called
    i) Transmitted wave   ii) Longitudinal wave   iii) Echo   iv) Peaco.

b. Describe a method of measuring velocity of ultrasonic waves in solids.   **(08 Marks)**

c. Explain nano tubes and its applications.   **(08 Marks)**

3 of 3

First/Second Semester B.E. Degree Examination, Dec.08/Jan.09

Computer Concepts and C programming

Time: 3 hrs.   Max. Marks:100

Note: *1.Answer any FIVE full questions, selecting at least TWO questions from each part.*
2.Answer all objective type questions only in first & second writing pages.
3.Answer for objective type questions shall not be repeated.

PART – A

1 a. (i) Which of these is a computer for an organization?
(A) Work station   (B) Tablet computer (C) Main frame (D) Smart phones

(ii) Which of these in an example of Hand held PCs?
(A) RAM   (B) PDA   (C) BUS   (D) CMOS

(iii) Approximate value of one Terabyte computer memory & its storage is
(A) 10^9 bytes   (B) 10^{10} bytes   (C) 10^{12} bytes   (D) 10^{15} bytes

(iv) Which of these keys is not called modifier key?
(A) START   (B) SHIFT   (C) ALT   (D) CTRL   (04 Marks)

b. Describe the computers for individual users.   (06 Marks)

c. What is information processing cycle? Explain.   (05 Marks)

d. Write a note on types of monitors.   (05 Marks)

2 a. (i) Which of the following is NOT a standard text code system?
(A) ASCII   (B) LCD   (C) UNICODE (D) EBCDIC

(ii) Which of these is NOT a part of CPU
(A) CU   (B) ALU   (C) L2-CACHE (D) L3-CACHE

(iii) A laser printer's speed is measured in _____
(A) cps   (B) ppm   (C) dpi   (D) ltpm

(iv) Which of these is a hot swappable bus
(A) Local Bus   (B) USB   (C) PCI   (D) AGP   (04 Marks)

b. Discuss the factors that affect the speed of a computer   (10 Marks)

c. How to optimize disk performance? Explain.   (06 Marks)

3 a. (i) Which of the following acts as the primary controlling mechanism for the computer's hardware
(A) RAM   (B) CPU   (C) CDROM   (D) OS.

(ii) Which of these is a freeware operating system
(A) MS-DOS   (B) WIN-95   (C) WIN-XP   (D) LINUX.

(iii) _____ is a device that connects two LANS or two segments of the same LAN.
(A) Hub   (B) Bridge   (C) Switch   (D) Router.

(iv) E-mail is the system for exchanging messages through a _____.
(A) Client   (B) Program   (C) Network   (D) Backbone. (04 Marks)

b. Describe the different network topologies.   (08 Marks)
c. List and explain four major types of operating systems.   (08 Marks)

4 a. (i) Which of the following is a 'C' keyword?
         (A) Int   (B) else   (C) scanf   (D) character.

   (ii) Which of the following is the valid hexa integer
         (A) oabc   (B) oxabc   (C) xabc   (D) abc

   (iii) If p = 2, q = 3 & r = 4, what is the output of following 'C' statement
          Printf("%d", p&q ¦ r);
         (A) 6   (B) 4   (C) 2   (D) 0.

   (iv) What is output of following 'C' statement
             x = 3, y = 5;
             y = + x − y;
             y = ++y;
             printf ("%d", y);
         (A) Error   (B) 1   (C) 0   (D) −1.   (04 Marks)

   b. What is an algorithm? List and explain the characteristics of an algorithm.   (04 Marks)

   c. Write an algorithm and draw a flowchart to find factorial of a given integer.   (06 Marks)

   d. Explain with examples:
       (i) Increment operators (ii) Decrement operators (iii) Conditional operator.   (06 Marks)

PART – B

5 a. (i) Format specifier for inputting real numbers is _____
         (A) %d   (B) %c   (C) %f   (D) %s

   (ii) The output of following code is
             x = 98.7654;
             printf ("%7.2f", x);
         (A) 98.765400   (B) 98.760000   (C) 98.77   (D) 98.000000

   (iii) Which of the following 'C' statement branches unconditionally from one point to
          another point in the program
         (A) if   (B) goto   (C) switch   (D) if else

   (iv) Assuming x = 5, y = 0, z = 0 initially, what is the value of z after execution of the
          following code segments?
             if (x = = 0 ¦¦ x && y)
                if (!y)
                    z = 1;
                else
                    z = 2;
             else
                    z = 3;
         (A) 0   (B) 1   (C) 2   (D) 3   (04 Marks)

   b. With an example explain switch statement and significance of break in switch block.
                                                                                        (10 Marks)

   c. Write a 'C' program to find the roots of a quadratic equation.   (06 Marks)

6 a. (i) A for loop with No test condition is known as _____ loop.
     (A) finite   (B) infinite   (C) controlled   (D) None of these.

   (ii) Which of the following looping construct is exit controlled loop?
     (A) while   (B) do....while   (C) for   (D) None of these.

   (iii) What is the output of the following code segment?
```
x = 4;
do
printf ("\ t % d", x)
while (x -- > = 0);
```
     (A) Error   (B) 4 3 2 1   (C) 4 3 2 1 0   (D) 4 3 2 1 0 –1

   (iv) What is the output of the following code segment?
```
For (i = 0, x = 4; i < 5 && x; i++)
   printf("%d \t", x = x >>1);
```
     (A) 2 1 0 0 0   (B) 2 1 0 –1 –2   (C) 2   (D) 2 1   (04 Marks)

b. Write a 'C' program using do....while loop to calculate and print first N Fibonacci numbers (08 Marks)

c. Using for loop, write 'C' program to generate N prime numbers. (08 Marks)

7 a. (i) Which of the following declaration has error?
     (A) int N[ ]={0, 0, 0};   (B) int M[3][2] ={1, 2, 3};
     (C) char ch[ ] = "vtu";   (D) int Num [2, 4] = {{0,1},{1,2},{2,3},{3,4}};

   (ii) What is the memory occupied by the array: int A[10][5]
     (A) 15 bytes   (B) 150 bytes   (C) 100 bytes   (D) 30 bytes

   (iii) If base address of the int p[5][5] is 5000 then output of :
     printf("%d" & p[2][0]); is
     (A) 5010   (B) 5004   (C) 5006   (D) 5020

   (iv) Arrays can be initialized at
     (A) Compile time   (B) Run time   (C) Both A & B   (D) none of these   (04 Marks)

b. Explain Horner's method to evaluate a polynomial and write a 'C' program for the same. (06 Marks)

c. What is an array? What are its advantages & disadvantages? (04 Marks)

d. Write a 'C' program to input N integer numbers into a single dimension array. Conduct a linear search for a given key integer number. Report success or failure with suitable message. (06 Marks)

8 a. (i) Which of the following return statement in a function has error?
     (A) return;   (B) return(0);   (C) return (expression);   (D) None of these.

   (ii) Parameter passed as arguments to the function call are called as:
     (A) Actual parameters   (B) Formal parameters
     (C) No parameters   (D) None of the above.

   (iii) In function prototype, specifying _____ is optional.
     (A) return type   (B) Parameter name   (C) Parameter data type   (D) All of these.

   (iv) A variable declared in a function is called _____ .
     (A) Actual variable   (B) Formal variable
     (C) Local variable   (D) Global variable.   (04 Marks)

b. Without using Global variables, write a 'C' program, by implementing these functions (i)Read N array elements (ii) Print N array elements and (iii) Conduct binary search for a given key integer number in N array elements. (08 Marks)

c. With examples, explain different methods of passing parameters to a function. (08 Marks)

* * * * *

First and Second Semester B.E. Degree Examination, Dec.08/Jan.09
Elements of Civil Engineering and Engineering Mechanics.

Time: 3 hrs.   Max. Marks:100

Note : *1. Answer any FIVE full questions selecting at least two questions from each part.*
2. Answer all objective type questions only in first and second writing pages.
3. Answer for Objective type questions shall not be repeated.
4. Missing data if any may suitably assumed and indicated.

PART - A

1 a. i) Geotechnical Engineering involves the study of   **(04 Marks)**
           A) Water   B) Soil   C) Air   D) All the above.
      ii) By – pass road is constructed
           A) Inside the city B) Over the main road C) Around the city D) None of the above.
      iii) The part of civil engineering which deals with waste water and solid waste is called.
           A) Water supply Engineering   B) Geotechnical Engineering   C) Sanitary Engineering   D) Structural Engineering.
      iv) A bascule bridge is a
           A) Floating bridge   B) Arch bridge   C) Suspension bridge   D) Movable bridge.
  b. Write a note on role of civil Engineer in infrastructural development.   **(10 Marks)**
  c. Name the different types roads.   **(06 Marks)**

2 a. i) Moment of a force can be defined as the product of force and ---------- distance from the line   of action of force to the moment center.
           A) Least   B) Maximum   C) Any   D) None of the above.
      ii) Effect of force on a body depends on
           A) Direction   B) Magnitude   C) Position   D) All the above.
      iii) The forces which meet at one point have their line of action in different plane are called.
           A) Coplanar concurrent forces   B) Non coplanar concurrent forces   C) Non coplanar non concurrent forces   D) None of the above.
      iv) Couple means two forces acting parallel.
           A) Equal in magnitude and in the same direction   B) Not equal in magnitude but in the same direction   C) Equal in magnitude but opposite in direction   D) None of the above.   **(04 Marks)**
  b. State the Newton's three laws of the motion.   **(06 Marks)**
  c. Define force and state its characteristics.   **(05 Marks)**
  d. Replace the horizontal 600 N force acting on the lever as shown Fig.Q.2(d). by an equivalent system consisting of a force and a couple at 0.   **(05 Marks)**

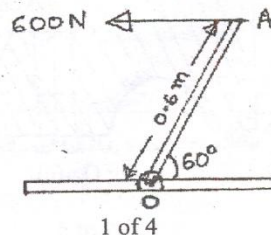600N ⬱━━━━⬈ A

0.6 m

60°

Fig.Q.2(d).

O

3   a. i)   The technology of finding the resultant of a system of forces is called
            A) Resultant   B) Resolution   C) Composition   D) None of the above.
       ii)   Equilibriant is nothing but a resultant
            A) Equal in magnitude and in the same direction   B) Equal in magnitude but
            opposite in direction   C) Not equal in magnitude but in the same direction,
            D) Not equal in magnitude and opposite in direction.
       iii) If two forces P and Q (P > Q) act on the same straight line but in opposite direction
            their resultant is
            A) P + Q   B) P/Q   C) Q – P   D) P – Q.
       iv)   In coplanar concurrent force system if $\Sigma H = 0$, then the resultant is
            A) Horizontal   B) Vertical   C) Moment   D) None of the above.   **(04 Marks)**
    b. State and prove Verignon's theorem of the moments.   **(06 Marks)**
    c. Determine the magnitude, direction of the resultant force for the force system shown in
        Fig.Q.3(c). Determine the X intercepts of the resultant force with respect to the point O.
                                                                                         (10 Marks)
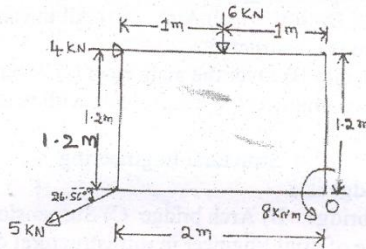
Fig.Q.3(c).

4   a. i)   Moment of total area about its centroided axis is   **(04 Marks)**
            A) Twice the area   B) Three times the area   C) Zero   D) None of the above.
       ii)   The centroid of a semi circle of Radius R about its centroidal axis parallel to its
            diametric axis is
            A) 3R/4π   B) 3R/8π   C) 4R/π   D) 4R/3π.
       iii) An axis over which one half of the plane figure is just mirror of the other half which
            is
            A) Bottom most axis of the figure   B) Axis of symmetry   C) Un symmetrical axis
            D) None of the above.
       iv)   Centroid of a rectangle of a triangle with base b and depth d is
            A) b/3 and d/3   B) b/2 and d/2   C) b/4 and d/4   D) None of the above.
    b. Determine the centroid of a triangle by the method of integration.   **(06 Marks)**
    c. Locate the centroid of an area shown in Fig.Q.4(c). With respect to OX and OY. All
        dimensions are in mm.   **(10 Marks)**

Fig.Q.4(c).

2 of 4

PART – B

5 a. i) The necessary condition of equilibrium of a coplanar concurrent force system is
algebric sum of ----------- must be zero
A) Horizontal and vertical forces   B) Moments of forces   C) Horizontal,
vertical and moments of forces   D) None of the above.

ii) In nonconcurrent force system it $\sum H = 0$, $\sum V = 0$, then the resultant is
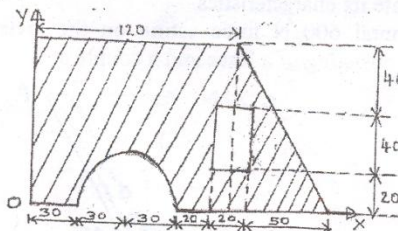A) Horizontal   B) Vertical   C) Moment   D) Zero.

iii) The force which is equal and opposite to the resultant is
A) Resultant force   B) Force   C) Equilibriant   D) None of the above.

iv) The procedure of resolution is
A) To find the resultant of the force system   B) To break up an inclined force in
to two components   C) TO find the equilibriant   D) None of the above.

(04 Marks)

b. Determine the reactions at the point of contact for the sphere shown in Fig.Q.5(b).
(06 Marks)

c. Determine the angle θ for the system of strings ABCD in equilibrium as shown in
Fig.Q.5(c).

(10 Marks)
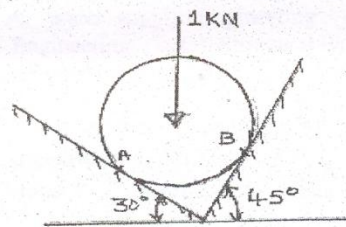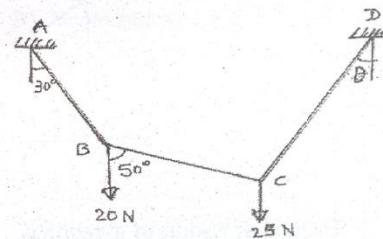
Fig.Q.5(b).   Fig.Q.5(c).

6 a. i) Statically determinate beams are
A) The beams which can be analyzed completely using static equations of
equilibrium   B) The beams which can be analyzed without using static equations
of equilibrium   C) Fixed beams   D) None of the above.

ii) Fixed beams are - A) One end is fixed and the other is simply supported   B) Both
ends are fixed   C) Both ends are roller support   D) One end is fixed and the
other is free.

iii) The number of reaction components at fixed end of a beam are
A) 2   B) 3   C) 4   D) None of the above.

iv) U.d.l. stands for
A) Uniform dead load   B) Uniform distributed load   C) Uniform door load
D) All the above.

(04 Marks)

b. Explain different types of supports.   (06 Marks)
c. Determine the reactions at the support for the beam shown in Fig.Q.6(c).   (10 Marks)
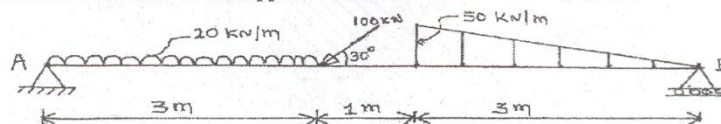
Fig.Q.6(c).

7 a. i) Angle of friction is angle between
            A) The incline and horizontal B) The normal reaction and Friction force C) The weight of the body and the friction force D) Normal reaction and the resultant.
       ii) The force of friction developed at the contact surface is always
            A) Parallel to the plane and along the direction of the applied force B) Perpendicular to the plane   C) Parallel to the plane and opposite to the direction of the motion   D) All the above.
       iii) The maximum inclination of the plane on which the body free from external forces, can repose is called.
            A) Cone friction   B) Angle of friction C) Angle of repose D) None of the above.
       iv) The force of friction depends on
            A) Area of contact   B) Roughness of the surface   C) Both area of contact and roughness of the surfaces   D) None of the above.   (04 Marks)
    b. Distinguish between static friction and kinetic friction.   (04Marks)
    c. Mention the laws of the friction.   (04Marks)
   d. A ladder 6m long weighing 300N is resting against a wall at an angle of 60° to the horizontal ground as shown in Fig.Q.7(d). A man weighing 750N climbs the ladder. At what position along the ladder from bottom does he induce slipping. Take $\mu = 0.2$ for all surfaces.   (08 Marks)
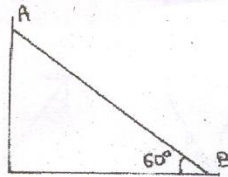
Fig.Q.7(d).

8 a. i) The unit of Radius of gyration is
            A) mm   B) mm^2 C) mm^3 D) mm^4
       ii) The moment of Inertia of an area about an axis which is in a aplane perpendicular to the area is called
            A) Radius of Gyration   B) Polar moment of Inertia   C) Second moment of area D) None of the above.
       iii) The moment of Inertia of a circle with 'd' as its diameter about its centroidal axis
            A) $\pi D^2/32$ B) $\pi D^2/64$ C) $\pi D^4/32$ D) $\pi D^4/64$.
       iv) The moment of Inertia of a square of side 'b' about an axis through its centroid is
            A) $b^4/12$ B) $b^4/8$ C) $b^4/36$ D) $b^3/12$.   (04 Marks)
    b. State and prove Parallel axis theorem.   (06 Marks)
    c. Determine the Radius of gyration of the area shown in Fig.Q.8(c). about its base AB. All dimensions are in mm.   (10 Marks)
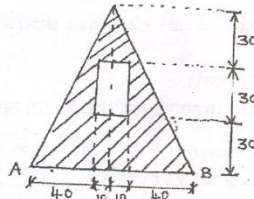
Fig.Q.8(c).
*****
4 of 4

First/Second Semester B.E. Degree Examination, Dec.08/Jan.09
Elements of Mechanical Engineering

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note:*1.Answer any FIVE full questions, selecting at least TWO questions from each part.*
　　　2.Answer all objective type questions only in first & second writing pages.
　　　3.Answer for objective type questions shall not be repeated.
　　　4.Use of steam table is not permitted.

PART – A

1　a.　Choose the correct answer :　　　　　　　　　　　　　　　(04 Marks)
　　　(i)　The centrifugal forces generated by the earth rotation on the far side results in another bulge rise on this side of the earth.
　　　　　(A) Lunar Tides　　(B) Earth Quakes　　(C) Volcanoes　　(D) None.
　　　(ii)　The process in which, using the principle of photovoltaic effect the solar energy is directly converted in to Electrical energy is
　　　　　(A) Helio Thermal process　　　　(B) Helio Electrical process
　　　　　(C) Mechanical process　　　　　　(D) None.
　　　(iii)　Babcock and Wilcox Boiler is _ _ _ _ _ _ _ pressure boiler.
　　　　　(A) Low　　(B) High　　(C) Medium　　(D) None.
　　　(iv)　Actual energy stored in the steam is called as
　　　　　(A) Internal latent heat　　　　　(B) Sensible heat
　　　　　(C) Internal energy of steam　　　(D) latent heat of Evaporation.

　　b.　With neat sketch explain working of Lanchashire boiler & also show the path of flue gases [Show all 3 views.]　　　　　　　　　　　　　　(10 Marks)
　　c.　What amount of heat would be required to produce 4 kg of steam at a pressure of 6 bar and temperature of 250°C from water at 30°C? Take C_{pg} = 2.2 kJ/kgK. Specific heat of water=4.18 kJ/kgK. At 6 bar h_f = 670.4 kJ/kg , h_{fg} = 2085 kJ/kg, T_s = 158.8°C　　(06 Marks)

2　a.　Choose the correct answer :　　　　　　　　　　　　　　　(04 Marks)
　　　(i)　The high velocity steam particle enters in the turbine blades where it undergoes
　　　　　(A) Change in momentum　　　　(B) Change in direction of motion
　　　　　(C) Change in kinetic energy　　　(D) None.
　　　(ii)　Kaplan turbine is a _ _ _ _ _ _ _ _ turbine.
　　　　　(A) Low head reaction　　　　　(B) High head reaction
　　　　　(C) Impulse　　　　　　　　　　(D) Fire tube
　　　(iii)　Expansion of steam in several stages is called
　　　　　(A) Open cycle gas turbine　　　(B) Closed cycle gas turbine
　　　　　(C) Compounding　　　　　　　(D) Impulse water turbine.
　　　(iv)　A prime mover in which the heat energy of the steam is transformed in to mechanical energy directly in the form of rotary motion is called
　　　　　(A) Generator　　(B) Alternator　　(C) Steam turbine　　(D) IC Engine.

　　b.　With neat sketch explain working of pressure – velocity compounding.　　(06 Marks)
　　c.　Differentiate between Impulse and Reaction turbine.　　　　　　　(04 Marks)
　　d.　Explain the working of closed cycle gas turbine with a line diagram.　　(06 Marks)

3 a. Choose the correct answer : **(04 Marks)**
   (i)   In diesel engine heat is supplied at constant
          (A) Temperature (B) Pressure   (C) Volume   (D) Enthalpy
   (ii)   In two stroke engine, number of rotation of the crankshaft to complete a cycle
          (A) 2   (B) 4   (C) 6   (D) 1
   (iii) In CI engine, in suction stroke _ _ _ _ _ _ is sucked in the cylinder.
          (A) Air   (B) Air-fuel-mixture (C) Fuel-air-mixture (D) Petrol.
   (iv)   In a SI engine, heat is supplied at
          (A) Constant pressure   (B) Constant temperature
          (C) Constant spark   (D) Constant volume.

   b. Explain with neat sketch, working of four stroke petrol engine with P-V diagram. **(08 Marks)**
   c. Following observations are taken during a trial on four stroke diesel engine. Cylinder diameter = 25cm, stroke = 40cm, Speed = 250 rpm, Break load = 70 kg, Break drum diameter = 2 mts, Mean effective pressure = 6 bar, diesel oil consumption = 0.1 m^3/min, specific gravity of fuel = 0.78, CV of fuel = 43900 kJ/kgK. Determine (i) IP (ii) BP (iii) FP (iv) Mechanical efficiency (v) Break thermal efficiency (vi) Indicated thermal efficiency.
   (08 Marks)

4 a. Choose the correct answer : **(04 Marks)**
   (i)   Monocloro – diafloro methane is popular refrigerant called
          (A) NH_3 (B) Freon   (C) Water   (D) Carbon
   (ii)   One ton of Refrigeration is equal to _ _ _ _ _ _ kJ/sec.
          (A) 50   (B) 1.055   (C) 3.5   (D) 210
   (iii) A reverse Carnot cycle is called
          (A) Refrigeration cycle   (B) Mechanical cycle
          (C) Vapour compression cycle   (D) Vapour absorption cycle
   (iv)   The efficiency of Refrigeration system is expressed by a factor known as
          (A) mechanical efficiency   (B) Co-efficient of performance
          (C) Thermal efficiency   (D) Performance ratio.

   b. Explain with neat sketch, working of vapour absorption refrigeration system. **(08 Marks)**
   c. Explain in brief properties of good refrigerant. **(08 Marks)**

PART – B

5 a. Choose the correct answer : **(04 Marks)**
   (i)   ……….. is the process of generating internal threads.
          (A) Tapping   (B) Turning   (C) Knurling   (D) None.
   (ii)   ………finishing operation to produce a flat round surface around already drilled hole
          (A) Counter sinking (B) Counter boring (C) Spot facing   (D) Tapping
   (iii) ……… is the operation of removing excess material from the surface of the cylindrical workpiece.
          (A) Taper turning   (B) Plain turning (C) Boring   (D) Facing
   (iv)   ……… is the operation of embossing a diamond shaped pattern on the surface of workpiece.
          (A) Taper turning   (B) Knurling   (C) Threading   (D) Eccentric turning

   b. Draw the neat sketch of center lathe and indicate the parts. **(08 Marks)**
   c. With neat sketch explain the mechanism of Taper turning by swiveling compound rest.
   (04 Marks)
   d. With neat sketch explain Radial drilling machine. **(04 Marks)**

6   a.   Choose the correct answer :   (04 Marks)
        (i)   Grinding is also called as
                (A) Twisting   (B) Honing   (C) Lapping   (D) Abrassive machining.
        (ii)   In ………. Process the workpiece is fed in the same direction as th.t of cutter's
                tangential velocity.
                (A) Horizontal milling (B) Vertical milling (C) Down milling (D)Up milling
        (iii)   …….. is the type of artificial abrassive.
                (A) sand stone   (B) Corundum   (C) Emery   (D) Aluminium oxide.
        (iv)   Irregular shape of machining is done in
                (A) Angular milling   (B) Form milling (C) Gang milling (D) End milling

    b.   Draw the neat sketch of Horizontal milling machine & explain parts.   (08 Marks)
    c.   With neat sketch explain centerless grinding process & also cylindrical grinding process
                                                                                     (08 Marks)

7   a.   Choose the correct answer :   (04 Marks)
        (i)   The hard filler material used in Brazing is
                (A) Solder   (B) Flux   (C) Spelter   (D) Electrode
        (ii)   Resistance of lubricating oil to flow is
                (A) Porosity   (B) Electricity   (C) Viscosity   (D) None.
        (iii)   French chalk is
                (A) Filler material (B) Flux   (C) Lubricant   (D) Solder
        (iv)   Support provided for rotating shaft is
                (A) Bearing   (B) Lubricant   (C) Axle   (D) Hook.

    b.   Explain with neat sketch flame characteristics of oxy-acetylene gas welding.   (08 Marks)
    c.   Explain with neat sketch plummer block   (08 Marks)

8   a.   Choose the correct answer :   (04 Marks)
        (i)   For converting rotary motion in to rectilinear motion type of gear used is
                (A) Spur gear   (B) Rack & penion   (C) Spiral gear   (D) Bevel gear.
        (ii)   In an open belt drive, to increase the arc of contact of the belt and driven pulley
                …………..is used.
                (A) Jockey pulley   (B) Fast and loose pulley
                (C) Guide pulley   (D) Stepped cone pulley
        (iii)   The difference between actual speed and that of calculated is
                (A) Creep   (B) Slip   (C) Gear train   (D) Speed ratio
        (iv)   The ratio of diameters of driver and driven pulley is called
                (A) Module   (B) Pitch circle diameter (C) Ratio of tension (D) Velocity ratio.

    b.   Derive an equation for ratio of tension in belt drive.   (08 Marks)
    c.   Two pulleys of diameter 300mm and 750mm mounted on two parallel shafts 1.5 mts apart
         are connected by leather belt 150mm width. If maximum safe tension of belt is 14 N per mm
         width, determine maximum power transmitted in case of (i) Open belt drive (ii) Cross belt
         drive. Assume speed of the belt as 540 m/min, $\mu = 0.25$.   (08 Marks)

* * * * *

USN | | | | | | | | | | | 06ELN15/25

First / Second Semester B.E. Degree Examination, Dec 08 / Jan 09
Basic Electronics

Time: 3 hrs.   Max. Marks:100

Note : *1. Answer any FIVE full questions, selecting atleast two*
questions from each Part.
     2. Answer all objective type questions only in first and second
writing pages.
     3. Answer for objective type questions shall not be repeated.

PART – A

1   a.   i)   The Knee voltage of a silicon diode is _____ volts.
         A)   0.3V   B)   0.5V   C)   0.7V   D)   None of these
     ii)   The depletion layer capacitance effect occurs in a diode when it is _____
         A)   Forward biased   B)   Reverse biased   C)   Unbiased   D)   All of these
     iii)   The efficiency of full wave rectifier is about _____%.
         A)   40.6   B)   0.46   C)   1.21   D)   81.2
     iv)   Zenor diode used as a voltage regulator when it is _____ biased.
         A)   Forward   B)   Reverse   C)   Unbiased   D)   none of these.   **(04 Marks)**
   b.   What is a PN Junction? Draw and explain the V – I characteristics of PN Junction.
                                                                  (08 Marks)
   c.   Derive an expression for ripple factor and output DC voltage of a full wave rectifier with
     C filter.   **(08 Marks)**

2   a.   i)   In the saturation region, the Collector - base and Emitter – base Junctions are _____
     biased.
         A)   Forward   B)   Reverse   C)   Unbiased   D)   none of these
     ii)   Common - emitter current gain (Bdc) of a transistor is given by_____
         A) $\dfrac{I_C}{I_B}$ B) $\dfrac{I_E}{I_C}$ C) $\dfrac{I_C}{I_E}$ D)   none of these
     iii)   In a transistor the current conduction is due to _____ carriers.
         A)   Majority   B)   Minority   C)   Both   D)   none of these.
     iv)   The stability factor 'S' is the rate of change of collector current with respect to
     _____.
         A)   Reverse saturation current   B)   Collector current
         C)   Emitter current   D)   Base current.   **(04 Marks)**
   b.   Draw input and output characteristics of a transistor in common base configuration and
     explain in detail.   **(08 Marks)**
   c.   Obtain the relationship between Ldc and Bdc.   **(04 Marks)**
   d.   Calculate the values of I_C, I_E and Bdc for a transistor with Ldc = 0.98 and I_B = 120 µA.
                                                                         (04 Marks)

3   a.   i)   The intersection of DC load line and the output characteristics of a transistor is called
     _____
         A)   Q – Point   B)   Quiescent Point   C)   Operating Point   D)   All of these.
     ii)   The biasing circuit, which gives most stable operating point is _____
         A)   Base Bias   B)   Collector to Base Bias
         C)   Voltage divider Bias   D)   None of these.

iii) Reverse saturation current doubles for every _____ ^{0}C rise in temperature
   A) 50   B) 40   C) 30   D) 10

iv) Reverse recovery time can be kept minimum with the following condition_____
   A) $t_{f(min)}$ = 10 trr   B) $t_{f(min)}$ = 0.1 trr   C) $t_{f(max)}$ = trr   D) none of these
                                                                        (04 Marks)

b. List the transistor biasing circuits. Explain with neat circuit the operation of Base bias.
                                                                     (08 Marks)

c. Design a collector – to - Base bias circuit to have V_{CE} = 5V and I_C = 5mA, When the supply voltage is 15V and Bdc = 100, assume silicon transistor.
                                                                      (08 Marks)

4 a. i) SCR can be analyzed using_____
     A) Two transistor   B) Three transistor   C) Four transistor   D) All the above.

    ii) FET is a_____ controlled device.
     A) Voltage   B) Current   C) Power   D) none of these

    iii) In UJT the region of the characteristics between peak point and valley point is called _____ region.
     A) Negative resistance   B) Positive resistance   C) Active   D) All the above

    iv) Latching current in SCR is_____than holding current.
     A) more   B) less   C) equal   D) none of these   (04 Marks)

  b. Explain the operation of SCR using the two transistor equivalent circuit.   (08 Marks)

  c. Explain the basic construction and equivalent circuit of UJT.   (08 Marks)

PART – B

5 a. i) Oscillator uses_____ type of feedback.
     A) Positive   B) Negative   C) Reverse   D) None of these.

    ii) Negative feedback results in_____ Bandwidth.
     A) Increased   B) Decreased   C) Zero   D) None

    iii) The frequency of Hantley Oscillator is given by f =_____
     A) $\dfrac{1}{2\pi\sqrt{LC}}$ B) $\dfrac{1}{2\pi\sqrt{RC}}$ C) $\dfrac{1}{2\pi\sqrt{C}}$ D) $\dfrac{1}{2\pi LC}$

    iv) The overall voltage gain of two stage capacitor coupled CE amplifier is _____ than a single stage CE amplifier.
     A) greater   B) less   C) equal   D) none   (04 Marks)

  b. With a neat circuit diagram and frequency response, explain the operation of single stage common – emitter amplifier.
                                                                   (08 Marks)

  c. Draw the circuit of transistor RC phase shift oscillator and explain the significance of each component.
                                                                   (08 Marks)

6 a. i) Common mode rejection ratio of ideal Op AMP is _____.
     A) 0   B) 90   C) ∞ D) 180.

    ii) The gain of voltage follower is_____
     A) Unity   B) Zero   C) ∞ D) None.

    iii) In inverting amplifier there is _____ phase shift with input and output.
     A) 0^0 B) 90^0 C) 180^0 D) 360^0.

    iv) The maximum rate at which amplifier output can change in volts per microsecond (V/μs) is called_____
     A) Over rate   B) Slew rate   C) Under rate   D) None (04 Marks)

  b. Draw the block diagram of CRO and explain the function of each stage.   (08 Marks)

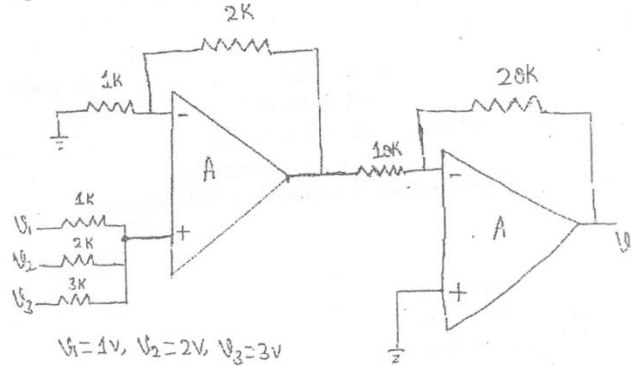c. Calculate the output voltage of the following circuit given below (08 Marks)

$V_1 = 1V$, $V_2 = 2V$, $V_3 = 3V$

Fig. Q6(c).

7 a. i) $(25)_{10} = (?)_2$.
      A) $(00111)_2$ B) $(11001)_2$ C) $(11000)_2$ D) $(00011)_2$.

   ii) $(101011.11001)_2 = (?)_{16}$.
      A) $(AB.2C)_{16}$ B) $(2C.B8)_{16}$ C) $(2B.C8)_{16}$ D) $(2C.2D)_{16}$.

   iii) $\overline{2'S}$ of binary number 10110 is_____
      A) 00011   B) 01010   C) 11100   D) 11111

   iv) $(763.634)_8 = (?)_2$.
      A) $(111110011.110011100)_2$ B) $(101011001.110011001)_2$.
      C) $(000011110.111100001)_2$ D) $(010101010.001100110)_2$.   (04 Marks)

   b. Subtract using 2's complement.   (04 Marks)
      i) $[4-9]$ ii) $[8-2]$.   (04 Marks)

   c. Explain the need of modulation.   (04 Marks)
   d. Draw the block diagram of a superheterodyne receiver and explain the function of each
      block.   (08 Marks)

8 a. i) Demorgan theorem states that $\overline{A+B}$ = _____
      A) $\overline{A}+\overline{B}$ B) $\overline{A} \cdot \overline{B}$ C) $\overline{AB}$ D) None.

   ii) Universal gates are_____ and _____
      A) NOT and NOR   B) AND and OR
      C) NAND and NOR   D) EXOR and EX-NOR

   iii) $A + AB + A =$ _____
      A) AB   B) $A+B$ C) A   D) O.

   iv) The output is High when all the outputs are high, such a gate is called.
      A) NAND   B) NOR   C) AND   D) OR   (04 Marks)

   b. Simplify the following Boolean expressions
      i) $y = \overline{\overline{AB}+\overline{A}+AB}$ ii) $y = AB + A(B+C) + B(B+C)$.   (06 Marks)

   c. Realize the following expressions using only NAND gates.
      i) $y = a\overline{b} + \overline{a}b$ ii) $y = (A+\overline{B}+C) \cdot (\overline{A}+B+C)$ (06 Marks)

   d. Realize a full adder using two half adders.   (04 Marks)

*****
3 of 3

USN ☐☐☐☐☐☐☐☐☐☐   06ELE15/25

First / Second Semester B.E. Degree Examination, Dec.08/Jan.09
Basic Electrical Engineering

Time: 3 hrs.   Max. Marks:100

Note : *1. Answer any FIVE full questions, selecting at least two from each part.*
2. Answer all objective type questions only in first and second writing pages.
3. Answer for objective type questions shall not be repeated.

PART - A

1 a. i) If 100 V is applied across a 200 V, 100 W bulb, the power consumed will be,
          A) 100 W   B) 50 W   C) 25 W   D) 12.5 W

   ii) Validity of Ohm's law requires that the
        A) Voltage should remain constant   B) Current should remain constant
        C) Resistance must remain constant   D) Power must remain constant.

   iii) The direction of magnetic field produced by a linear current is given by
        A) Ampere's law   B) Flemings left hand rule
        C) Right hand thumb rule   D) None of the above.

   iv) An emf of 7.2 volts is induced in a coil of 6mH. Then the rate of change of current is
        A) 12 A/s   B) 120 A/s   C) 1200 A/s   D) 12000 A/s.
                                                                            (04 Marks)

   b. A 8 Ohm resistor is in series with a parallel combination of two resistors 12 ohm and 6 Ohm. If the current in the 6 Ohm resistor is 5A, determine the total power dissipated in the current.   (06 Marks)

   c. State and explain Kirchoff's laws.   (05 Marks)

   d. A coil consists of 600 turns and a current of 10 A in the coil gives rise to a magnetic flux of 1 milli Weber. Calculate i) Self inductance; ii) The emf induced and iii) The energy stored when the current is reversed in 0.01 second.   (05 Marks)

2 a. i) A Sinusoidal voltage is represented as 141.42 Sin 314 t $_g$t$_s$.Rms value of voltage and frequency are respectively
          A) 141.42 V, 314 Hz   B) 100 V, 50Hz   C) 200 V, 100 Hz   D) 100 V, 100 Hz.

   ii) Inductive reactance of a coil of inductance 0.5 H at 50 Hz is
        A) 15.7 Ohm   B) 157 Ohm   C) 50 Ohm   D) 25 Ohm.

   iii) The power factor of pure resistive circuit is
        A) Zero   B) Unity   C) Lagging   D) Leading

   iv) The impedence of A.C circuit is 50 $\lfloor$-60° Ohm. Then the circuit is
        A) Resistive   B) Capacitive   C) Inductive   D) None of the above   (04 Marks)

   b. Obtain an expression for power in a series RLC circuit.   (08 Marks)

   c. A Parallel circuit comprises a resistor of 20 Ohm in series with an inductive reactance of 15 Ohm in one branch and a resistor of 30 Ohm in series with a capacitive reactance of 20 Ohm in the other branch. Determine the current and power dissipated in each branch if the total current drawn by the parallel circuit is 10 $\lfloor$-30° Amp.   (08 Marks)

3 a. i) In a three phase system, the emf's are:
          A) 30° apart   B) 60° apart   C) 90° apart   D) 120° apart.

   ii) In the measurement of three-phase power by two wattmeter method, if the two wattmeter readings are equal, then the p.f of the circuit is
        A) 0.8 lag   B) 0.8 lead   C) Zero   D) Unity

iii) If V is the line voltage, I is the line current and ϕ is the angle between them, then the power P measured in a star three-phase load is equal to

A) 3 VI cos ϕ B) 3 VI sin ϕ C) $\sqrt{3}$ VI cos ϕ D) $\sqrt{3}$ VI sin ϕ.

iv) The algebraic sum of instantaneous phase currents in a three phase balanced system is

A) Zero   B) Infinity   C) Line Current   D) Phase current.

(04 Marks)

b. With relevant vector diagram, show that two wattmeters are sufficient to measure three phase power.   **(08 Marks)**

c. Three similar coils each having resistance of 10 Ohm and reactance of 8 Ohms are connected in star across a 400 v, 3 phase supply. Determine the i) line current; ii) Total power and iii) Reading of each of two wattmeters connected to measure the power.

(08 Marks)

4   a. i) Integrating meters are used for the measurement of

A) Current   B) Voltage   C) Power   D) Energy

ii) A fuse is a

A) Protective device   B) Current limiting device
C) Voltage limiting device   D) Power limiting device.

iii) In a dynamometer wattmeter the fixed coil is

A) Current coil   B) Potential coil
C) Current or potential coil   D) None of the above.

iv) The average torque acting on the aluminium disc of an energymeter is proportional to the -----------consumed by the circuit

A) Current   B) Voltage   C) Power   D) None of the above.

(04 Marks)

b. Explain with a neat diagram the working of Dynamometer type wattmeter.   **(08 Marks)**

c. Explain the necessity of Earthing. Explain pipe earthing with a neat diagram.   **(08 Marks)**

PART - B

5   a. i) The emf generated by a given d.c generator depends upon

A) Flux only   B) Speed only   C) Flux and speed   D) Terminal voltage

ii) Residual magnetism is necessary in a D.C

A) Shunt generator   B) Seperately excited generator
C) Shunt motor   D) Series motor

iii) A commutator is made up of

A) Iron lamination   B) Copper segments
C) Both Iron lamination and copper segments   D) None of the above.

iv) The back emf of a motor at the moment of starting is

A) Zero   B) Maximum   C) Low   D) Optimum   **(04 Marks)**

b. A 4 pole, 1500 rpm d.c generator has a lap wound armature having 24 slots with 10 conductors per slot. If the flux per pole is 0.04 Wh, calculate the emf generated in the armature. What would be the generated emf if the winding is wave connected?   **(06 Marks)**

c. Derive an expression for Torque in a D.C motor.   **(04 Marks)**

d. The current drawn from the mains by a 220 V D.c shunt motor is 4 A on no-load. The resistance field and armature windings are 110 Ohms and 0.2 Ohm respectively. If the line current on full load is 40 A at a speed of 1500 RPM, find the no-load speed.   **(06 Marks)**

6   a. i) The core of the transformer is laminated to reduce.

A) Eddy current loss   B) Hysterisis loss   C) Copper loss   D) Friction loss.

ii) An ideal transformer does not change

A) Voltage   B) Current   C) Power   D) None of the above

2 of 3

iii)   The flux in transformer core
    A) Increases with load   B) Decreases with load
    C) Remains constant irrespective of load   D) None of the above.

iv)   The copper loss of certain transformer at half-full load is measured as 200W. Then the copper loss at full load will be
    A) 100 W   B) 200 W   C) 400 W   D) 800 W.   **(04 Marks)**

b. What are the losses in a transformer? On what factors do they depend? And how are they minimized?   **(05 Marks)**

c. How is efficiency of transformer pre-determined? Obtain the condition for maximum efficiency.   **(05 Marks)**

d. A 25 KVA transformer has an efficiency of 94% at full load unity p.f and at half full load, 0.9 p.f. Determine the Iron loss and full load copper loss.   **(06 Marks)**

7 a. i)   An induction motor works with
    A) d.c only   B) a.c only   C) Both a.c and d.c   D) None of he above.

    ii)   The slip of an induction motor at stand still is
    A) Zero   B) One   C) Infinity   D) None of the above.

    iii)   A 4 pole, 50 Hz induction motor runs at a speed of 1440 rpm. The frequency of the rotor induced emf is
    A) 3 HZ   B) 2.5 Hz   C) 2 Hz   D) 1 Hz.

    iv)   An induction motor under full load has a slip of about
    A) 0.03   B) 0.1   C) 0.3   D) Zero.   **(04 Marks)**

b. Explain the principle of operation of a 3 phase induction motor and give reason for "An induction motor cannot run at synchronous speed"   **(06 Marks)**

c. Define slip. Derive expression for frequency of rotor current.   **(05 Marks)**

d. A 6 pole alternator runs at 1000 rpm supplies power to a 4 pole induction motor. The frequency of rotor of IM is 2 Hz. Determine the slip and speed of the motor.   **(05Marks)**

8 a. i)   A 4 pole, 1200 rpm alternator generates emf at a frequency of
    A) 25 Hz   B) 40 Hz   C) 50 Hz   D) 60 Hz

    ii)   The rated voltage of alternators used is power station is usually
    A) 440 kV   B) 220 kV   C) 110 kV   D) 11 kV

    iii)   Usually modern alternators have short pitched windings so as to
    A) Increase the machine rating   B) Improve the voltage wave form
    C) Improve generated voltage   D) None of these

    iv)   A salient pole field construction is used for alternator having
    A) Low and Medium speed   B) Large speed
    C) Very large speed   D) None of these.   **(04 Marks)**

b. Explain the construction of cylindrical pole alternator.   **(06 Marks)**

c. Obtain expression for emf of an alternator and explain the significance of winding factor.   **(06 Marks)**

d. A 12 pole, 500 rpm, star connected alternator has 48 slots with 15 conductors per slot. The flux per pole is 0.02 Wh and is distributed sinusoidally. The winding factor is 0.97. Calculate the line emf.   **(04 Marks)**

*****

USN ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

| Question Paper Version : A |

I / II Semester B.E Degree Examination, Dec. 08 / Jan. 09
CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS
(COMMON TO ALL BRANCHES)

Time: 2 hrs.]   [Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Use only **Black ball point pen** for writing / darkening the circles.

2. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**

3. Darkening two circles for the same question makes the answer invalid.

4. **Damaging/overwriting, using whiteners on the OMR** sheets are strictly prohibited.

---

1. The preamble of the constitution declared India as
   a) Sovereign, Democratic, Republic   b) Sovereign, Socialist, Democratic, Republic
   c) Sovereign, Socialist, Secular, Democratic, Republic   d) Sovereign, Republic

2. Which one of the following writs is issued by the court in case of an illegal detention of a person.
   a) Habeas corpus   b) Mandamus   c) Certiorari   d) Quo-Warranto

3. Right to cultural and educational rights implies
   a) Provision of free and compulsory education
   b) Special assistance to backward classes to educate them
   c) Provision of religious and cultural instructions in schools run by the government
   d) Right of minorities to establish and administer educational institutions of their choice

4. The main objectives of directive principles are
   a) Establish political democracy in the country
   b) Establish social and economic democracy in the country
   c) Raise the moral and ethical standard of people
   d) Establish a police state in the country

5. The president of India gives resignation to
   a) Prime minister   b) The chief justice of supreme court
   c) The Vice President   d) Speaker of Lok Sabha

6. The sole channel of communication between President and his council of minister is
   a) Speaker of Lok Sabha   b) Prime Minister
   c) Vice President   d) Opposition leader

A1

7. Who elects the Rajya Sabha members
   a) The people
   b) Elected members of state assembly
   c) The members of parliament
   d) None of the above

8. Chief Justice and other Judges of Supreme Court hold office
   a) Till the age of 60 years
   b) For Life
   c) Till the age of 62 years
   d) Till the age of 65 years

9. Can the governor be the governor of two states
   a) Yes
   b) No
   c) Only one state
   d) None of the above

10. What is the minimum age to contest Vidhana Parishad
    a) 25 years
    b) 30 years
    c) 18 years
    d) 35 years

11. Who is the Present Governor of Karnataka
    a) T. N. Chaturvedi
    b) V. S. Ramadevi
    c) Rameshwar Thakur
    d) None of the above

12. Which article deals with Amendment procedure of Indian Constitution,
    a) Article 352
    b) Article 360
    c) Article 368
    d) Article 356

13. There is reservation of seats for S.C's and S.T's in both Lok Sabha and Rajya Sabha
    a) Yes
    b) No
    c) Only in Lok Sabha
    d) Only in Rajya Sabha

14. President can declare National Emergency under
    a) Article 256
    b) Article 356
    c) Article 352
    d) Article 360

15. Who is the Present Chief Election Commissioner of India?
    a) T. N. Sheshan
    b) S. L. Shakdhar
    c) M. P. Tandon
    d) N. Gopalaswamy

16. A fault tree is used to
    a) Assess the risk involved
    b) To claim compensation
    c) Take free consent
    d) To improve safety

17. Fear is ………. To responsibility
    a) A way of shift
    b) An impediment
    c) A conflict
    d) None of the above

18. It is not a kind of trade mark
    a) Designs
    b) Symbols
    c) Sounds
    d) Good will

19. Owner of the patent rights will be having patent rights for,
    a) 100 years
    b) 75 years
    c) 50 years
    d) 20 years

20. Tight couple means
    a) Binding two beams tightly
    b) Process tightly coupled
    c) Erecting two pillars side by side
    d) Strong adhesive material

21. Which amendment added the words "Secularism Socialist and integrity to the preamble of the constitution"
    a) 24th Amendment
    b) 42nd Amendment
    c) 44th Amendment
    d) 73rd amendment

22. This is not a directive principle,
    a) Uniform civil code
    b) Workers participation in management
    c) Minimum wage
    d) Prohibition of slaughtering of cows and calves

23. Right to primary education is a
    a) Directive principle
    b) Fundamental right
    c) Fundamental duty
    d) None of the above

A2

24. This is not a fundamental duty
    a) Respect to national flag and national anthem
    b) Safeguard public property
    c) Respect to elders and teachers
    d) Renounces the practices insulting to the dignity of women

25. Who is the present President of India ,
    a) A.P.J Abdul Kalam b) Mrs. Pratiba Patil c) K. R. Narayan d) Abdul Ansari

26. A person to be appointed as Prime Minister
    a) Should be a member of Lok Sabha
    b) Should be a member of Rajya Sabha
    c) Should become member of Lok Sabha or Rajya Sabha within six months
    d) Should be a post graduate

27. Rajya Sabha has a term of
    a) 5 years   b) 6 years   c) Permanent body   d) 4 years

28. To become a Judge of Supreme Court
    a) He must be a distinguished jurist
    b) He must be a judge of High Court for at least 5 years
    c) He must have served at least 10 years in any High Court
    d) One among above option is sufficient

29. Chief minister of a state is appointed by
    a) President   b) Governor
    c) High Command of a political party   d) Chief Justice of the high court

30. Which state among the following has two houses,
    a) Tamilnadu   b) Andhra Pradesh   c) Karnataka   d) West Bengal

31. Creamy layer means
    a) Upper caste people   b) Highly cultured people
    b) Persons holding high post and having higher income of backward class people
    d) Children of the ministers.

32. If the national emergency is declared, the following fundamental rights cannot be suspended,
    a) Art 14   b) Article 19   c) Article 32   d) Article 20 and 21

33. Which amendment of the constitution repealed right to property
    a) 42nd b) 43rd c) 44th d) 46th

34. This is not the function of election commission
    a) Preparation of electoral rolls   b) Determines code of conduct to candidates
    c) Selection of the candidate   d) Allotment of symbols

35. This is not dishonesty in engineering research and testing
    a) Crimping   b) Forging   c) Cooking   d) Plagiarism

36. Revealing confidential information amounts to
    a) Breach of contract   b) Misusing of truth
    c) Criminal breach of trust   d) Violation of patent right

A3

37. Minimalist view means
   a) A ministerial view
   b) A narrow thinking
   c) A concept of responsibility
   d) A novel plan to minimize industrial loss

38. Chairman of the constitution drafting committee was,
   a) Dr. B. R. Ambedkar
   b) Dr. Rajendra Prasad
   c) Jagajeevan ram
   d) Jawaharlal Nehru

39. Right to equality under article 14 means
   a) Treating all people equally
   b) Equality among equals and not equality among unequals
   c) Upliftment of S.C.'s and S.T.'s and backward class people
   d) None of the above

40. This is not the right of the arrested person
   a) To inform him the ground of his arrest
   b) To consult his lawyer
   c) To produce before the magistrate immediately
   d) To produce before the magistrate within 24 hours

41. If one considers engineering profession as a building, then the following is its foundation,
   a) Imagination
   b) Creativity
   c) Honesty
   d) Accepting the risk

42. The use of intellectual property of others without their permission is known as
   a) Forging
   b) Cooking
   c) Trimming
   d) Plagiarism

43. Conflict of interest exists for an engineer when he is subject to,
   a) Threat
   b) Loyalties
   c) Professional harassment
   d) Professional impediments

44. 74th amendment of the constitution refers to
   a) Rural local bodies
   b) Urban local bodies
   c) Repealment of right to property
   d) None of the above

45. National commission for women was constituted under
   a) Act of 1990
   b) Act of 1993
   c) Act of 1995
   d) Act of 1998

46. The constitution empowers state government to make special law for
   a) Farmers
   b) Women and children
   c) Workers
   d) Unemployed youth

47. There is no provision for impeachment of
   a) Governor
   b) Vice President
   c) President
   d) Judges of the supreme court and high court

48. A Legislature council is69
   a) Dissolved every 6 years
   b) Dissolved every 4 years
   c) It is a permanent body
   d) None of the above

49. Appeal under special leave petition will not be entertained by supreme court in
   a) Civil cases
   b) Criminal cases
   c) Revenue cases
   d) Cases heard by military courts

50. Total number of articles in Indian constitution is
   a) 397
   b) 395
   c) 400
   d) 445

* * * * *

A4

USN ☐☐☐☐☐☐☐☐☐☐ | Question Paper Version : A |

I / II Semester B.E Degree Examination, December/January 2008
ENVIRONMENTAL STUDIES
(COMMON TO ALL BRANCHES)

Time: 2 hrs.]   [Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Use only **Black ball point pen** for writing / darkening the circles.
2. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
3. Darkening two circles for the same question makes the answer invalid.
4. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

---

1. Word Environment is derived from :
    a) English   b) German   c) French   d) Italy

2. Organisms who directly feed on producers are called :
    a) Carnivores   b) Omnivores   c) Herbivores   d) Decomposers.

3. Anthropoginal activities means :
    a) Natural activities   b) Bacteriological activities
    c) Wild animals activities   d) Human activities.

4. Largest reservoir of Nitrogen is exists in :
    a) Hydrosphere   b) Lithosphere   c) Atmosphere   d) Stratosphere.

5. 'World Environmental Day' is celebrated every year on:
    a) 5th May   b) 5th June   c) 5th July   d) 18th July.

6. Ozone is present in which layers of the atmosphere?
    a) Troposphere   b) Mesosphere   c) Stratosphere   d) Thermosphere.

7. Which of the following is major Environmental issues in Mining activities?
    a) Air pollution and Dust   b) Water pollution
    c) Soil Degradation   d) All the above

A1

8. EIA is related to :
   a) Environmental and Industrial Activities.   c) Environmental Impact Assessment
   b) Environmental Impact Activities.   d) Environmental Internal Activities.

9. 'Earth's Day' is celebrated every year on:
   a) Oct 26th b) June 5th c) April 22nd d) Dec 23rd.

10. Eutrophication means :
    a) Waste water Treatment process   b) Neutralization of waste water
    c) Enrichment of plant nutrients in water bodies.
    d) Water purification techniques.

11. Which of the following is most environmental friendly agriculture practice?
    a) Using chemical fertilizers   c) Use of Bio – compost materials
    b) Using alluvial soil   d) Without using pesticides and chemical fertilizers

12. Carbondioxide reacts with moisture in the atmosphere forming
    a) H_2CO_2 b) H_2CO_3 c) COHb   d) $CaHCO_3$.

13. Loss of water content through the plants into the atmosphere is called :
    a) Evaporation   b) Transpiration   c) Vaporization   d) Hydraulic cycle.

14. As per BIS, the permissible limit of PH value for Drinking water :
    a) 7.0   b) 6.5 to 7.5   c) 6.5 to 8.5   d) 6.0 to 8.5

15. What is the Max. allowable concentration of Iron content in drinking water ? (as per BIS).
    a) 0.5mg/l b) 1.0mg/l c) 1.5 mg/l d) 2.0mg/l

16. Nitrogen fixation from the atmosphere is high in which type of plants?
    a) Manocoteliden   b) Liguminus   c) Both a and b   d) None of the above

17. Cholera and Typhoid are caused by
    a) Housefly   b) Virus   c) Bacteria   d) Fungus

18. Major source of Fluoride available in :
    a) River water   b) Ground water   c) Food products   d) Both a and c

19. Excess of Nitrate in drinking water causes :
    a) Gastro Enteritis   b) Minamata   c) Blue Baby Sundrome   d) None of the above

20. Which of the following is not a Natural mineral?
    a) Asbestos   b) Fluorospar   c) Lime stone   d) Nitrogen.

21. Which of the following is not a renewable source of Energy?
    a) Solar Energy   b) Fossil Fuel   c) Tidal Energy   d) Wind Energy.

22. Which of the following source of Energy is less Ecofriendly?
    a) Wind   b) Bio – Gas   c) Solar   d) Nuclear

23. Fossil Fuels are converted into Energy by
a) Cooling process b) Melting process c) Burning process d) Condensation process

24. BOD means :
a) Biological Oxygen Demand
b) Bio – chemical Oxygen Demand
c) Bacteriological Oxygen Demand
d) Bio – Physical Oxygen Demand.

25. Physical – Pollution of water is due to:
a) Dissolved Oxygen   b) PH   c) Turbidity   d) None of the these.

26. Noise pollution means.
a) High frequency sound
b) Loud sound
c) Unwanted sound
d) Environmental pollution

27. Which of the following is ill effect of Urbanization.
a) Decrease in Agricultural Land   b) Loss of soil degradation
c) Environmental pollution   d) All of these.

28. Major objectives of Family welfare programs in India is :
a) Disease control   b) Population growth rate control
c) Employment generation   d) None of these.

29. Demography is the study of :
a) Animal behavior   b) Geography   c) Rivers   d) Population growth

30. Global worming means :
a) Increase in solar radiation   b) Increase in Earth's Body Temperature
c) Acid Rain   d) All the above.

31. Which of the following is not a Green House Gas?
a) Ozone   b) CO_2 c) Water vapour   d) SO_2.

32. Which of the following is not a solution for Global worming?
a) Reducing fossil fuel consumption   b) Plantation of more Trees.
c) Deforestation   d) None of the above

33. The PH value of Acid Rain Recorded was :
a) 4.5   b) 5.7   c) 7.2   d) 2.0

34. Movement of Nutrients from the soil by the Acid Rain is called :
a) Infiltration   b) Transpiration   c) Leaching   d) Exfiltration

35. Thickness of the Ozone layer is measured in which units?
a) PPB   b) PPM   c) DU   d) dB

36. Each chlorine free radical can destroy the number of ozone molecules.
a) 100   b) 1000   c) 10,000   d) 100, 000

37. World 'Ozone day' is being celebrated on every year
a) June 5th b) Oct 15th c) Sept 5th d) Sept 16th

A3

38. Water Pollution, 'Prevention and Control Act' was enacted in the year
   a) 1984　　　　　b) 1974　　　　　c) 1986　　　　　d) 1994

39. 'Wild Life Protection Act' was enacted in the year
   a) 1972　　　　　b) 1974　　　　　c) 1986　　　　　d) 1984

40. Karnataka State Pollution Control Board was established in the year
   a) 1974　　　　　b) 1976　　　　　c) 1982　　　　　d) 1986

41. Water supply for Domestic consumption in Indian Towns as per BIS :
   a) 150*lpcd*　　　b) 120 *lpcd*　　　c) 135 *lpcd*　　　d) 200 *lpcd*.

42. First International Earth summit was held at
   a) Stockholm　　b) Germany　　c) Riode – Janeiro　　d) Johannesburg.

43. Amount of CO_2 content in atmospheric Air is normally
   a) 0.21%　　　　b) 0.416%　　　c) 0.318%　　　d) 0.428%

44. EPA means :
   a) Environmental Prevention Act　　b) Environmental Pollution Act
   c) Environmental Protection Act　　d) Environmental Protection Agency.

45. Facultative Bacteria existing in which type of Environmental condition?
   a) Presence of oxygen　　b) Absence of oxygen
   c) Both a and b　　　　　d) None of these

46. Bhopal Gas Tragedy happened in the year
   a) Dec. 1984　　b) Dec. 1983　　c) Dec. 1994　　d) Dec. 1987

47. Nuclear Power Plant in Karnataka is located at
   a) Kuderemukh　　b) Raichur　　c) Kaiga　　d) Karavali

48. Noise is measured in which units?
   a) Joule　　　　b) PPB　　　　c) db　　　　d) NTU

49. Liquid waste generated from Bathrooms and Kitchens are called.
   a) Domestic sewage　　b) Runoff　　c) Sullage　　d) All the above

50. Among fresh water availability on Earth, the percentage of Groundwater occurs is about.
   a) 0.2%　　　　b) 0.5%　　　　c) 0.8%　　　　d) 1.0%

*****

A4