VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234

DEPARTMENT OF PHYSICS					
Course Code:	06AT01	**Programme:**	B.Sc., Maths/ Chemistry	**CIA:**	**III**
Date:	28.12.2021	**Part:**	III	**Semester:**	**I**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Allied			
Course Title:	**ALLIED PHYSICS – I**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1. a. Describe Melde's string method to determine the frequency of an electrically maintained tuning fork by transverse and longitudinal modes. **CO1**

(OR)

b. Calculate the frequency of the fundamental mode of a string 1m long weighing 2 g when loaded with 40 g in Melde's string experiment (longitudinal mode) **CO1**

2. a. Explain the theory of non uniform bending and the method of finding the young's modulus by non-uniform bending. **CO2**

(OR)

b. A rectangular bar 0.02m in breadth and 0.01 m in thickness and 1 m in length is supported at its ends on two knife edges. A load of 2 kg is hung in the middle. Calculate the depression if the young's modulus of the material of the bar is 2×10^{10} N m^{-2} **CO2**

3. a. Explain about the parts of the Carnot's engine. **CO3**

(OR)

b. Calculate the change in entropy when 10^{-2} kg of ice at 0° C is converted into water at the same temperature. Given that the specific latent heat of fusion of ice is 3.36×10^{5}J kg^{-1} **CO3**

4. a. What is a relay? Explain the principle and working of a relay. **CO4**

(OR)

b. A circular coil has a radius of 0.1 m and a number of turns of 50. Calculate the magnetic induction at a point (i) on the axis of the coil and distance 0.2 m from the centre (ii) at the centre of the coil, when a current of 0.1 A flows in it. **CO4**

5. a. Obtain the condition for minimum spherical aberration of two thin lenses separated by a distance. **CO5**

(OR)

b. The dispersive powers for crown and flint glass are 0.015 and 0.030 respectively. Calculate the focal lengths of the lenses (made from crown and flint glass) which form an achromatic doublet of focal length 60 cm when placed in contact. **CO5**

SECTION – B

Answer **ALL** the Questions: **(5 X 10 = 50 Marks)**

6. a. What are ultrasonic waves? Give an account on their used and applications. **CO1**

(OR)

b. Discuss the factors that affect the acoustics in a hall and the remedies for them. **CO1**

7. a. Obtain an expression for the bending moment of a beam. **CO2**

(OR)

b. Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube. **CO2**

8.	**a**.	Explain the change of entropy in a reversible process.	**CO3**
		(OR)	
	b.	i) State and explain First law of thermodynamics ii) State and explain Second law of thermodynamics	**CO3**
9.	**a**.	Derive an expression for the field along the axis of a circular coil carrying current.	**CO4**
		(OR)	
	b.	Give the theory of choke coil. Discuss the energy losses in it and compare them with those in a rheostat. Why is it considered superior to a rheostat?	**CO4**
10	**a**.	Obtain an expression for the refractive index of the material of a prism of angle A.	**CO5**
		(OR)	
	b.	What is meant by chromatic aberration in lenses? Derive the condition for achromatism of two thin lenses placed in contact.	**CO5**

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234

DEPARTMENT OF PHYSICS					
Course Code:	06CT11	**Programme:**	B.Sc., Physics	**CIA:**	**III**
Date:	22.12.2021	**Part:**	III	**Semester:**	**I**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Core			
Course Title:	**MECHANICS**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1. **a.** Illustrate accelerated motion with example. **CO1**

(OR)

b. A force acts in a 2 kg mass and gives it an acceleration of 3 met/sec^2. What is the acceleration is produced by the same force when acting on a mass of a) 1 kg and b) 4 kg c) How large is the force? **CO1**

2. **a.** Obtain Newton's laws in three-dimensional vector form. **CO2**

(OR)

b. A 400 kg block originally at 120 cm/sec, along a table top of 70 cm before coming to a stop. What is the coefficient of friction between the block and table? **CO2**

3. **a.** Describe linear momentum of a body and express Newton's Second law in terms of momentum. **CO3**

(OR)

b. A ball of 0.4 kg mass and a speed of 3 m/sec has a head on, completely elastic collision with a 0.6 kg initially at rest. Find the speed of both bodies after the collision. **CO3**

4. **a.** Derive the relation between torque and angular momentum for a system of particles. **CO4**

(OR)

b. In raising a 200 kg bronze statute 10,000 J of work is performed. How high is it raised? **CO4**

5. **a.** Calculate static pressure and dynamic pressure using Bernoulli's equation. **CO5**

(OR)

b. The interior of a submarine located at a depth of 50 m in seawater is maintained at sea-level atmospheric pressure. Find the force acting on a window of area 20 cm^2. The density of seawater is 1.03 x 10^3 kg/m^3. **CO5**

SECTION – B

Answer **ALL** the Questions: **(5 X 10 = 50 Marks)**

6. **a.** Illustrate the significance of Newton's first, second and third laws of motion with examples. **CO1**

(OR)

b. Derive the equations of motion when the particle moves with constant acceleration. **CO1**

7. **a.** Derive the equation to calculate the horizontal range 'R' of a projectile. **CO2**

(OR)

b. Arrive at the equation to calculate the period of motion of a conical pendulum. **CO2**

8. **a.** Deduce Newton's Second law in the case of many particle systems. **CO3**

(OR)

b. Obtain velocity and acceleration of the centre of mass for a system of particles. Prove that in a centre of mass reference frame, the total momentum is zero. **CO3**

9. **a.** Illustrate angular momentum. Derive the relation between torque and angular momentum for a single particle. **CO4**

(OR)

b. Derive work-energy theorem and explain its significance. **CO4**

10. **a.** Explain how the pressure of a fluid varies with depth. **CO5**

(OR)

b. Derive the equation of continuity for the steady flow of the fluid. **CO5**

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234

DEPARTMENT OF PHYSICS					
Course Code:	06CT12	**Programme:**	B.Sc., Physics	**CIA:**	**III**
Date:	27.12.2021	**Part:**	III	**Semester:**	**I**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Core			
Course Title:	**ELECTROMAGNETISM**				

SECTION – A

Answer ALL Questions: **(5 X 5= 25 Marks)**

1 a) State and explain Coulomb's law **CO 1**

(OR)

b) Calculate the electric field at a distance **y** from an infinite line charge having linear density of charge λ. **CO 1**

2 a) Derive the relation between electric field and electric potential. **CO 2**

(OR)

b) Derive the relation for capacitance of a parallel plate capacitor. **CO 2**

3 a) Derive the equation of continuity. **CO 3**

(OR)

b) A copper wire of diameter 0.5 mm and length 20m is connected across a battery of emf 1.5V and internal resistance 1.25 Ω . Calculate the current density in the wire. **CO 3**

4 a) State and prove Ampere's circuital law. **CO 4**

(OR)

b) A solenoid of 1200 turns is wound uniformly in single layer on a glass tube 2m long and 0.2 m in diameter. Find the magnetic induction at the centre of the solenoid. When a current of 2 A flows through it. **CO 4**

5 a) Explain the working principle of choke coil. **CO 5**

(OR)

b) An alternating voltage of 10 volts at 100 Hz is applied to a choke of inductance 5henry and resistance 200 Ω. Find the power factor of the coil and power absorbed **CO 5**

SECTION – B

Answer ALL Questions: **(5 X 10= 50 Marks)**

6 a) Derive the relation for electric field due to an electric dipole at an axial point and equatorial point. **CO 1**

(OR)

b) Apply the gauss's law to find electric field intensity inside and outside of a uniformly charged sphere. **CO 1**

7	**a)**	Derive the relation for potential at a point due to a uniformly charged conducting sphere.	**CO 2**
		(OR)	
	b)	Derive the relation for capacitance of a cylindrical capacitor.	**CO 2**
8	**a)**	Describe the Carey Foster bridge with neat circuit diagram to find the resistance.	**CO 3**
		(OR)	
	b)	Explain the principle of potentiometer to calibrate the low range voltmeter and low range ammeter.	**CO 3**
9	**a)**	Determine the magnetic induction at a point on the axis of a circular coil carrying current.	**CO 4**
		(OR)	
	b)	Describe the working principle and the construction of moving coil ballistic galvanometer.	**CO 4**
10	**a)**	Explain the Series LCR resonance circuit.	**CO 5**
		(OR)	
	b)	Explain the theory of transformer and discuss its working.λ	**CO 5**

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DEPARTMENT OF PHYSICS					
Course Code:	06CT31	**Programme:**	B.Sc. (Physics)	**CIA:**	**III**
Date:	22.12.2021	**Part:**	III	**Semester:**	**III**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Core			
Course Title:	**PRINCIPLES OF ELECTRIC CIRCUITS**				

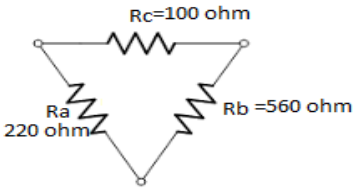
SECTION – A

Answer ALL Questions: **(5 X 5= 25 Marks)**

1 a) State and explain Thevenin's theorem **CO 1**

(OR)

b) Convert the delta network to wye network **CO 1**



2 a) **CO 2**

How do you determine various voltage and current values of a sine wave?

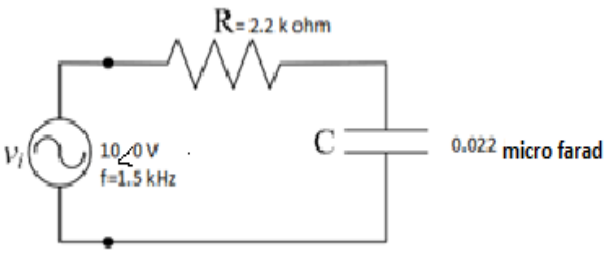
(OR)

b) i) Subtract $1+j2$ from $3+j4$ ii) Divide $100\angle 50^{o}$ by $25\angle 20^{o}$ **CO 2**

3 a) Describe the relationship between current and voltage in a series RC circuit. **CO 3**

(OR)

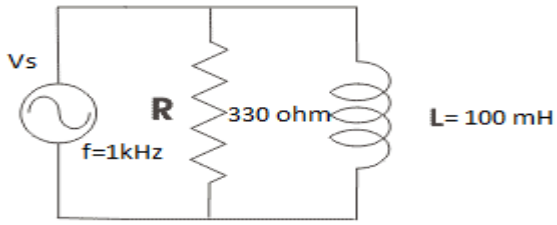
b) Determine the current in the following circuit and draw a phasor diagram showing the relation between source voltage and current. **CO 3**



4 a) How to determine the impedance of a series RL circuit? **CO 4**

(OR)

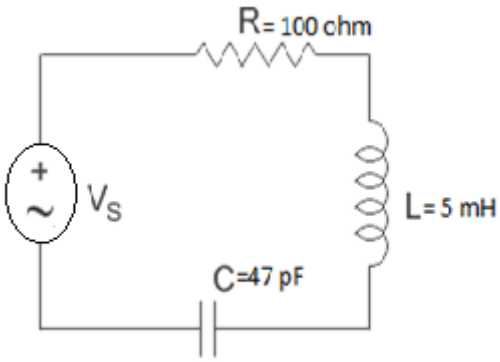
b) Determine the total admittance and draw the admittance phasor diagram. **CO 4**



5 a) Analyze series RLC circuit **CO 5**

(OR)

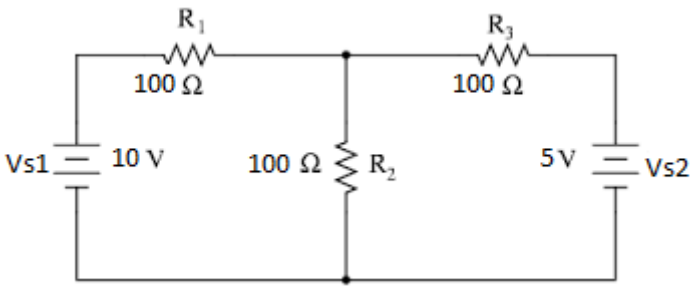
b) Find the series resonant frequency for the given circuit **CO 5**



SECTION – D

Answer ALL Questions: **(5 X 10= 50 Marks)**

6 a) Using superposition theorem, find the current through the resistor R_2 **CO 1**



(OR)

b) State and explain the maximum power transfer theorem **CO 1**

7 a) Write the characteristics of basic non sinusoidal wave forms. **CO 2**

(OR)

b) i) Convert the following complex numbers to polar form a) 8 + j6 and b) 10 – j5 **CO 2**

ii) Polar quantities to rectangular form c) $10 \angle 30^o$ and d) $200\angle -45^o$

8 a) Discuss how the RC circuit operates as a filter **CO 3**

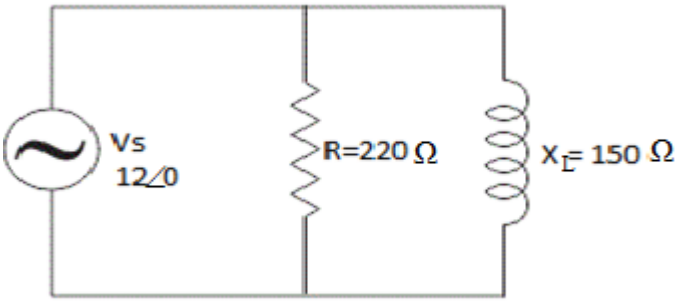
(OR)

b) Explain the power in RC circuits. **CO 3**

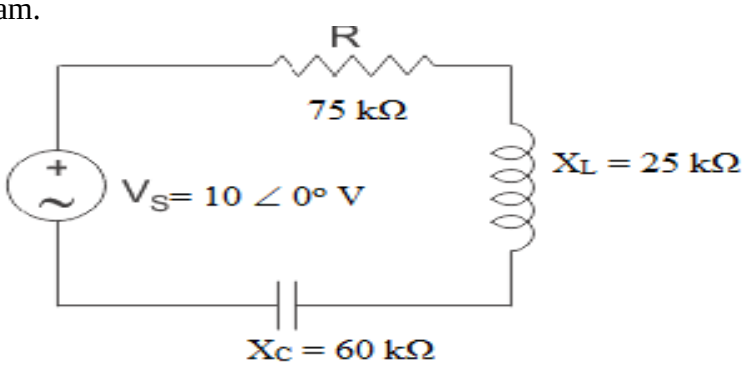
9 a) Discuss lead network and lag network of RL circuit **CO 4**

(OR)

b) Determine the value of each current in the given circuit and draw the current phasor diagram. **CO 4**



10 a) Find the current and the voltages across each component and draw a complex voltage phasor diagram. **CO 5**



(OR)

b) Analyse the operation of band pass and band stop filters **CO 5**

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DEPARTMENT OF PHYSICS

Course Code:	06CT32	**Programme:**	B.Sc., Physics	**CIA:**	**III**
Date:	27.12.2021	**Part:**	III	**Semester:**	**III**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Core			
Course Title:	**SPECTROSCOPY**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1 a) Discuss the experimental verification conducted by Geiger and Marsden on Rutherford scattering theory. **CO1**

[OR]

b) Calculate the radius and energy of the electron in the nth orbit in hydrogen from the following data $e = 1.6 \times 10^{-19}$ Coulomb, $m = 9.1 \times 10^{-31}$ kg, $h = 6.6 \times 10^{-34}$ joule-sec $\varepsilon_0 = 8.85 \times 10^{-12}$ farad / metre, $c = 3 \times 10^{8}$ m / sec **CO1**

2 a) Discuss the coupling schemes used in atoms having two or more electrons. **CO2**

[OR]

b) Calculate the wavelength separation between the unmodified line of wavelength $6000A^0$ and the modified lines, when a magnetic induction of $1wbm^{-2}$ is applied in normal Zeeman effect. **CO2**

3 a) Describe the microwave spectrometer with the help of a diagram. **CO3**

[OR]

b) Calculate the i) reduced mass and ii) moment of inertia of Sodium chloride using the mean inter nuclear distance of $2.36A^0$. Atomic masses are Cl = 35×10^{-3} kg/mol, Na = 23×10^{-3}kg/mol **CO3**

4 a) Discuss the energy of a diatomic molecule. **CO4**

[OR]

b) In the near infrared spectrum of HCl molecule there is single intense band at 2885.9 cm^{-1}. Assume that it is due to the transition between vibrational levels, show that the force constant k = 480 N/m. Given $M_H = 1.68 \times 10^{-27}$ kg. **CO4**

5 a) Explain the rotational Raman spectrum of (i) Symmetric top molecules (ii) Spherical top molecules and (iii) Asymmetric top molecules. **CO5**

[OR]

b) The rotational Raman spectrum of H_2 gas is found to consist of a series of stokes and anti stokes lines, the first of which appears at 3459 cm^{-1} relative to the source of excitation. Calculate the bend distance of H_2. **CO5**

SECTION – B

Answer **ALL** the Questions: **(5 X 10 = 50 Marks)**

6 a) Explain Rutherford experiment on scattering of α particles and derive Rutherford scattering formula. **CO1**

[OR]

b) Calculate the total energy of the electron. Explain spectral series of hydrogen with energy level diagram. **CO1**

7 a) Explain the quantum numbers associated with vector atom model. **CO2**

[OR]

b) Explain the Stern and Gerlach experiment. **CO2**

8 a) Explain the factors which affect the intensities of spectral lines. **CO3**

[OR]

b) Describe the applications of microwave spectroscopy. **CO3**

9 a) Explain how anharmonic oscillator differs from simple harmonic oscillator. Discuss the vibrational energy levels for transitions from v = 0 to v = 1, 2 and 3. **CO4**

[OR]

b) Explain the transition between the rotational–vibrational energy level of a diatomic molecule together with the spectrum. **CO4**

10 a) Explain the rotational energy levels of a linear molecule and the rotational Raman spectrum arising from transitions between them. **CO5**

[OR]

b) Explain Raman Spectrometer. Discuss the problems encountered and the remedial measure of Raman spectroscopy. **CO5**

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234

	DEPARTMENT OF PHYSICS				
	Course Code:	06CT51	**Programme:**	B.Sc., Physics	**CIA:**	**III**
	Date:	24.12.2021	**Part:**	III	**Semester:**	**V**
	Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
	Study Component:		Core			
	Course Title:	**SOLID STATE PHYSICS**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1. a. Deduce the expression for the inter-planar distance in terms of Miller indices for a cubic structure. **CO1**

(OR)

b. Copper has FCC structure and the atomic radius is 1.278 Aº. Calculate the density of copper crystal. Given atomic weight of copper = 63.5. **CO1**

2. a. Write a note on point defects with suitable figures **CO2**

(OR)

b. The fraction of vacancy sites in a metal is 1×10-10 at 500ºC. What will be the fraction of vacancy sites at 1000 ºC **CO2**

3. a. Derive Clausius-Mosotti equation **CO3**

(OR)

b. A parallel capacitor has an area of 100 cm^2, a plate separation of 1 cm and is charged to a potential of 100 V. Calculate the capacitance of the capacitor and the charge on the plates **CO3**

4. a. Explain about diamagnetism and its properties **CO4**

(OR)

b. The magnetic field intensity in a piece of ferric oxide is 10^6 amp/metre. If the susceptibility of the material is 1.5×10-3, calculate the magnetization of the material and the flux density **CO4**

5. a. Explain Meissner effect. How is it used to classify the superconductors? **CO5**

(OR)

b. A superconducting tin has a critical temperature of 3.7 K at zero magnetic field and a critical field of 0.0306 Tesla at 0K. Find the critical field at 2 K **CO5**

SECTION – B

Answer **ALL** the Questions: **(5 X 10 = 50 Marks)**

6. a. Calculate the c/a ratio and packing factor for the hexagonal close packed (HCP) structure. **CO1**

(OR)

b. Describe with suitable diagram, the powder method of determination of crystal structure. **CO1**

7. a. Derive an expression for the density of Frenkel defects in ionic crystals **CO2**

(OR)

b. Explain the following **CO2**

i) Edge dislocation ii) Screw dislocation

8. a. Define electronic polarization. Derive the expression for electronic polarizability **CO3**

(OR)

b. Give a brief account of ferro and piezo electricity **CO3**

9. a. Give the brief theory of paramagnetic materials **CO4**

(OR)

b. Discuss in detail about antiferromagnetic materials **CO4**

10 a. Give the BCS theory of superconductivity **CO5**

(OR)

b. Describe Josephson effects and their applications **CO5**

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DEPARTMENT OF PHYSICS

Course Code:	06CT52	**Programme:**	B.Sc., Physics	**CIA:**	**III**
Date:	27.12.2021	**Part:**	III	**Semester:**	**V**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Core			
Course Title:	**DIGITAL ELECTRONICS**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1. a. i) What is the decimal value of binary 1011.1101? **CO1**
ii) Convert 29 to an excess -3 code number.

(OR)

b. i) What us the binary equivalent of 35? **CO1**
ii) Write a short note on ASCII code.

2. a. Show the binary subtraction of 125_{10} from 200_{10} **CO2**

(OR)

b. Show how to add 150_{10} and 85_{10} with unsigned 8 bit numbers. **CO2**

3. a. Explain JK Master slave flip flop with relevant truth table and diagram. **CO3**

(OR)

b. Explain serial in serial out register in detail. **CO3**

4. a. Discuss about the advantages and disadvantages of frequency modulation **CO4**

(OR)

b. Find the carrier and modulating frequencies, modulation index, and the maximum deviation of the FM wave represented by the voltage equation **CO4**
$v = 12 \sin (6 \times 10^8 t + 5 \sin 1250t)$. What power will this FM wave dissipate in a 10-Ω resistor?

5. a. Draw the 8085 microprocessor pin out diagram. **CO5**

(OR)

b. Write down the 8085 microprocessor program to add 8 bits numbers. **CO5**

SECTION – B

Answer **ALL** the Questions: **(5 X 10 = 50 Marks)**

6. a. Prove NOR and NAND as a universal gate. **CO1**

(OR)

b. Explain 16 to 1 multiplexer in detail. **CO1**

7. a. Explain 555 time astable multivibrator in detail. **CO2**

(OR)

b. Discuss briefly about the arithmetic building blocks of a circuit. **CO2**

8. a. With the help of truth table, Explain RS flip flop with neat circuit diagram. **CO3**

(OR)

b. Discuss asynchronous counter in detail. **CO3**

9. a. Explain the mathematical representation of FM wave. **CO4**

(OR)

b. Explain the frequency spectrum of the AM wave. **CO4**

10. a. Explain about the 8085 bus organization with neat block diagram **CO5**

(OR)

b. Discuss briefly about the 8085 instruction set **CO5**

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234

DEPARTMENT OF PHYSICS					
Course Code:	06EP51	**Programme:**	B.Sc., Physics	**CIA:**	**III**
Date:	28.12.2021	**Part:**	III	**Semester:**	**V**
Duration:	2 Hours	**Academic Year:**	2021-22	**Max.Marks:**	**75**
Study Component:		Elective			
Course Title:	**OBJECT ORIENTED PROGRAMMING WITH C++**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1 a) What do you mean by Data Abstraction and Encapsulation? Explain briefly. **CO1**

[OR]

b) With neat diagram, explain output operator and input operator. **CO1**

2 a) Distinguish between Call by reference and Return by reference. **CO2**

[OR]

b) What is called Inline function? Write down the general form of inline function. **CO2**

3 a) Write down the general form of a class declaration. With block diagram, how to access data members and member functions in private area. **CO3**

[OR]

b) What is friend function? What are the merits and demerits of using friend function. **CO3**

4 a) What do you mean by dynamic initialization of objects? Why do we need to do this? **CO4**

[OR]

b) What is a constructor?. List out the special characteristics of constructor functions. **CO4**

5 a) What does inheritance mean in C++? Illustrate the different forms of inheritance. **CO5**

[OR]

b) Distinguish between Multilevel inheritance and Multiple inheritance with general forms and diagram. **CO5**

SECTION – B

Answer **ALL** the Questions: **(5 X 10 = 50 Marks)**

6 a) Explain the structure of C++ program. **CO1**

[OR]

b) Write a program for temperature conversion (Celsius to Fahrenheit and Fahrenheit to Celsius using if-else statement. **CO1**

7 a) With diagram and examples explain about Basic data types. **CO2**

[OR]

b) Write a program for Binary to Decimal conversion. **CO2**

8 a) Discuss about defining a member function outside the class definition and inside the class definition. **CO3**

[OR]

b) Write a program to find largest among two numbers using nesting of member function. **CO3**

9 a) What are the different types of constructors? Explain with example. **CO4**

[OR]

b) Write a program using overloading unary minus operator. **CO4**

10 a) Write down the general form of defining derived class and Sketch the pictorial representation for the two levels of derivation (ie., Effect of inheritance on the visibility of members.) **CO5**

[OR]

b) Write a program to implement single inheritance. **CO5**

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VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234

DEPARTMENT OF PHYSICS

Course Code:	06SB31	**Programme:**	B.Sc., Physics	**CIA:**	**III**
Date:	21.12.2021	**Part:**	IV	**Semester:**	**III**
Duration:	1 Hour	**Academic Year:**	2021-22	**Max.Marks:**	**25**
Study Component:		Skill Based			
Course Title:	**SOLAR ENERGY**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1. **a**. Explain about sunshine recorder in detail. **CO1**

(Or)

b. Discuss briefly about the pyranometer with neat diagram. **CO1**

2. **a**. Explain about the effect of dust and shading. **CO2**

(Or)

b. Explain typical liquid collector in detail. **CO2**

3. **a**. Write down the advantages and disadvantages of solar concentrators over the flat plate collectors. **CO3**

(Or)

b. Discuss about the solar concentrators and receivers geometries. **CO3**

4. **a**. Explain about the PV technology in India. **CO4**

(Or)

b. Write down the advantages and disadvantages of photovoltaic solar energy conversion. **CO4**

5. **a**. Illustrate the box type solar cooker with neat diagram and also point out its merits and demerits. **CO5**

(Or)

b. Give a brief account on the application of solar energy in space. **CO5**

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DEPARTMENT OF PHYSICS

Course Code:	06SB51	**Programme:**	B. Sc., Physics	**CIA:**	**III**
Date:	21.12.2021	**Part:**	IV	**Semester:**	**V**
Duration:	1 Hour	**Academic Year:**	2021-22	**Max.Marks:**	**25**
Study Component:		Skill Based			
Course Title:	**FIBRE OPTIC COMMUNICATION**				

SECTION – A

Answer **ALL** the Questions: **(5 X 5 = 25 Marks)**

1. **a**. Explain the significance of Numerical Aperture of an optical fibre. **CO1**

(OR)

b. Calculate the refractive indices of the core and cladding material of a fibre from the following data: NA = 0.22 and Δ = 0.012. **CO1**

2. **a**. Write short notes on the structure of a stepped index fibre with suitable diagrams. **CO2**

(OR)

b. A fibre has a refractive index of its core 1.46 and cladding 1.45. Compute the NA and fractional difference in the refractive index (Δ). **CO2**

3. **a**. Describe with suitable sketch the external CVD technique. **CO3**

(OR)

b. Elucidate the fibre fabrication process using Phasil system along with its characteristics. **CO3**

4. **a**. Explain the working principle of a semiconductor laser diode. **CO4**

(OR)

b. Calculate the 3-dB bandwidth and the resistor that can be used without significantly increasing rise time. The PIN diode has a capacitance of 5 pF and a transit-time limited rise time of 2 ns. **CO4**

5. **a**. Explain with necessary diagram the working principle of a fibre optic receiver. **CO5**

(OR)

b. Explain various important applications of integrated optic fibre technology. **CO5**

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