



SVIET
STRENGTHENING THE LIFE

STUDENT HAND BOOK



SVIET

COURSE- B.TECH
SEMESTER- 1ST & 2ND

DEPARTMENT OF APPLIED SCIENCES

SWAMI VIVEKANAND INSTITUTE OF ENGINEERING & TECHNOLOGY

RAM NAGAR BANUR NEAR CHANDIGARH

COURSE FILE OF B.TECH. 1ST & 2ND SEMESTER

DEPARTMENT OF APPLIED SCIENCES

Sr. No	LIST OF FACULTY MEMBER	DESIGNATION	CONTACT NUMBER	E-mail ID
1	Dr. Sandeep Sharma	Professor & Principal	9855013524	principal@sviet.ac.in
2	Nitika Gupta	Assistant Professor	7837333285	ngnitikagupta1@gmail.com
3	Rajni Dhawan	Assistant Professor	9988335118	sachdevarajni6@gmail.com
4	Sushma Rani	Assistant Professor	9991435167	sharmababy73@yahoo.com
5	Arun Sharma	Assistant Professor	9459125061	arunsharma036@gmail.com
6	Ambika	Assistant Professor	9780924083	ambikasingh49491@gmail.com
7	Sukriti Acharya	Assistant Professor	7831886484	sukritiac793@gmail.com
8	Shahzad	Assistant Professor	9816133894	vickyshahz150@gmail.com
9	Lehar	Assistant Professor	9988121737	lehar.sharma1@hotmail.com
10	Ritika Chaudhary	Assistant Professor	8400224967	ritika.chaudhary22@gmail.com
11	Love Kumar	Assistant	9023236498	luvkumar.pqr@gmail.com

		Professor		
12	Sonia Rani	Assistant Professor	9023869995	Soniabansal5677@gmail.com

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SYLLABUS

(As Per MRSPTU)

APPLIED CHEMISTRY

(Subject Code: BCHM0-101)

FACULTY NAME: Mr. Shahzad

(Assistant Professor (Applied Sciences))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT – I

1. Molecular Spectroscopy

UV/Visible Spectroscopy: Selection rule, Principle and instrumentation, Electronic Transitions, Chromophores & Auxochromes, Factors affecting λ_{\max} intensity of spectral lines, Types of absorption bands, Frank Condon Principle, Applications.

IR Spectroscopy: Principle and instrumentation; Force Constant, Anharmonic Oscillator Model, Finger Print region, Fundamental modes of vibrations, Factors affecting vibrational frequency, Applications.

2. NMR Spectroscopy

Principle & instrumentation; Chemical shift; Factors affecting Chemical Shift; Spin-Spin Splitting; Coupling Constant, High resolution NMR spectrum, NMR spectrum of EtOH, Relaxation process, Applications.

UNIT - II

3. Polymers

Introduction; Functionality; Classifications of Polymers, Types of polymerization; Specific features of polymers; Structures - regularity and irregularity; Tacticity of polymers; Average

molecular weights and size; Effect of molecular weight on the properties of polymers; Glass Transition Temperature, Crystallinity of polymers, Introduction to polymer reinforced composite.

4. Petrochemicals

Introduction; First, second & third generation petrochemicals; Primary Raw Materials for Petrochemicals. Natural gas and its treatment processes; Properties of natural gas; Crude oil: Composition of and classification of crude oil; Physical separation processes; Conversion processes.

UNIT – III

5. Water and its Treatment

Specifications of water, Hardness of water, Treatment and problems of Boiler feed water, Different methods of the water softening, Domestic water treatment of water, Desalination of water.

6. Coordination and Organometallic Chemistry`

Coordination number and structures of coordination complexes, Nomenclature of Coordination Compounds, Theory of bonding- crystal field and molecule orbital theory for Tetrahedral and octahedral complexes, JT distortion.

UNIT – IV

7. Green Chemistry and its Applications

Introductory overview - Definition and concepts of Green chemistry; Twelve Principles of Green chemistry, Use of alternative feedstock (bio-fuels); Use of innocuous reagents in natural processes; Alternative solvents; Design of the safer chemicals; Designing alternative reaction methodology. Microwave and ultrasonic radiation in Green synthesis - Minimizing energy consumption.

8. Corrosion and its Prevention

Introduction; Wet and Dry corrosion; Different types of surface films; Mechanisms of wet corrosion; Galvanic corrosion; Galvanic Series; Concentration cell corrosion and differential aeration corrosion; Soil and microbial corrosion; Factors affecting corrosion; Various methods of corrosion control.

Recommended Books :

1. William Kemp, 'Organic Spectroscopy', Palgrave Foundations, **1991**.
2. D. A. Skoog, F. J. Holler and A. N. Timothy, 'Principle of Instrumental Analysis', 5th Edn., Saunders College Publishing, Philadelphia, **1998**.
3. G. W. Castellan, 'Physical Chemistry', 3rd Edn, 1995, Narosa, reprint **2004**.
4. C. P. Poole, Jr., F. J. Owens, 'Introduction to Nanotechnology', Wiley Interscience, **2003**.
5. L.E. Foster, 'Nanotechnology', Science Innovation & Opportunity, Pearson Education, **2007**.
6. M. Lancaster, 'Green Chemistry- An Introductory Text', 1st Edn., Royal Society of Chemistry, Cambridge, UK, **2010**.

ASSIGNMENT-1

1. What is NMR spectroscopy and nuclear spin. Explain the principle of NMR spectroscopy.
2. What is chemical shift in NMR. What are the causes of Chemical shift?
3. Explain the spin-spin coupling?
4. Differentiate between chemical corrosion and electrochemical corrosion.
5. How will you differentiate between condensation and addition polymerization?

ASSIGNMENT-2

1. What is corrosion of metals? Explain electrochemical corrosion with its mechanism?
2. Explain the mechanism of rusting of iron in acidic and neutral environment?
3. Explain the process of galvanization of iron. How does it prevent the corrosion of iron?
4. Classify the polymers on the basis of molecular forces ?
5. Explain how crystalline, chemical reactivity are influenced by the structure of polymer ?

ASSIGNMENT-3

1. What is meant by polymerization? Differentiate between addition and condensation polymerization?
2. Define the term functionality? How is it related to the chemical structure?
3. Explain the number-average and weight –average molecular mass of polymers? Explain the effect of molecular mass on the properties of polymers?
4. Explain the Isotactic, Syndiotactic and Atactic polymers with suitable examples ?
5. How will you explain the number-average and weight- average molecular mass of polymers. Explain the effect of molecular weight on the properties of polymer?

TUTORIAL-1

- Q1. Explain the chemical shift in NMR spectroscopy .
- Q2. Explain the causes of chemical shifts?
- Q3. What do you understand by the term spin-spin coupling?
- Q4. Explain the shielding and de-shielding of the proton of a nucleus?
- Q5. How will you explain the relaxation process in the NMR spectroscopy?

TUTORIAL-2

- Q1 . Differentiate between chemical corrosion and electrochemical corrosion.
- Q2. What is Pilling-Bedworth rule ? How is it related to the protectiveness of an oxide layer ?
- Q3. what is corrosion of metals. Explain the electrochemical corrosion with its mechanism?
- Q4. What is the process of galvanization of iron. How does it prevents the corrosion of iron?
- Q5. What is the corrosion of metals. Explain the electro chemical corrosion with its mechanism?

QUESTION BANK

Q1. Explain the following terms :-

- a. Polymer b. Monomer C. Homopolymer d. Co-polymer
- e. Degree of polymerization

Q2. Explain the term functionality of monomers. How is it related to the chemical structure?

Q3. Differentiate between addition polymerization and condensation polymerization?

Q4. Classify the polymers on the bases of their structure?

Q5. Explain how crystallinity, chemical reactivity are influenced by the structure of polymer ?

Q6. Explain the Isotactic, Syndiotactic and Atactic polymers.

Q7. Explain the number-average and weight-average molecular mass of polymers. Explain the effect of molecular weight on the properties of polymer?

Q8. What do you mean by polymerization? Explain the specific features of polymers.

Q9. What are composites? Give the main components of composite polymers ?

Q10. What do you understand by tacticity in polymers? Explain different types.

Q11. What is corrosion of metals. Explain the electrochemical corrosion with its mechanism?

Q12. Explain the process of galvanization of iron. How does it prevent the corrosion of iron?

Q13. Explain the mechanism of rusting of iron in acidic and neutral environment?

Q14. Explain the mechanism of rusting of iron in acidic and neutral environment?

Q15. Explain the following:-

- a. Wet corrosion b. Dry corrosion c. Pitting corrosion

Q16. Discuss the mechanism of wet corrosion?

Q17. Write a note on metallic coating for corrosion prevention?

- Q18. Write a note on metal cladding for corrosion prevention?
- Q19. Explain galvanization in detail.
- Q20. Pitting corrosion is dangerous, explain?
- Q21. What is the chemical shift in NMR.
- Q22. What are the causes of chemical shifts?
- Q23. What do you understand by the term spin-spin coupling?
- Q24. What is meant by de-shielding of the proton of a nucleus?
- Q25. Explain the relaxation process in the NMR spectroscopy.
- Q26. What is the corrosion of metals. Explain the electro chemical corrosion with its mechanism?
- Q27. What is standard hard water? Explain.
- Q28. Discuss hot lime soda process for softening of hard. What are its advantages and disadvantages?
- Q29. What are the disadvantages of sludge formation? How it can be prevented.
- Q30. What is priming and foaming? Explain.
- Q31. What are petrochemicals? How they are different from synthetic organic chemicals? Explain.
- Q32. How are the petrochemicals classified? Explain with examples.
- Q33. What is natural gas? What is its composition? Mention the type of natural gas and importance of each type?
- Q34. What is crude oil? Give in brief its composition and classification?
- Q35. Give the chemistry of two manufacturing processes of vinyl chloride?
- Q36. Discuss the natural gas. Discuss its treatment processes.
- Q37. Discuss the production of ethylene and propylene.
- Q38. What are third generation petrochemicals?



Q39. Differentiate between chemical corrosion and electrochemical corrosion.

Q40. What is Pilling-Bedworth rule ? How is it related to the protectiveness of an oxide layer?

APPLIED MATHEMATICS-II

(Subject Code: BMAT0-201)

FACULTY NAME: Ms. Rajni

(Assistant Professor (Applied Sciences))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-I

Differential & Integral Calculus and its Applications

Curve tracing- Tracing of standard Cartesian, Parametric and polar curves, Curvature of Cartesian, Parametric and polar curves. Rectification of standard curves, Areas bounded by standard curves, Volumes and surfaces of revolution of curves, Applications of integral calculus to find center of gravity and moment of inertia.

UNIT-II

Partial Differentiation and its Applications

Functions of several variables, Limit and continuity, Change of variable, Chain rule, Partial differentiation, Homogeneous functions and Euler's theorem, Composite functions, Total derivative, Derivative of an implicit function; Change of variable, Jacobians. Tangent and normal to surface, Taylor's and Maclaurin's series for functions of two variables, Errors and approximations, Maxima and minima of function of several variables, Lagrange's method of undetermined multipliers.

UNIT-III

Multiple Integrals and its Applications

Double and triple integrals and their evaluation, Change of order of integration, Change of variables, Applications of double and triple integral to find area and volumes.

UNIT-IV

Vector Calculus and its Applications

Scalar and vector fields, Differentiation of vectors, Velocity and acceleration, Vector differential operators: Del, Gradient, Divergence and curl and their physical interpretations, Formulae involving del applied to point function and their products, Line, surface and volume integrals, Solenoidal and irrotational vectors, Gauss divergence theorem, Green's theorem in plane, Stoke's theorem (without proofs) and their applications.

Recommended Books :

1. G.B. Thomes, R.L. Finney, 'Calculus and Analytic Geometry', 9th Edn., Pearsons Education, **1995**.
2. E. Kreyszig, 'Advanced Engineering Mathematics', 9th Edn., John Wiley, **2006**.
3. Peter V.O. Nil, 'Advanced Engineering Mathematics', Wordsworth Publishing Company.
4. R.K. Jain and S.R.K. Iyengar, 'Advanced Engineering Mathematics', 4th Edn., Narosa.
5. B.S. Grewal, 'Higher Engineering Mathematics', 40th Edn., Khanna Publishers, New Delhi, **2007**.
6. H.C. Taneja, 'Engineering Mathematics', Volume-I, II, 2nd Edn., I.K. Publisher, **2010**.
7. Babu Ram, 'Advanced Engineering Mathematics', Peaeson Education, **2009**.
8. J.S. Bindra, 'Applied Mathematics', Volume-I, 9th Edn., Kataria Publications, **2009**.

ASSIGNMENT-1

Q(1)(i) if $u = x^2 + y^2 + z^2$ prove that $xu_x + yu_y + zu_z = 2u$

(ii) if $z = \log(x^2 + yx + x^2)$ prove that $x \frac{z}{jx} + y \frac{z}{jy} = 2$

Q(2) if $u = \sin^{-1} \frac{x}{y} + \tan^{-1} \frac{x}{y}$ prove that $x \frac{ju}{jx} + y \frac{ju}{jy} = 0$

Q(3) if $u = f(r, s, t)$ and $r = \frac{x}{y}$ $s = \frac{y}{z}$ $t = \frac{z}{x}$ prove that $x \frac{ju}{jx} + y \frac{ju}{jy} + \frac{ju}{jz} = 0$

Q(4) if $u = xf\left(\frac{y}{x}\right)$ show that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$ and $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial u}{\partial x \partial y} + y^2 = 0$

Q(5)(i) Find $\frac{du}{dt}$ when $u = x^2 + y^2$ and $x = at^2, y = 2at$

(ii) if $u = \sin \frac{x}{y}$, and $x = e^t, y = t^2$

Q(6) If $u = \tan^{-1} \frac{xy}{\sqrt{1+x^2+y^2}}$ show that $\frac{\partial^2 u}{\partial x \partial y} = (1+x^2+y^2)^{-\frac{3}{2}}$

Q(7) State and prove Eulers Theorem

Q(8) If $u = \frac{yz}{x}$, $v = \frac{zx}{y}$, $w = \frac{xy}{z}$ the show that $\frac{\partial(u,v,w)}{\partial(x,y,z)} = 4$

Q(9) If $x^2 + y^2 + u^2 - v^2 = 0$ and $uv + xy = 0$ then prove that $\frac{\partial(u,v)}{\partial(x,y)} = \frac{x^2 - y^2}{u^2 + v^2}$

Q(10) if $x^y = y^x$ then show that $\frac{dy}{dx} = \frac{y(y-x \log y)}{x(x-y \log x)}$ using partial derivative method

ASSIGNMENT-2

Q(1)

- Define irrotational vector.
- Define Solenoidal vector.
- State Gauss divergence theorem.
- State Greens theorem.
- State Stokes theorem.
- Prove that $r^n \cdot \vec{r}$ is irrotational vector
- If $V = \frac{\vec{r}}{r^3}$ then prove that \vec{r} is solenoidal
- Prove that $\nabla^2 f(x) = f''(r) + \frac{2}{r} f'(r)$
- Prove that $\nabla^2 (r^n) = n(n+1)r^{n-1}$
- If $\vec{f}(t) = 5t^2 - 3t \vec{i} + (6t^3)\vec{j} - 7\vec{k}$ then evaluate $\int_{t=2}^{t=4} \vec{f}(t) dt$

Q(2) Prove that $\Delta e^{r^2} = 2e^{r^2} \cdot \vec{r}$

Q(3) find the equation of tangent plane to the surface $2xz^2 - 3xy - 4x = 7$ at the point (1,-1,2)
Also find the equation of normal.

Q(4) (i) Prove $\text{curl} \left(\vec{A} + \vec{B} \right) = \text{curl} \left(\vec{A} \right) + \text{curl} \left(\vec{B} \right)$

(ii) $\text{curl} \left(\vec{A} \otimes \vec{\phi} \right) = (\nabla \cdot \vec{\phi}) * \vec{A} + \vec{\phi} (\nabla * \vec{A})$

Q(5) apply greens theorem to prove that the area enclosed by the plane curve is $\frac{1}{2} \int x dy - y dx$

Evaluate $\iint (12xy \mathbf{i} + yz^2 \mathbf{j} + xz \mathbf{k}) ds$

ASSIGNMENT-3

1. Show that the length of the arc of the parabola $y^2=4ax$ cut off by the line $3y=8x$ is $a(\log 2 + \frac{1}{2})$.
2. (a) Find the whole length of the cardioids $r = a(1-\cos\theta)$.
(b) Find the perimeter of the cardioids $r = a(1+\cos\theta)$.
3. Find the area bounded by the parabola $y^2 = 4x$ and its latus rectum.
4. Find the volume generated by revolving the first quadrant area bounded by the parabola $y^2 = 8x$ and its latus rectum about x-axis.
5. Find the volume of solid of revolution of curve $y = x^2$, $y = 4x-x^2$ about x-axis.
6. Find the area of surface of revolution generated by revolving about x-axis the arc of the parabola $y^2 = 12x$ from $x = 0$ to $x = 3$.
7. Find moment of inertia of a thin uniform rod of length $2a$ about
 - (a) a line through its one extremity perpendicular to the rod
 - (b) the line through mid-point and perpendicular to the rod.
8. Find moment of inertia of rectangular area A of dimensions a and b w.r.t. a side.
9. Find the whole length of the arc of the cardioids $r = a(1+\cos\theta)$. Also show that the arc of the upper half is bisected by $\theta = \frac{\pi}{3}$.
10. Find the length of loop of the curve $9ay^2 = x(x-3a)^2$.

TUTORIAL-1

1. Prove that $\nabla \times (\phi \mathbf{f}) = \nabla \phi \times \mathbf{f} + \phi \nabla \times \mathbf{f}$.

2. Evaluate $\nabla^2 (\nabla \cdot ())$.
3. Find curl f at the point $(1,2,3)$ given $F = \text{grad} (x^3y + y^3z + z^3x - x^2y^2z^2)$.
4. State and prove Gauss Divergence Theorem.
5. Verify Green theorem for $(x^2 + y^2) dx + x^2 dy$, where c is bounded by $y = x$ and $y = x^2$.
6. State and prove stoke's theorem.

TUTORIAL-2

1. If $u = \cos(\theta)$, prove that $x + y + z = 0$.
2. Find the minimum value of $x^2 + y^2 + z^2$ given that $xyz = a^3$.
3. Evaluate $\int_C y^3 dx + x^3 dy + z dz$, where c is trace of the cone $z = \sqrt{x^2 + y^2}$ intersected by the plane $z = 4$ and S is the surface of the cone below $z = 4$.
4. Find the whole length of the arc of the cardioid $r = a(1 + \cos\theta)$. Also show that the arc of the upper half is bisected by $\theta = \frac{\pi}{2}$.
5. Find the equation of the tangent and normal to the surface $x^3 + y^3 + 3xyz = 3$ at $(1,2,-1)$.
6. Find the directional derivative of $f(x,y,z) = xy^2 + yz^3$ at $(2,-1,1)$ in the direction of normal to the surface $x \log z - y^2 = -4$ at $(-1,2,1)$.
7. Use Taylor's theorem to expand $x^2 y + 3y - 2$ in powers of $(x-1)$ and $(y+2)$.
8. Find the rectangular asymptotes of the curve $(x-1)^2(x-2)y = x$.
9. Use Green's Theorem in plane to evaluate $\int_C (x^2 + y^2) dx + (x^2 - y^2) dy$, where c is the boundary in XY-plane of the area enclosed by x-axis and the semi-circle $x^2 + y^2 = 1$ in the upper half XY-plane.

QUESTION BANK

1. State Gauss' Divergence theorem.
2. State Green's theorem in a plane.
3. State Stokes' theorem.
4. What is a rectangular asymptote.
5. What is Node.
6. What is Cusp.
7. What is Conjugate point.
8. Find the asymptotes parallel to coordinate axes of the curve $xy + 2y - 3x + 1 = 0$.
9. Find the rectangular asymptotes of the curve $x^2y + 6xy - x^2 + 2x + 9y + 3 = 0$.
10. Trace the curve $y^2(x^2 + y^2) = a^2(y^2 - x^2)$.
11. What is Curvature of circle.
12. Find radius of curvature $s = c \log \sec\theta$.
13. Find the point of maximum curvature of $y = \dots$.
14. Drive radius of curvature of polar curves.
15. What is rectification.
16. Find length of an arc of the curve $y = \log \sec\theta$ from $\theta = 0$ to $\theta = \dots$.
17. Find the perimeter of the cardioid $r = a(1 + \cos\theta)$.
18. Find area bounded by the lines $y = x$, $x = -1$ and $x = 1$.
19. Find area enclosed by lemniscate $r^2 = 4\cos 2\theta$.
20. What is Prolate Spheroid.
21. What is Oblate Spheroid.
22. Find the volume generated by revolving the first quadrant area bounded by the parabola $y^2 = 8x$ and its latus rectum about x-axis.

23. The cardioid $r = a(1 + \cos\theta)$ revolves about the initial line. Find the volume of the solid generated.
24. What is Centre of gravity.
25. Find C.G. of the arc of the cycloid $x = a(t + \sin t)$, $y = a(1 - \cos t)$ in the first quadrant.
26. What is moment of inertia.
27. Find moment of inertia of a rectangular area A of dimensions a and b w.r.t. a side.
28. What is limit of function of two variables.
29. Find the first order partial derivatives of the $z = \sin(x^2y^2)$.
30. State and prove Euler's theorem on homogenous function of two variables.
31. State Taylor's theorem.
32. If $z = xy^2 + x^2y$, $x = at^2$, $y = 2at$ find .
33. Find the extreme values of the function $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$.
34. Explain Lagrange's method of undetermined multipliers.
35. Discuss advantages and disadvantages of Lagrange's method.
36. Define right circular cone.
37. Find the equation of the cone whose vertex is at origin and which passes through the curve :
- $$x^2 + y^2 - 4z y + z = 2.$$
38. Define central conic.
39. Find the area of the region bounded by lines $x = -2$, $x = 2$ and the circle $x^2 + y^2 = 9$.
40. Define scalar and vector point function.

(Subject Code: BMEE0-101)

FACULTY NAME: Mr. Chander Kant

(Assist. Professor)

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-I

1. Basic Concepts of Thermodynamics and various laws

Thermodynamic System, Boundary and Surroundings, Thermodynamic System types, basic definitions, reversible and irreversible process, Temperature, pressure, heat, work, internal energy, enthalpy and specific heat, Zeroth law of Thermodynamics, first law of Thermodynamics, its corollaries and applications on various cyclic processes (constant volume, constant pressure, constant temperature, adiabatic and polytropic, Free Expansion Process), Steady State energy flow process and its engineering applications Second Law of Thermodynamics, its corollaries and applications. Heat Engine, Heat Pump and Refrigerator, Clausius Inequality, concept and philosophy of entropy, entropy changes during various Processes, third law of thermodynamics

2. Basics of Automobiles:

IC engines and its classification, petrol and diesel engines, two and four stroke engines, basic components of IC engines, BHP, IHP, FHP, Mechanical efficiency, gears and its types, power transmission in automobiles, basic function of clutch, brake, differential, axle, tyres.

UNIT-II

3. Fluids and Fluid Mechanics:

Fluids, types of fluids, properties of Fluids, Pascal law, Archimedes law, buoyancy and buoyant force, Continuity equation and Bernoulli's equation

4. Laws of forces:

Two dimensional force system, basic concepts, rigid body, free body diagram, resolution of forces into components, triangle law of forces, parallelogram law of forces, polygon law of forces, Lami's equation. Varignon's theorem, Application,

UNIT-III

5. Friction: Introduction Laws of Coulomb's friction, equilibrium of bodies involving dry friction, Applications.

UNIT-IV

6. Centroid, Centre of Gravity and Moment of Inertia :

Difference between Centre of gravity and centroid. determination of position of centroid of plane geometric figures of I, T, Circular and Triangular Sections. Determination of position of Centre of Gravity (CG) of simple solid figures. Parallel axis theorem, Perpendicular axes Theorem, Radius of gyration, determination of area Moment of Inertia of I, T, Circular and Triangular Sections.

Recommended Books:

1. A. Yunus Cengel and Mishal A. Boles, 'Thermodynamics & Engineering Approach', 4th Edn., Tata Mc Graw Hill, 2011.
2. G.S. Sawhney, 'Fundamentals of Mechanical Engg.: Thermodynamics, Mechanics, Theory of Machines, Strength of Materials and Fluid Dynamics', 3rd Edn., PHI, 2013.
3. P.N. Chandramouli, 'Engineering Mechanics', PHI, 2013.
4. K.U. Siddiqui, 'A Text Book of Automobile Engineering', 1st Edn., New Age, 2011.
5. K.L. Kumar, 'Engineering Fluid Mechanics', S. Chand, 2015.
6. R.K. Rajput, 'A text Book of Fluid Mechanics', S. Chand, 2013

ASSIGNMENT NO. 1

1. What is the difference between the classical and the statistical approaches to thermodynamics?
2. Why does a bicyclist pick up speed on a downhill road even when he is not pedaling? Does this violate the conservation of energy principle?
3. An office worker claims that a cup of cold coffee on his table warmed up to 80°C by picking up energy from the surrounding air, which is at 25°C . Is there any truth to his claim? Does this process violate any thermodynamic laws.
4. A can of soft drink at room temperature is put into the refrigerator so that it will cool. Would you model the can of soft drink as a closed system or as an open system? Explain.
5. What is the difference between intensive and extensive properties?
6. For a system to be in thermodynamic equilibrium, do the temperature and the pressure have to be the same everywhere?
7. What is a quasi-equilibrium process? What is its importance in engineering?
8. Define the isothermal, isobaric, and isochoric processes.
9. Consider an alcohol and a mercury thermometer that read exactly 0°C at the ice point and 100°C at the steam point. The distance between the two points is divided into 100 equal parts in both thermometers. Do you think these thermometers will give exactly the same reading at a temperature of, say, 60°C ? Explain.
10. Establish a relation between Kelvin, Celsius and Fahrenheit scale.

ASSIGNMENT NO. 2

1. Consider a system whose temperature is 18°C . Express this temperature in R, K, and $^{\circ}\text{F}$
2. The temperature of a system rises by 15°C during a heating process. Express this rise in temperature in Kelvin's.
3. In what forms can energy cross the boundaries of a closed system?
4. When is the energy crossing the boundaries of a closed system heat and when is it work?
5. What is an adiabatic process? What is an adiabatic system?
6. A gas in a piston–cylinder device is compressed, and as a result its temperature rises. Is this a heat or work interaction?
7. A room is heated by an iron that is left plugged in. Is this a heat or work interaction? Take the entire room, including the iron, as the system. A room is heated as a result of solar radiation coming in through the windows. Is this a heat or work interaction for the room?
8. An insulated room is heated by burning candles. Is this a heat or work interaction? Take the entire room, including the candles, as the system.
9. What are point and path functions? Give some examples.
10. On a hot summer day, a student turns his fan on when he leaves his room in the morning. When he returns in the evening, will the room be warmer or cooler than the neighboring rooms? Why? Assume all the doors and windows are kept closed.

ASSIGNMENT NO. 3

1. Describe an imaginary process that satisfies the second law but violates the first law of thermodynamics
2. What is a thermal energy reservoir? Give some examples.
3. Is it possible for a heat engine to operate without rejecting any waste heat to a low-temperature reservoir? Explain.
4. Is it possible for a heat engine to operate without rejecting any waste heat to a low-temperature reservoir? Explain.
5. In the absence of any friction and other irreversibilities, can a heat engine have an efficiency of 100 percent? Explain.
6. What is the difference between a refrigerator and a heat pump?
7. In a refrigerator, heat is transferred from a lower temperature medium (the refrigerated space) to a higher temperature one (the kitchen air). Is this a violation of the second law of thermodynamics? Explain
8. Why are engineers interested in reversible processes even though they can never be achieved?
9. Why does a nonquasi-equilibrium compression process require a larger work input than the corresponding quasi-equilibrium one? Somebody claims to have developed a new reversible heat-engine cycle that has the same theoretical efficiency as the Carnot cycle operating between the same temperature limits. Is this a reasonable claim
10. Show that the enthalpy of a fluid before throttling is equal to that after throttling.

TUTORIAL -1

- Determine the atmospheric pressure at a location where the barometric reading is 750 mm Hg. Take the density of mercury to be $13,600 \text{ kg/m}^3$
- A pump forces $1.5 \text{ m}^3/\text{min}$ of water horizontally from an open well to a closed tank where the pressure is 0.9 MPa. Calculate the work the pump must do upon the water in an hour just to force water into the tank against the pressure.
- A gas turbine receives gases from the combustion chamber at 7 bar and 650°C with a velocity of 90 m/s . The gases leave the turbine at 1 bar with a velocity of 45 m/s . Calculate the work done if the expansion is isentropic. Assume $\gamma = 1.333$ and $C_p = 1.11 \text{ kJ/kg}$.
- Air at 1.02 bar, 22°C , initially occupying a volume of 0.015 m^3 is compressed reversibly and adiabatically by a piston to a pressure of 6.8 bar. Take $\gamma = 1.4$ for air. Plot process on P-V diagram.
Calculate 1. final temperature 2. final volume. 3. work done on the mass of air. Indicate the direction of work done.
- 1 kg of air having an initial volume of 0.3 m^3 is heated at constant pressure of 3.2 bar until the volume is doubled. Find

- heat added and
- work done.

Take $C_p = 1.005 \text{ kJ/Kg} \cdot \text{K}$, $C_v = 0.718 \text{ kJ/kg} \cdot \text{K}$.

- 4 kg of air is compressed in a reversible steady flow polytropic process, $pV^{1.25} = C$, from 1 bar and 30°C to 10 bar. Calculate the work input, heat transferred and change in entropy.
- A mass of gas is compressed without friction from a state of 0.3 m^3 and 0.105 MPa to a final state of 0.15 m^3 and 0.105 MPa , there is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change?
- A mass of 1.5 kg of air is compressed in a quasi-static process from 1.1 bar to 10 bar according to the law $pV^{1.25} = \text{Constant}$. The initial density of air is 1.2 kg/m^3 . Find the work involved in the compression process
- Steam enters a nozzle at a pressure of 7 bar and 205°C (*i.e.* initial enthalpy 2850 kJ/kg) leaves at a pressure of 1.5 bar. The initial velocity of steam at the entrance is 40 m/s and exit velocity from the nozzle is 700 m/s . The mass flow rate through the nozzle is 1400 kg/hr . The heat loss from the nozzle is 11705 kJ/hr . Determine the final enthalpy of steam and the nozzle exit area, if the specific volume is $1.24 \text{ m}^3/\text{kg}$
- A diesel engine takes in air at 1 bar and 27°C . The compression and expansion ratios are 18 and 6 respectively. Estimate the quantity of heat energy added, rejected and the efficiency of the cycle. Take $\gamma = 1.4$, $c_p = 1.005 \text{ kJ/kg} \cdot \text{K}$, and $c_v = 0.717 \text{ kJ/kg} \cdot \text{K}$.

TUTORIAL-2

- In an air standard Otto cycle, the compression ratio is 7 and the compression begins at 35°C and 0.1 MPa . The maximum temperature of the cycle is 1100°C . Find (a) the temperature and the pressure at various points in the cycle, (b) the heat supplied per kg of air, (c) work done per kg of air, (d) the cycle efficiency and (e) the MEP of the cycle.
- An ideal Otto cycle has a compression ratio of 8. At the beginning of the compression process, air is at 100 kPa and 17°C , and 800 kJ/kg of heat is transferred to air during the constant-volume heat-addition process. Accounting for the variation of specific heats of air with temperature, determine
 - (a) the maximum temperature and pressure that occur during the cycle,
 - (b) the net work output,
 - (c) the thermal efficiency, and
 - (d) the mean effective pressure for the cycle
- An ideal Diesel cycle with air as the working fluid has a compression ratio of 18 and a cut-off ratio of 2. At the beginning of the compression process, the working fluid is at 14.7 Pa , 80°F , and 117 in^3 . Utilizing the cold-air standard assumptions, determine
 - (a) the temperature and pressure of air at the end of each process

- (b) the net work output and the thermal efficiency, and
(c) the mean effective pressure
- A Carnot heat engine operates between a source at 1000 K and a sink at 300 K. If the heat engine is supplied with heat at a rate of 800 kJ/min, determine
 - the thermal efficiency and(b) the power output of this heat engine.
 - Carnot heat engine receives 650 kJ of heat from a source of unknown temperature and rejects 250 kJ of it to a sink at 24°C.
Determine
 - (a) the temperature of the source and
 - (b) the thermal efficiency of the heat engine.
 - A heat engine operates between a source at 550°C and a sink at 25°C. If heat is supplied to the heat engine at a steady rate of 1200 kJ/min, determine the maximum power output of this heat engine.

QUESTION BANK

1. What do you understand by thermodynamic equilibrium?
2. What is first law of thermodynamics?
3. Distinguish between non-flow and flow processes.
4. State the Classius statement of second law of thermodynamics.
5. What is Classius inequality?
6. Draw p - v and T - S diagram for the otto cycle.
7. What is a quasi-static process?
8. Define internal energy.
9. Give the representation of throttling process on P-V chart.
10. What is a cyclic heat engine?
11. Give the Kelvin-Plank statement of the second law.
12. Define the COP of a refrigerator.
13. What is an air standard cycle?
14. State the four processes of the Otto cycle.
15. Explain, the difference between temperature, heat and internal energy.
16. State the basic assumptions of steady flow energy equation.
17. Why does the enthalpy of an ideal gas depends upon temperature only?
18. State Carnot theorem for an engine and a refrigerator.
19. How the Second law of thermodynamics overcomes the limitation of First law?
20. What is function of crank shaft and flywheel in an IC engine?
21. What is air standard efficiency? Write its expression for diesel cycle.
22. Define centre of gravity and centroid.

23. discuss basic concepts of rigid body and free body diagram
24. discuss the method of resolution of forces in to components
25. explain vector law of addition addition . considering force as a vector quantity discuss in detail triangle law , pallelogram law and ploygon law of forces
26. discuss lames equation and varignons theorem with application
27. explain laws of coulomb friction
28. Discuss the equilibrium of bodies involving dry friction with application. explain with example.
29. What do you understand by thermodynamic equilibrium?
30. What is firrst law of thermodynamics?
31. Distinguish between non-fow and fow processes.
32. State the Classius statement of second law of thermodynamics.
33. What is Classius inequality?
34. Draw p-v and T-S diagram for the otto cycle.
35. Defne mechanical advantages and velocity ratio.
36. Diferentiate between mechanim and machines.
37. What is thermal stress?
38. What is meant by hardness of a material?
39. Explain, the diference between temperature, heat and internal energy.
40. State the basic assumptions of steady fow energy equation.
41. Why does the enthalpy of an ideal gas depends upon temperature only?
42. State Carnot theorem for an engine and a refrigerator.
43. How the Second law of thermodynamics overcomes the limitation of First law?
44. What is function of crank shaft and flywheel in an IC engine?
45. What is air standard efficiency? Write its expression for diesel cycle.
46. What is mild steel? How is it different from cast iron and wrought iron?
47. How does stainless steel become stainless?
48. Dene centre of gravity and centroid.
49. What is a quasi-static process?
50. Give the representation of throttling process on P-V chart.

BASICS OF ELECTRONICS ENGINEERING

(Subject Code: BECE0-101)



FACULTY NAME: Er. Aseem

(Assist. Professor(ECE))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-I

1. Diodes (3 Hrs.)

PN Junction diode, LED, Photodiode, Zener diode, Avalanche & Zener phenomenon.

2. Diode Applications (4 Hrs.)

Rectification: Half Wave & Full Wave, Bridge vs Centre Tapped Rectifiers; Switching: ideal vs Practical; Regulation, Power supply design

UNIT-II

3. Transistors

Bipolar Junction Transistors: NPN, PNP types; Terminology: Biasing, Q-Point; JFET

4. Transistor Applications

Common Emitter, Common Base, Common Collector configurations; Transistor as Amplifier and Switch.

UNIT-III

5. Digital Electronics Fundamentals

Analog vs Digital Signals, Digital Signal Representations with Binary and Timing diagrams, Multi-input Basic and Composite Gates working with symbolic representation, Universal Gates, ICs, Performance Characteristics terminology, Boolean Expression simplification with K-maps upto 4-variables

UNIT-IV

6. Transducers

Measurements, Measurement system with blocks, Transducers & their nomenclature; Static Performance Characteristics-Qualitative & Quantitative description; Representation of Working Principal on fully labelled graphs and Applications of LVDT, RTD, Thermistors, Strain Gauges.

Recommended Books:

1. Robert Boylestad and Louis Nashelsky, 'Electronic Devices and Circuits', Prentice Hall of India 10th Edn., 2009.
2. R.P. Jain, 'Modern Digital Electronics', Tata McGraw Hill, 2003.
3. Bhargava, Kulshreshtha, Gupta, 'Basic Electronics and Linear Circuits' TTTI Chandigarh, TMH, 1984.
4. M.S. Sukhija and T.K. Nagsarkar, 'Basic of Electrical and Electronics Engineering' Oxford University Press, 2012,

ASSIGNMENT-1

- Q1. DIFFERENTIATE BETWEEN INSULATORS SEMICONDUCTORS & CONDUCTORS.
- Q2. DEFINE FABRICATION PROCESS OF PN JUNCTION?

- Q3. WHAT IS DOPING? EXPLAIN P & N TYPE SEMICONDUCTORS.
- Q4. EXPLAIN FORWARD BIASING & REVERSE BIASING? DEFINE POTENTIAL BARRIER & DEPLETION REGION?
- Q5. WHY IS A TWO-INPUT NAND GATE CALLED UNIVERSAL GATE?
- Q6. WHAT IS BOOLEAN ALGEBRA? ALSO EXPLAIN WHY IS AN EXCESS-3 CALLED AN UN-WEIGHTED CODE?

ASSINGMENT-2

- Q1. EXPLAIN WORKING OF PHOTO DIODE WITH ITS APPLICATIONS?
- Q2. DEFINE LED? WHY SILICON IS NOT USED IN CONSTRUCTION OF LED?
- Q3. WHAT IS VOLTAGE REGULATION? HOW ZENER DIODE IS USED AS VOLTAGE REGULATOR?
- Q4. EXPLAIN ALL THE APPLICATIONS OF LED, HOW IT IS BETTER FROM OLD TECHNOLOGIES?
- Q5. HOW TRANSISTOR ACT AS AMPLIFIER?
- Q6. DRAW COMMON BASE CHARACTERISTICS OF BJT?

ASSINGMENT-3

- Q1. DRAW THE BLOCK DIAGRAM OF REGULATED EXPLAIN EACH BLOCK?
- Q2. EXPLAIN HALF WAVE RECTIFIER WITH ANALYSIS?
- Q3. COMPARISON BETWEEN HALF & FULL WAVE RECTIFIER ?
- Q4. HOW FULL WAVE RECTIFIER WORKS ALSO FIND THE EXPRESSION FOR EFFICIENCY?
- Q5. WHY IS AN EXCESS-3 CODE CALLED AN UN-WEIGHTED CODE?

Q6. DIFFERENTIATE BETWEEN BJT & FET ?

TUTORIAL-1

Problem 1. This is a Regulated DC Power Supply design problem. The students must choose the values of the following parameters for the design:

- a) $V_{\text{Out}} = 6.0 \text{ V}$ or 10.0 V or 12.0 V
- b) $R_L = ??$ and $R_1 = ??$?
- c) Wattage ratings of R_1 and R_L to be determined
- d) $I_L = 20 \text{ mA}$; $I_{ZD} = 20 \text{ mA}$; $I_{R1} = ?? \text{ mA}$
- e) Voltage $V_{A_DC} = V_B + 3 \text{ V}$
- f) Turns ratio, $n = ??$

Problem 2.

A full-wave, 4-diode bridge rectifier circuit with a $1\text{k}\Omega$ load operates from a 120-V (rms) 60-Hz household supply through a 10-to-1 stepdown transformer. It uses silicon diodes that one can model to have a 0.7-V drop for any current. (a) What is the peak voltage of the rectified output? (3 points)(b) For what fraction of the time does the diode conduct?(5points)

Problem 3.

An engineer designs a power supply that consists of a transformer, a full-wave, 4-diode bridge rectifier and a smoothing capacitor. She designed the supply to operate in the U.S. where the power line (mains) frequency and voltage is 60 Hz and 120 V respectively. The ripple voltage at full load is 20 mV. Estimate the ripple voltage when the unmodified supply is used in regions of Japan where the corresponding values are 50 Hz and 100 V respectively. Assume that the equivalent load resistance stays the same. (5 points)

TUTORIAL-2

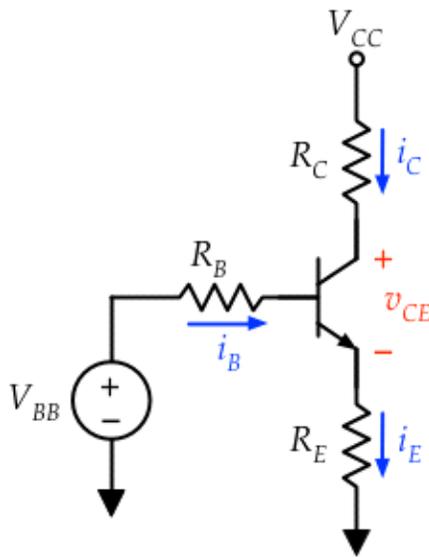
Ques 1) In a certain transistor, collector current is 0.98 mA and base current is 20mA. Determine the value of 1. Emitter current, 2. Current amplification factor 3. Current gain factor

Ques 2) Determine the values of emitter current and collector current of the transistor having $\alpha=0.98$ and collector to base leakage current $I_{CB0} = 4\mu\text{A}$. the base current is $50 \mu\text{A}$.

Ques 3) The BJT has $I_B = 10 \mu\text{A}$, $\beta = 99$ and $I_{C0} = 1 \mu\text{A}$. what is collector current I_C ?

or the BJT circuit shown below, find i_C , i_B , i_E , and v_{CE} .

Ques 4) In the circuit, $V_{CC} = 19 \text{ V}$, $V_{BB} = 4.5 \text{ V}$, $R_B = 175 \text{ k}\Omega$, $R_E = 3 \text{ k}\Omega$, $R_C = 6 \text{ k}\Omega$, and $\beta_F = 100$.



QUESTION BANK

1. Passive components.
2. Constant current source.
3. Atomic structure.

4. Intrinsic semiconductor.
5. Doping.
6. PN junction.
7. Junction capacitance.
8. Half wave rectifier.
9. Filter circuit.
10. Rectifier efficiency.
11. Varactor diode.
12. PNP transistor.
13. Transistor biasing.
14. h- parameters.
15. DC load line.
16. Decibel gain.
17. Multistage amplifier.
18. FET.
19. What are different types of electronic components?
20. Explain the graphic representation of current and voltage sources.
21. Explain the effect of temperature on intrinsic and extrinsic semiconductors.
22. Explain Silicon vs. Germanium for mobility and conductivity.
23. What is the concept of junction capacitance in forward biased conditions in diode?
24. Explain half wave rectifier using diodes.
25. Explain the working characteristics photo diode.
26. Draw input/output characteristics of common emitter (CE) transistor configuration.
27. What is the effect of temperature on the operating point of a transistor?
28. What is need of transistor biasing?

29. Explain the phase reversal in single stage transistor amplifier.
30. Write calculation of voltage gain using AC equivalent circuit of single stage transistor amplifier.
31. What are applications of multi stage amplifier?
32. What are applications of transformer coupled amplifier?
33. Comparison between JFET and MOSFET
34. What is a filter circuit? What are different types of filter circuit? Explain them.
35. Draw and explain input/output characteristics of common base (CB) transistor configurations.
36. What are different types of transistor biasing circuit? Explain them.
37. Draw and explain working of direct coupled amplifier.
38. Explain construction and operation of a p- channel JFET.
39. What is a dc power supply?
40. What is a rectifier?
41. What is PIV of a diode in a rectifier circuit?
42. Why diodes are not operated in the breakdown region in rectifiers?
43. What is meant by filter?
44. Why capacitor input filter is preferred to choke input filter?
45. What is a cathode ray oscilloscope (CRO)?
46. How is CRO superior to ordinary measuring instruments?
47. What is meant by the temperature coefficient?
48. What happens to the series current, load current and zener current when the dc input voltage of a zener regulator increases?
49. Photodiode is a photovoltaic device or a photoconductive device or both?
50. What is meant by radix (or base) of a number system?

BASICS OF COMPUTER PROGRAMMING

(Subject Code: BCSE0-101)

FACULTY NAME: Ms. Nitika Gupta

(Assistant Professor (MCA))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-I

1. Introduction to Problem Solving and Programming Languages

Problem Solving Aspects, Program Development Steps, Introduction to Programming Languages, Types and Categories of Programming Languages, Program Development Environments

2. Logic development and Algorithms

Types of Problem: Data Centric and Process Centric, Problem Solving Strategies, Problem Analysis, formal definition of problem, Top- Down design and Bottom –Up design, Algorithms, Flow charts, Flow chart symbols, Pseudo codes, illustrative examples

UNIT-II

3. Introduction to C Programming Language

Introduction to C Language, Evolution and Characteristics of C Language, Compilation Model, Character Set, Keywords, Identifiers, Data Types, Variables, Constants, Operators, Expressions, Type conversion and Type Casting, Overview of Pre-processors, Structure of a C Program, Input and Output Statements

4. Control Statements

Basic Programming Constructs, Sequence, Selection Statements ‘if’ Statement, Conditional / Ternary /?: Operator, Switch Statement, Iteration Statements, ‘for’ statement, ‘while’ statement, ‘do - while’ statement, break, continue Statement

UNIT-III

5. Arrays and Strings

Need for an Array, Memory Organization of an Array, Declaration and Initialization, Basic Operation on Arrays, Multi-dimensional Array, Strings

6. Pointers

Introduction, Declaration and Initialization, Pointer Arithmetic, Pointers and Arrays, Dynamic Memory Allocation

UNIT-IV

7. Functions and Storage Classes

Need for Functions, Function Prototype, Function Definition, Function Call Passing Arguments, Functions and Arrays, Functions and Pointers, Command Line Arguments, Recursive Functions, String Functions, Automatic Storage Class, Register Storage Class, Static Storage Class, External Storage Class

8. Structures

Declaration and Initialization, Structures and Arrays, Structures and Pointers, Structures and Functions, Introduction to Unions, Enumeration, Typedef Statement

9. Files

Introduction, File Operations, Character I/O, String I/O, Numeric I/O, Formatted I/O, BlockI/O

Recommended Books

1. Yashwant P. Kanetkar, 'Let us C', BPB Publications.
2. Yashwant P. Kanetkar, 'Pointers in C', BPB Publications.
3. Jitender Chhabra, 'Programming with C', Schaum's Series.
4. Reema Thareja, 'Computer Fundamentals & Programming in C', Oxford.
5. Peter Norton, 'Computing Fundamentals', Tata McRaw Hill.

Reference Books

1. Cognizant, 'Problem Solving and C Programming',
2. R.S. Salaria, 'Problem Solving and Programming in C'.

ASSIGNMENT-1

Ques. 1) Explain the structure of C-Program in detail with the steps involved. Also create some example.

Ques. 2) What do you mean by data-type? Explain the various types of data-types available in C-language.

Ques. 3) Draw a table chart of the number of bytes consumed by the various data-types. Also mention the range used by them.

Ques. 4) Define the term operator. Also explain the various types of operators used in C with the help of program.

Ques.5) Define the term conditional operator? Also find the largest number among the two nos. using conditional operator.

Ques.6) WAP to find the smallest number among the three numbers using the logical operators.

Ques.7) What do you mean by the control statements? Explain the various selection statements with the help of a syntax and a program.

Ques.8) Differentiate between the pre/post increment /decrement operator with the help of a program.

ASSIGNMENT-2

Ques. (1) What are Iterations? Explain the various types of loops with the help of a program.

Ques. (2) Differentiate between the term break and continue statement with the help of a program.

Ques. (3) What do you mean by goto statement? Demonstrate it with the help of a programme.

Ques. (4) What do you mean by the term user defined function? Give the syntax of function declaration, function definition and function calling.

Ques. (5) Explain the third category of user defined function, when the function takes the argument and also return some value with the help of a program.

Ques. (6) Differentiate between the call-by-value and call-by-reference with the help of a program.

Ques. (7) Explain the recursion with the help of a program, by finding the factorial of a number.

Ques. (8) Explain all the three different forms of user-defined function with the help of a syntax.

ASSIGNMENT-3

Ques.1) Explain all the symbols used in Flow Chart.

Ques.2) Differentiate between the compiler and the interpreter.

Ques.3) WAP to find the sum & average of various numbers using linear array.

Ques. 4) WAP to find the Fibonacci series using recursion.

Ques. 5) WAP to find the sum of diagonal elements of matrix using non-linear array.

Ques. 6) WAP to compare the two strings without using string handling function.

Ques.7) WAP to find the vowels and consonants using strings.

Ques. 8) What are the various operations that can be implemented on a the file.

Ques.9) WAP to find out the product of two matrices with the order 3*3.

Ques.10) WAP to print some design pattern using userdefined function when the function takes no arguments and does not return any value.

TUTORIAL-1

Ques.1) Write a program that defines a structure book having members name, author and price and compares two variables of type book.

Ques.2) Explain malloc() function using an example.

Ques.3) What is the difference between a character 'A' & string "A

Ques.4) Explain strcmp function.

Ques.5) What is a preprocessor directive?

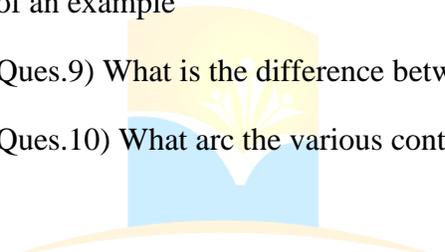
Ques.6) What is type casting?

Ques.7) Can we store integer values and floating point values in the same array? If yes, how? If not, why not?

Ques.8) Differentiate between user defined functions and library defined functions? with the help of an example

Ques.9) What is the difference between an algorithm and a flowchart?

Ques.10) What are the various control statements available in C.



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TUTORIAL-2

Ques.1) When should we use conditional operator (? :)

Ques.2) Define the term operator. Why a++ executes faster than a+1?

Ques.3) What conditions must be satisfied by all of the elements of any given array?

Ques.4) Is it essential for strings to be end with '\0'

Ques.5) What is enumeration?

Ques.6) Explain how 'while' statement is different from 'do while' statement.

Ques.7) Why is it essential to release & free a memory which is allocated using malloc function?

Ques.8) What is the role of return statement?

Ques.9) What is meant by the term void?

Ques.10) WAP to check the year is leap or not?

QUESTION BANK

Ques.1) In which year C-language is developed ?

Ques.2) List various features of C language.

Ques.3) What is a constant? How it is declared in C language?

Ques.4) Write a program in C language to find the factorial of a given number.

Ques.5) What is break statement? How it is different from continue statement?

Ques.6) What is function? List various categories of a function.

Ques.7) What is pointer? How it is declared and accesses in C language?

Ques.8) What is nested if statement? Explain with example.

Ques.9) What is file? What is its need?

Ques.10) What is header file? Discuss its use in C programming.

Ques.11) What is the significance of stdio.h?

Ques.12) Differentiate formatted and unformatted I/O functions.

Ques.13) Write the general structure of a C program.

Ques.14) What are jumping statements?

Ques.15) Differentiate between getch() and getche().

Ques.16) What is an array? How it is declared and initialized?

Ques.17) Differentiate between structure and union.

Ques.18) What are the logical operators in 'C' language?

- Ques.19) What are problem solving strategies in C? Discuss significance of each.
- Ques.20) Explain creating a data file also opening and closing a data file with example.
- Ques.21) What do you mean by scope of a variable? What are local and global variables? Give examples.
- Ques.22) What is a pointer? What are the different operations that can be performed on pointers?
- Ques.23) What is meant by data-type? What are the data types supported by 'C' language? Illustrate the importance of each.
- Ques.24) What are the different types of errors that occur in C-programming?
- Ques.25) What do you understand by programming paradigm? Name various programming paradigms.
- Ques.26) Differentiate between strlen() and size of() with suitable examples.
- Ques.27) Write any two advantages of pointers?
- Ques.28) What is type-def declaration? Give suitable example.
- Ques.29) What are the three constructs that govern statement flow?
- Ques.30) Write a program in C to traverse the elements of one dimensional array.
- Ques.31) Differentiate between pass by value and pass by reference with the help of example.
- Ques.32) Write a program to concatenate two strings.
- Ques.33) Explain the concept of passing array to functions.
- Ques.34) Write a program in C to bubble sort the numbers.
- Ques.35) Write a program using C to compute transpose of a matrix.
- Ques.36) What is the role of modulus operator in C? Does it work for floating point numbers?
- Ques.37) Differentiate between break and continue statement.
- Ques.38) What is significance of calloc function in C?
- Ques.39) What are different modes in which a file can be opened



Ques.40) Write short note on : (a) File handling (b) Pointer Arithmetic

Ques.41) Write a program to multiply two 2-D matrices.

Ques.42) Differentiate between structure and union.

Ques.43) Compare recursion with iteration. Also write a recursive program to find factorial of a number.

Ques.44) Discuss in detail with the help of examples differences between all the four storage classes

Ques.45) Differentiate between switch and if-else statement.

Ques.46) What are the differences between for, while & do while construct.

Ques.47) Write a program that accepts a string, reverses the string and prints it.

Ques.48) Write a program that finds the largest of three numbers using nested 'if' statement. Also give its flowchart .

Ques.49) Write a program that uses a recursive function to print fibonacci sequence. (Fibonacci sequence is 0, 1, 1, 2, 3, 5, 8 and so on)

Ques.50) What is the difference between a structure and a union.

APPLIED PHYSICS

(Subject Code: BPHY0-101)

FACULTY NAME: Mr. Love Kumar

(Assistant Professor (Applied Sciences))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-I

1. EM waves & Dielectrics

Introduction and physical significance of Gradient, Divergence & Curl, Dielectric polarization (qualitative only), Types of polarization, Displacement Current Maxwell's Equations, Equation of EM waves in free space, velocity of EM waves, Poynting Theorem, Electromagnetic Spectrum (Basic ideas of different region).

2. Quantum Theory

Need and origin of Quantum Concept, Wave-particle duality, Matter waves, Group & Phase velocities, Concept of Uncertainty Principle, wave function & its Significance, normalization of wave function, Schrodinger wave equation: time independent and dependent, Eigen functions & Eigen values, particle in a box in 1-D.

UNIT-II

3. Elements of crystallography

Unit cell, Basis, Space lattice, Crystal Systems, Miller Indices of Planes & Directions in cubic system, Continuous & Characteristic X-Rays, X-Ray Diffraction & Bragg's law in Crystals, Bragg's spectrometer, X-ray radiography.

4. Magnetic Materials & Superconductivity

Basic ideas of Dia, Para, Ferro & Ferri, Ferrites, Magnetic Anisotropy, Magnetostriction its applications in production of Ultrasonic waves, Superconductivity, Superconductors as ideal diamagnetic materials, Signatures of Superconducting state, Meissner Effect, Type I & Type II superconductors, Introduction to BCS theory, Application of superconductivity.

UNIT-III

5. Lasers

Spontaneous & Stimulated emissions, Population Inversion, Pumping Mechanisms, Einstein's Coefficients, Components of a laser System, Three and four level laser systems; Ruby, He-Ne, CO₂ and semiconductor Lasers, Introduction to Holography.

6. Fibre Optics

Introduction, Acceptance Angle, Numerical Aperture, Normalized frequency, Modes of propagation, material dispersion & pulse broadening in optical fibres, fibre connectors, splices and couplers, applications of optical fibres.

UNIT-IV

7. Special Theory of Relativity

Concept of Ether, Michelson Morley Experiment, Einstein's postulates, Lorentz transformation equations; length, time and simultaneity in relativity, addition of velocity, variation of mass with velocity (concept only), Mass-Energy and Energy-momentum relations.

8. Nanophysics

Nanoscale, surface to volume ratio, electron confinement, nanoparticles (1D, 2D, 3D), Nanomaterials, Unusual properties of nanomaterials, synthesis of nanomaterials- ball milling and sol-gel techniques, Carbon nanotubes (synthesis and properties), applications of nanomaterials.

Recommended Books :

1. Serway and Jewett, 'Physics of Scientists and Engineers', Vol.1, 2, 6th Edn, Cengage

ASSIGNMENT-1

1. A step index fibre has numerical aperture of 0.17, core diameter of 100 micrometer. Determine the normalized frequency parameter of fibre when light of wavelength 0.85 micrometer is transmitted through it. Also find the Number of guided modes propagating in fibre.
2. Describe the role Helium gas in CO₂ laser.
3. Explain the three level pumping scheme.
4. Write characteristics of Laser beam.
5. What are components of Laser devise. Write a short note.
6. (a) Explain different types of optical fiber cables?
(b) Define terms V-parameter and Number of modes in optical fiber communication.
7. Explain Population inversion. How it is achieved?
8. What is Dispersion in optical fiber communication? Explain the different modes of dispersion?
9. Explain principle, construction and working of CO₂ laser with energy level diagram.
10. What are three electric vectors? How are these related?

ASSIGNMENT-2

1. Explain the Type 1 and type 2 superconductivity.
2. Explain Duane-hunt law and Mosley's law.
3. Explain BCS theory of superconductivity.
4. What are ferrites? Mention their applications?
5. Explain the Domain theory of ferroelectric materials.
6. Define the terms
 - (a) Magnetic Anisotropy
 - (b) Magnetostriction
 - (c) Magnetic effect in superconductivity
 - (d) Silsbee's Rule
 - (e) Persistent current
7. Give the theoretical justification for continuous and characteristic spectrum of X-rays.
8. Explain working of Magnetostriction oscillator.
9. Define magnetic susceptibility, relative magnetic permeability, and establish relation between them?
10. Show equation of continuity is contained in Maxwell equation?

ASSIGNMENT-3

1. What is meant by scalar field and vector field?
2. What do you mean by gradient, divergence, curl, and their physical significance?
3. State and prove Gauss divergence theorem?
4. Derive continuity equation? Give its physical significance?
5. Derive relation among three $D = E + P$?
6. Derive Gauss law in dielectric?
7. Write Maxwell equation in differential form?

8. State and prove stokes law?
9. Compare hard and soft magnetic material?
10. What are isotopic effect and Meissener effect?
11. What is condition for material to be super conductor?
12. What are ferrites? Give their application?

TUTORIAL-1

Ques 1. The critical temperature for a metal with isotopic mass 199.5 is 4.185 K. Calculate the isotopic masses if critical temperature falls to 4.133 K

Ques 2. Critical temperature of Nb is 9.15 K. At zero Kelvin the critical field is 0.196 T. Calculate the critical field at 6 K

Ques 3. Prove Meissner effect contradicts the Maxwell equation?

Ques 4. For simple cubic lattice, calculate $d_{100}:d_{110}:d_{111}$?

Ques 5. Calculate interplanar spacing for a (321) plane in a simple cubic lattice whose lattice constant is 420000000000 cm?

Ques 6. Find set of Miller indices for plane cutting of intercepts 3a, 2b, 4c?

Ques 7. Compare the densities of lattice points in (111) and (110)

Ques 8. The first maximum Bragg's diffraction of X-ray from KCl crystal appears at 14 degrees. Calculate energy incident on X-ray?

TUTORIAL-2

Ques 1. Calculate the percentage contraction in the length of a rod moving with a velocity of $0.8c$ in the direction making 60° to its length.

Ques 2. A beam of particles of half-life 2.0×10^{-8} sec, travels in the laboratory with speed of 0.96 times the speed of light. How much distance does the beam travel before the flux falls to half of initial flux.

Ques 3. A clock is moving with speed of $0.95c$ relative to an observer stationed on earth. If the speed increases by 5%, by what percentage does time dilation occur?

Ques 4. Calculate the velocity of rod when its length appears three-fourth of its proper length.

Ques 5. Prove that a particle having rest mass zero moves with velocity of light.

Ques 6. If p and E represent the momentum and energy of a particle, then show that, under Lorentz transformations, is invariant.

Ques 7. Calculate glancing angle on the cube (100) of rock salt ($a=2.814\text{\AA}$) corresponding to 2nd order diffraction maxima for x ray of wavelength 0.710\AA

Ques 8. in unit cell of simple cubic structure, find the angle between the normals to pairs of plane whose miller indices are : 1.(100) and (010) 2.(121) and (111)

QUESTION BANK

1. Explain Compton scattering? Derive an expression for Compton shift? Also give the experimental verification?
2. Define wave function and derive expression for time dependent Schrödinger wave equation?
3. How does x-ray differ from gamma rays?
4. Explain difference between step index and graded index fiber?
5. What is born probability interpretation of wave function?
6. What is Moseley's law? how can it be explained on the basis of Bohr theory?
7. Difference between type 1 and type 2 superconductors?
8. What is significance of wave function?
9. What are ferrite material? Give some of its useful application?
10. Differentiate between 3 and 4 level laser. Give construction and working of He-Ne laser?
11. Write down Maxwell equation. give their physical significance?
12. What is holography?
13. What is BCS theory of superconductivity?
14. Drive expression for time dependent Schrödinger wave equation?
15. Calculate mass and energy of electron having total energy of 2mev ?
16. Explain Heisenberg's uncertainty principle of uncertainty?
17. Explain the concept of time dilation. deduce the necessary relation?
18. What are advantages of using nano material using sol gel method?
19. Advocate the utility of fullerene structure in reference to synthesis of nano tubes?

20. Derive expression due to pulse broadening due to intermodal dispersion fiber?
21. Calculate the wave no of 10 kv neutron?
22. Discuss London theory of superconductivity?
23. What are nano material?
24. What is physical mechanism about meissner effect?
25. Give important application of fiber?
26. features of BCS theory?
27. Superconductivitiers are perfectly diamagnetic in nature. why?
28. What is meant by acceptance angle for optical fiber? Show how it is related to numerical aperture?
29. Write short note on magnetostriction?
30. What are different form of gauss law?
31. Define spontaneous and stimulated emission?
32. What is significance of Bragg's law?
33. What is importance of uncertainty principle?
34. Derive an expression for time dependent Schrödinger wave equation?
35. Explain BCS theory of superconductivity?
36. What is holograph?
37. What is Compton Effect?
38. What is meissner effect?
39. What do you mean by ferromagnetic domain?
40. What is differential form gauss law?
41. Write down Maxwell equation and explain their physical significance?
42. What is meant of acceptance angel for an optical fiber?
43. Write a short note on magnetostiction?
44. What is difference between step index fiber and graded index fiber?
45. Difference between type 1 and type 2 superconductor?

46. What is BCS theory?
47. Superconductor is perfectly diamagnetic in nature .why?
48. Write short note on ‘Energy quantization for particle in one dimensional potential box’?
49. Difference between ordinary light and laser light?
50. Explain the utility of Bragg’s spectrometrometer in determining the structure of crystals?

COMMUNICATIVE ENGLISH

(Subject Code:BHM0101)

FACULTY NAME: Ms. Ritika Chadhary

(Assistant Professor (Applied Sciences))

Internal Marks: 40

External Marks: 60

Total Marks: 100

SWAMI VIVEKANAND
GROUP OF INSTITUTES

UNIT-I

Communication: Meaning, its types, Significance, Process, Channels, Barriers to Communication, Making Communication Effective, Role in Society.

Business Correspondence: Elements of Business Writing, Business Letters: Components and Kinds, Memorandum, Purchase Order, Quotation and Tenders, Job Application Letters, Resume Writing etc.

UNIT-II

Discussion Meeting and Telephonic Skills: Group Discussion, Conducting a Meeting, Telephone Etiquettes, Oral Presentation: Role of Body Language and Audio Visual Aids.

Grammar: Transformation of Sentences, Words used as Different Parts of Speech One Word Substitution, Abbreviations, Technical Terms etc.

UNIT-III

Reading Skills: Process of reading, Reading Purposes, Models, Strategies, Methodologies, Reading Activities.

Writing Skills: Elements of Effective Writing, Writing Style, Technical Writing: Report Writing.

UNIT-IV

Listening Skills: The process of Listening, Barriers to Listening, Effective Listening Skills and Feedback Skills.

Speaking Skills: Speech Mechanism, Organs of Speech, Production and Classification of Speech Sound, Phonetic Transcription, Skills of Effective Speaking, Components of Effective Talk.

Recommended Books:

1. M. V, Rodrigues, 'Effective Business Communication', Concept Publishing Company New Delhi, 1992, reprint 2000.
2. Adhikari Sethi, 'Business Communication', McGraw Hill.

ASSIGNMENT-1

1. Your company has recently launched a low cost laptop in the market . Assuming yourself to be the sales manager of the company, draft a sales letter to be sent to college and universities and others.
2. You as a customer ordered certain product from Amazon.com and the product which you have received turns out to be defective on delivery. Write a complaint letter to the company asking for compensation.

ASSIGNMENT-2

Draft your Resume.

- 1).Assuming yourself to be the head of electronics department of your institution .Write a report on the fire caused in the laboratory of the department. Invent Details.
Draft your Resume.
- 2).Assuming yourself to be the head of electronics department of your institution .

Write a report on the fire caused in the laboratory of the department. Invent Details.

ASSIGNMENT-3

Write an essay of 350-400 words on any one of the topic-

- Technology- A boon or bane
- Does gender help or hinder women in workplace.
- Your views on Demonitisation

TUTORIAL-1

1. How is inviting a quotation different from tender notice.
2. What is a circular and how it is different from office order.
3. What do you understand by the word communication. State various channels of communication.
4. List different barriers to active communication.
5. How do visual regression and visual wandering affect reading.
6. Differentiate between Gestures and Postures.
7. Throw the light on the process of group discussion.
8. Distinguish between “Diphthongs” and “Monophthongs”.
9. What are the characteristics of technical paper writing.
10. Explain the process of listening along with barriers to listening.

TUTORIAL-2

1. Write a technical description of a commodity.
2. Draft a complaint letter to a company over faulty delivery of goods ordered.

3. Describe Active Phony.
4. Explain the role of body language in enhancing communication.
5. What are the telephonic etiquettes.
6. How to conduct an effective meeting.
7. Explain in detail various audio-visual aids to communication.
8. Draft a sales letter promoting new range of products which your company has launched.
9. Write a job application letter.
10. Draft your resume.

QUESTION BANK

1. How will you define effective communication?
2. Explain in detail basic model of communication.
3. What are the barriers to effective communication.
4. What is the role of effective communication in society.
5. What are the barriers to communication?
6. What is the difference between tender and quotation letter.
7. Write a job application letter to a reputed company of your field?
8. What are the constituents of a resume.
9. What is a purchase order.
10. Construct a tender notice.
11. What is an office memorandum.
12. How can we conduct effective group discussion.
13. How body language plays an effective role in communication.

14. What are meeting etiquettes.
15. Differentiate between minutes and agenda of a meeting.
16. What are the components of minutes of a meeting.
17. What are the audio visual aids to communication.
18. What are the telephonic etiquettes.
19. How can we conduct effective oral presentation.
20. Construct a quotation letter.
21. What are Monophthongs.
22. Explain in detail process of reading.
23. How can we read fast.
24. What are the elements of technical writing.
25. Construct a report in relation to a situation in your college.
26. What are the different kinds of official reports. Explain in detail.
27. What are reading methodologies.
28. Explain in detail process of listening.
29. What are the barriers to effective listening.
30. How can a person improve his/her listening skills.
31. What are speech mechanisms.
32. What are different organs of speech.
33. Explain in detail various classifications of speech sounds.
34. What is a phonetic transcription.
35. What are the components of effective talk.
36. Construct a resume.

37. What are the skills required for effective speaking.
38. Explain how can we improve visual presentations.
39. Differentiate between an extempore and JAM session.
40. What is the significance of posture in listening.
41. What are Diphthongs.
42. What is meant by ombudsperson?
43. “Poise is an important skill in discussion. Explain.
44. What do these abbreviations stand for-i)e.g. ii) rpm
45. How are gestures different from postures.
46. What is visual regression and visual wandering.
47. What is a circular . How is it different from office order.
48. Differentiate between an abstract and summary.
49. How can we deal with difficult callers.
50. Explain role of layout in business writing.

HUMAN VALUES & PROFESSIONAL ETHICS

(Subject Code: BHUM0-103)

FACULTY NAME: Ms. Pratibha



(Assistant Professor (Applied Sciences))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-I

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education
Understanding the need, basic guidelines, content and process for Value Education.
SelfExploration-what is it? - its content and process; “Natural Acceptance” and Experiential
Validation- as the mechanism for self-exploration, Continuous Happiness and Prosperity- A look
at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic
requirements for fulfilment of aspirations of every human being with their correct priority,
Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
Method to fulfill the above human aspirations: understanding and living in harmony at various
levels

UNIT-II

Understanding Harmony in the Human Being - Harmony in Myself! Understanding human being
as a co-existence of the sentient “I” and the material “Body” Understanding the needs of Self
 (“I”) and “Body” - Sukh and Suvidha Understanding the Body as an instrument of “I” (I being
the doer, seer and enjoyer) Understanding the characteristics and activities of “I” and harmony in
“I” Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of
Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
Understanding harmony in the Family- the basic unit of human interaction; Understanding values
in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure
Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship;
Understanding the meaning of Vishwas; Difference between intention and competence
Understanding the meaning of Samman, Difference between respect and differentiation; the
other salient values in relationship

UNIT-III

Understanding the Harmony in the Society (Society Being an Extension of Family) Samadhan,
Samridhi, Abhay, Sah-astitva as comprehensive Human Goals Visualizing a universal
harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum
Vyawastha)- from family to world family! Understanding Harmony in the Nature and Existence

- Whole existence as Co-existence Understanding the harmony in the Nature; Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature; Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space; Holistic perception of harmony at all levels of existence

UNIT-IV

Implications of the above Holistic Understanding of Harmony on Professional Ethics Natural acceptance of human values Definitiveness of Ethical Human Conduct; Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order; Competence in professional ethics: Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems Case studies of typical holistic technologies, management models and production systems; Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers At the level of society: as mutually enriching institutions and organizations

Recommended Books:

1. R.R. Gaur, R. Sangal, G.P. Bagaria, 'A Foundation Course in Value Education', 2009.

ASSIGNMENT-1

1. What are the basic guidelines for value education?
2. What is the program to fulfill the Basic Human Aspirations?

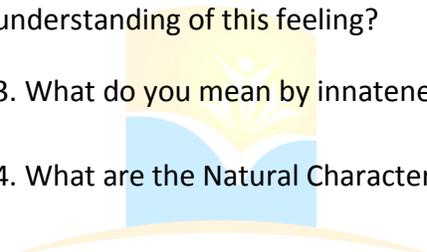
3. What is Prosperity? Is it different from happiness?

ASSIGNMENT-2

1. Distinguish B/w the needs of the self & the needs of the Body?
2. What do you mean by Right Utilization of the body?
3. Explain the Assuming, recognizing, & Fulfillment with one example.

ASSIGNMENT-3

1. What is Justice? What are its four elements? Is it a continuous or a Temporally need?
2. What is the meaning of Respect? How do we disrespect others due to lack of right understanding of this feeling?
3. What do you mean by innateness in the four orders?
4. What are the Natural Characteristics of human order? Explain.



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TUTORIAL-1

- 1) What is the difference between the belief and understanding?
- 2) What are the basic guidelines for value education?
- 3) Write a short note on the need for value education in today's scenario.
- 4) Define self exploration. What is the content of self – exploration?
- 5) What do you understand by prosperity? What is the difference between prosperity and wealth? How are the two related?
- 6) Explain the basic requirements to fulfil human aspirations. Give the correct priority among them.
- 7) What are the basic human aspirations? Explain.
- 8) What are the programs needed to achieve the comprehensive human goal? List and define each briefly

- 9) What do you understand by trust? Differentiate between intention and competence with examples.
- 10) Difference between respect and differentiation.

TUTORIAL-2

- 1) What do you mean by Sukh and Suvidha?
- 2) Differentiate between the needs of self and the needs of body.
- 3) Human being is co-existence of the Self and the Body' – elaborate on this statement.
- 4) Differentiate between the activities of knowing, assuming, recognizing and fulfilling with the help of an example.
- 5) What is pre-conditioning? What is their source?
- 6) What are the four orders of nature? Briefly explain them.
- 7) Explain the differences and similarities between animal order and human order. What is the relation between the two orders?
- 8) Explain the concept of holistic perception of harmony in existence.
- 9) What do you understand by definitiveness of ethical human conduct? Why is this definitiveness desirable?
- 10) What do you mean by competence in professional ethics? Elaborate with examples.

QUESTION BANK

1. Write a short note on the need for value education in today's scenario
2. What are the basic guidelines for value education?
3. Define process of self exploration. What is the content of self – exploration?

4. Explain the basic requirements to fulfil human aspirations. Give the correct priority among them
5. What is prosperity? Is it different from happiness?
6. What is value education? Why there is a need of value education?
7. What is the difference between prosperity and wealth? What is more acceptable to us and why?
8. What are the basic human aspirations? Explain.
9. Explain how the activities of the Body are different from those of the self with the help of an example.
10. Explain the meaning of Sanyam and Swasthya. Which is more basic between the two. Elaborate briefly on the programs of Sanyam.
11. What do you mean by recyclability? How is it applicable to production activities?
12. What is meant by gratitude? Express an example from your life in your mutual relationships.
13. Briefly explain the natural characteristics of the four orders in nature.
14. What do you mean by natural acceptance? Explain, Explain how it remains untouched by our past pre-conditionings with the help on an example from your life.
15. Explain the activities of imaging, Analysing and selecting / Tasting with the help of an example.
16. Make a list of any ten desires of yours. Explain how each of the desire is related to the Self or the Body.
17. Briefly explain the five dimensions of human endeavour in society, defining each term.
18. Explain how the activities of the Body are different from those of the Self with the help of an example.
19. . What do you mean by Sukh and Suvidha?
20. How is the body an instrument of the Self? What is the responsibility of the Self towards the body? Explain.
21. Distinguish between Sukh and Suvidha in detail taking needs of yourself as an example.
22. 'Human being is co-existence of the Self and the Body' – elaborate on this statement
23. What do you mean by right utilization of the body?

24. Differentiate between the activities of the self and the body on any two grounds.
25. What is meaning of justice in human relationships? How does it follow from family to world family?
26. What is justice? How does it lead to mutual happiness?
27. What is the meaning of respect? How do we disrespect others due to lack of right understanding of this feeling?
28. How do we come to differentiate between human beings on the basis of body? Explain. What are its consequences?
29. What do you understand by trust? Differentiate between intention and competence with examples.
30. How do you differentiate between intention and competence when you have to judge the other? Why is it important?
31. What are the foundational values of relationships? How can they be used to ensure strong and mutually relationships?
32. List down the foundation value and the complete value in human relationship. Explain each with one example
33. Explain the comprehensive human goal. How does fearlessness follow from right understanding and prosperity?
34. What do you mean by comprehensive human goal? Explain. How is it related to your goal in life?
35. Right understanding in the individuals is the basis for harmony in the family, which is the building block for harmony in the society. Give your comments.
36. Define harmony in nature. OR Explain the harmony in nature.
37. What do you mean by co-existence?
38. What do you mean by 'innateness'? What is the innateness in the four orders?
39. What is the svabhava (natural characteristic) of a unit? Elaborate on the svabhava of a human order.
40. Explain the natural characteristics of the material and pranic orders. Give examples.

41. Explain the differences and similarities between animal order and human order. What is the relation between the two orders?
42. Present the difference and similarity between a human being and an animal. Give examples to support your answer.
43. What are the four orders in nature? How can the human order be responsible to the other three orders?
44. How can we say that 'nature is Self Organized and in space Self-Organization Is Available.'
45. Differentiate between units and space. How are units self-organized in space?
46. What are the values in interaction of human beings with the material things? Give one example of each.
47. What do you understand by definitiveness of ethical human conduct? Why is this definitiveness desirable?
48. What do you mean by professional ethics?
49. What do you understand by competence in professional ethics? Give two examples of its implications in industry.
50. What do you mean by 'universal human order'?

ENVIRONMENTAL SCIENCE

(Subject Code:BESE0-101)

FACULTY NAME: Ms. Sukriti

(Assistant Professor (Applied Sciences))

Internal Marks: 40

External Marks: 60

Total Marks: 100

UNIT-1

1.The Multidisciplinary Nature of Environmental Studies

Definition, scope and importance. Need for public awareness.

2. Natural Resources

Renewable and Non-renewable Resources: Natural resources and associated problems.

- (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- (g) Role of an individual in conservation of natural resources.
- (h) Equitable use of resources for sustainable lifestyles.

UNIT-2

3. Ecosystems

- (a) Concept of an ecosystem.

- (b) Structure and function of an ecosystem.
- (c) Producers, consumers and decomposers.
- (d) Energy flow in the ecosystem.
- (e) Ecological succession.
- (f) Food chains, food webs and ecological pyramids.
- (g) Introduction, types, characteristic features, structure and function of the following ecosystem:
 - i) Forest ecosystem.
 - ii) Grassland ecosystem.
 - iii) Desert ecosystem.
 - iv) Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries).

4. Biodiversity and its Conservation

- (a) Introduction – Definition: genetic, species and ecosystem diversity.
- (b) Biogeographical classification of India.
- (c) Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and
- (d) option values.
- (e) Biodiversity at global, national and local levels.
- (f) India as a mega-diversity nation.
- (g) Hot-spots of biodiversity.
- (h) Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts.
- (i) Endangered and endemic species of India.
- (j) Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-3

5. Environmental Pollution

Definition

(a) Causes, effects and control measures of:

- i) Air pollution
- ii) Water pollution
- iii) Soil pollution
- iv) Marine pollution
- v) Noise pollution
- vi) Thermal pollution
- vii) Nuclear pollution

(b) Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

(c) Role of an individual in prevention of pollution.

(d) Pollution Case Studies.

(e) Disaster management: floods, earthquake, cyclone and landslides

6. Social Issues and the Environment

(a) From unsustainable to sustainable development

(b) Urban problems and related to energy

(c) Water conservation, rain water harvesting, Watershed Management

(d) Resettlement and rehabilitation of people; its problems and concerns. Case studies.

(e) Environmental ethics: Issues and possible solutions

(f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.

(g) Wasteland reclamation

(h) Consumerism and waste products

- (i) Environmental Protection Act
- (j) Air (Prevention and Control of Pollution) Act
- (k) Water (Prevention and control of Pollution) Act
- (l) Wildlife Protection Act
- (m) Forest Conservation Act
- (n) Issues involved in enforcement of environmental legislation
- (o) Public awareness

UNIT- 4

7. Human Population and the

- (a) Population growth, variation among nations
- (b) Population explosion – Family Welfare Programmes
- (c) Environment and human health
- (d) Human Rights
- (e) Value Education
- (f) HIV/AIDS
- (g) Women and Child Welfare
- (h) Role of Information Technology in Environment and Human Health
- (i) Case Studies

8. Field Work

- (a) Visit to a local area to document environmental assets river/
- (b) forest/grassland/hill/mountain
- (c) Visit to a local polluted site – Urban / Rural / Industrial /Agricultural
- (d) Study of common plants, insects, birds.

(e) Study of simple ecosystem-ponds, river, hill slopes, etc

ASSIGNMENT-1

1. What is meant by environment? Enumerate and discuss its various components
2. Define natural resources. How will you classify natural resources?
3. Write short note on :
 - (a) Causes and effect of Deforestation
 - (b) Effects of mining
4. Explain Geothermal energy, Tidal energy and Hydro-energy
5. Write short notes on cause of deforestation?

ASSIGNMENT-2

1. What is ecosystem? With the help of suitable modes explain the energy flow in the ecosystem?
2. Explain the type, characteristic features and functions of forest ecosystem?
3. Write short notes on
 - (a) Ecological pyramids
 - (b) Ecological succession
4. What is meant by biodiversity? Explain the three levels of biodiversity and point out the major threats of biodiversity depletion.
5. Write short notes on

- (a) hotspots of biodiversity
- (b) In-situ and Ex-situ conversion

ASSIGNMENT-3

1. Write short notes on

- (a) Disaster management
- (b) Air pollution control devices
- (c) Sources and effects of radioactive pollution

2. Discuss Sailable features of :

- (a) Wildlife protection act, 1972
- (b) Water Act, 1974
- (c) Environment Act, 1986

3. How industrial, domestic, agricultural and other wastes affect the fertility of soil?

4. Write short notes on

- (a) Wasteland Reclamation
- (b) Population explosion
- (c) Sustainable development

TUTORIAL-1

Q1. What is global warming? What are its causes and effects. Discuss the measure to control it?

Q2. Define water pollution? Discuss its major sources and effects. What are precautions that should be taken to prevent it?

Q3. What is noise pollution? What are the effects of noise pollution and explain various methods to reduce it?

Q4. What do you mean by bio-fuel? How is it important in environment conservation?

Q5. Discuss the relationship between human health and environment?

Q6. What is hardness of water?

Q7. What are chlorofluorocarbons (CFC)? What are its major uses? Explain its significance in global atmospheric change?

Q8. India is a Mega biodiversity region. Justify it.

Q9. Differentiate between

- (a) National park and Sanctuary
- (b) Species and Genetic biodiversity

Q10. Write short note on:

- (a) Value Education
- (b) Watershed Management

SVIET

TUTORIAL-2

Q1. List the problems involved in the disposal of solid wastes. What is the role of the informal sector of municipal solid waste management?

Q2. How does soil pollution differ from water pollution in effects and control?

Q3. Discuss the energy flow in typical grassland ecosystem?

Q4. What are the major water pollutants arising out of agricultural practices?

Q5. How can you minimize emissions that contribute to acid rain?

Q6. India is a mega biodiversity region. Justify it?

Q7. What is food chain and food web? Explain with the help of suitable example?

Q8. What are various renewable resources options? Explain why their use is important?

Q9. Define ecological succession?

Q10. Define term “Biochemical Oxygen Demand”

QUESTION BANK

1. List any two basic needs of a man?

2. Write full form of C F L.?

3. What is meant by 'Cash Crops'?

4. Which two crops are grown with wheat, at the time of mixed farming ?

5. Define Herbivorous animals

6. What is water-cycle ?

7. Write two features of good soil. Who opposed the construction of "Narmada project in Madhya Pradesh ?

8. In which country and when, Eco-Mark-scheme was initially started ?

9. Write the names of herbivores, carnivores and omnivores of your locality.

10. What is Chipko Movement ?

11. What are the ill effects of Chemical Fertilizers ?

12. How can we conserve the resources

13. What is the importance of ground water ?

14. Describe the economic potential of animals in detail?

15. Current model of development will lead to destruction of environment., Discuss.

16. What are the reasons of wildlife-people's conflict ? How it can be mitigated ?

17. How many species are present on Earth Planet ?

18. Which is the home of Snow Leopard ?
19. Write the full form of CNG.
20. Which gas emission is increasing at alarming rate? ,?
21. What is the major cause of extinction ?
22. Name any two medicinal plants in your locality and their benefits also.
23. Write two goals of Sustainable Development Commission.
24. Define "Mixed Farming".
25. What is meant by Population Explosion ?
26. Why there is need of Environmental Management ?
27. How development effects environment ?
28. Write briefly :
- (a) What is environment?
- (b) Define ecology.
- (c) Differentiate between biotic and abiotic components of environment.
- (d) Write the uses of forests.
- (e) Mention various effects of water pollution.
- (f) What is solid waste management?
- (h) List the causes of displacement of people.
29. What is the full form of AIDS? Give its main cause.
30. What do you mean by value education?
31. Write short note on : (i) Sustainable development (ii) Rain water harvesting
32. What is Global warming? Discuss its causes and effects.

33. What do you understand by population explosion? Explain various reason and ill effects of over population.
34. Write short note on : (i) Family welfare programs (ii) Role of IT in maintaining healthy environment.
35. Describe briefly the environment ethics and related issue with their solutions.
36. What is value education? Discuss the concept of value education with suitable example?
37. Discuss the problem likely to be faced by a child working as a bonded labourer in a hazardous industry?
38. Define Optimum population?
39. What is the effect of depletion of ozone layer on human beings? Discuss
40. 'Fire accident is a natural disaster'. Comment this statement.



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