

**U.G. DEGREE EXAMINATION – JUNE 2021  
PHYSICS  
FIRST YEAR**

**MECHANICS, PROPERTIES OF MATTER AND SOUND**

**Time: 3 Hours**

**Maximum Marks: 75**

**PART- A**

**(5 x 3 = 15 Marks)**

**Answer ALL questions.**

1. Define Frictional forces
2. State any two Kepler's laws of motion.
3. What are elastic materials?
4. Differentiate Laminar and Vortex flow.
5. What are stationary waves?

**PART - B**

**(5 x 12 = 60 Marks)**

**Answer ALL questions.**

6. a) i. What is a projectile?  
ii. Derive the general equation for the motion of a projectile. Calculate the expressions for maximum height  
Or  
b) Derive an expression for law of conservation of angular momentum.
7. a) State the Kepler's laws of planetary motion and derive the Kepler's third law of planetary motion.  
Or  
b) Mention any three merits of Boy's method over others method.
8. a) Explain with necessary theory, the determination of young's modulus of elasticity of the material of a beam supported at its ends and loaded in the middle.  
Or  
b) What are elastic materials and differentiate between elastic and inelastic materials?
9. a) State and prove Bernoulli's theorem also derive an expression for horizontal pipe also.  
Or  
b) Differentiate Laminar and Vortex flow.

10. a) i) Derive an expression for Simple Harmonic vibration.  
ii) Derive an expression for the potential energy and K.E. of a harmonic oscillator, hence show that total energy remains conserved in S.H.M.

Or

- b) What is progressive and stationary wave?

## U.G. DEGREE EXAMINATION - JUNE 2021

## PHYSICS

## FIRST YEAR

## MECHANICS, PROPERTIES OF MATTER AND SOUND

Time: 3 Hours

Maximum Marks: 70

## PART – A

(5x2=10 Marks)

Answer all the questions.

1. Define center of a mass of system.
2. State Newton's law of gravitation.
3. What do you mean by bending moment of a beam?
4. Distinguish between streamline and turbulent flow.
5. What is meant by harmonic motion?

## PART - B

(4 x 5 = 20 Marks)

Answer any FOUR questions.

6. Define the terms momentum and impulse. How are they related to each other?
7. State Kepler's laws of planetary motion.
8. Prove that Young's modulus 'Y', bulk modulus 'K' and rigidity modulus 'n' are related by the relation  $\frac{9}{Y} = \frac{1}{K} + \frac{3}{n}$ .
9. Derive an expression for the internal bending moment of a bar.
10. Obtain an expression for the excess of pressure inside a spherical liquid drop.
11. Define 'angle of contact' and 'surface film'. How surface energy is related to surface tension?
12. What are stationary waves? Compare the characteristic properties between progressive and stationary waves.

**Answer any FOUR questions.**

13. What do you understand by friction? Derive the relation between angle of friction and coefficient of friction.
14. Define inelastic collision. Prove that the kinetic energy before collision is greater than the kinetic energy after collision in an inelastic collision.
15. Derive expressions for the gravitational potential due to a uniform sphere at a point i) inside ii) outside and iii) on the surface of the sphere.
16. Derive an expression for the time period of a torsional pendulum.
17. Explain how the viscosity of a given liquid is determined by using Poiseuille's method.
18. Explain Melde's string method to determine the frequency of tuning fork by transverse and longitudinal mode.
19. State and explain Doppler's effect. Explain how the Doppler Effect is used in ultrasonic to study fetal heart movement.

**U.G. DEGREE EXAMINATION – JUNE 2021****Physics****First Year****OPTICS AND SPECTROSCOPY**

Time: 3 Hours

Maximum Marks: 75

**PART - A****(5 x 3 = 15 Marks)****Answer ALL questions.**

1. How do eliminate or reduce astigmatism?
2. Mention any three application of air wedge.
3. What is Fraunhofer diffraction?
4. What do you mean by specific rotation in optics?
5. Distinguish spontaneous and stimulated emissions.

**PART - B****(5 x 12 = 60 Marks)****Answer ALL questions.**

6. a) What are the methods used to minimize spherical aberration? Explain any three method.  
Or  
b) Derive an expression of prismatic combination for i) deviation without dispersion  
ii) dispersion without deviation
7. a) Describe the construction and the principle of working of a Michelson's interferometer also explain the formation of fringes.  
Or  
b) Deduce the theory of Fresnel's biprism and workout mathematically the shape of the interference fringes in space.
8. a) What is diffraction of light? Explain the essential difference between interference and diffraction. Distinguish between Fresnel and Fraunhofer class of diffraction.  
Or  
b) Discuss Fraunhofer diffraction pattern due to a single slit, giving analytically the distribution of intensity in the pattern. Find the expression for the width of central maxima.
9. a) Describe the construction and action of a Nicol prism. Explain how a nicol prism is used to produce and analyse plane polarized light.  
Or  
b) Give construction and the theory of (a) a quarter wave plate (b) half wave plate

10. a) Explain with principles, the construction, working, energy level diagram, advantages and disadvantages of semiconductor Laser.

Or

b) Derive an expression of Einstein's coefficient and its relations.

## U.G. DEGREE EXAMINATION - JUNE 2021

## PHYSICS

## FIRST YEAR

## OPTICS AND SOECTROSCOPY

Time: 3 Hours

Maximum Marks: 70

## PART – A

(5x2=10 Marks)

Answer all the questions.

1. Define the term coma.
2. State the condition for brightness and darkness in thin films.
3. What is a Zone plate?
4. Calculate the thickness of a Quarter wave plate of quartz for a wave length of  $5000 \text{ \AA}$ , when the refractive indices of ordinary and extraordinary rays are 1.544 and 1.553 respectively.
5. Give any two applications of laser.

## PART – B

(4 x 5 = 20 Marks)

Answer any FOUR questions.

6. How spherical aberration caused and what is the ways to minimize spherical aberration?
7. Explain the theory and construction of Huygen's eyepieces.
8. Explain how interference can fringes be obtained with the help of a Fresnel's biprism.
9. Distinguish between Fraunhofer and Fresnel diffraction.
10. Derive an expression for resolving power of a telescope.
11. Describe how Nicol prism can be used as an analyzer.
12. Explain the different methods for the detection of Ultraviolet Radiation.

Answer any FOUR questions.

13. Explain how two narrow angled prisms of different dispersive powers may be combined to produce dispersion without deviation and deviation without dispersion.
14. Explain the formation of interference fringes by air-wedge. How can the above method be used to measure the thickness of the paper?
15. Describe the construction and working of Michelson's interferometer. How is the interferometer used to measure wavelength of the light?
16. Explain the determination of wavelength of light using plane transmission grating by normal incidence method.
17. Describe Laurent's half shade polarimeter. Explain how it can be used to find the specific rotatory power of a sugar solution.
18. Describe Raman Effect. Explain in detail about the experimental study of Raman Effect.
19. Derive an Einstein's relation for stimulated emission, and hence explain the existence of stimulated emission.



## U.G. DEGREE EXAMINATION – JUNE 2021

## PHYSICS

## SECOND YEAR

## HEAT AND THERMODYNAMICS

Time: 3 Hours

Maximum Marks: 75

## Part -A

(5 x 3 = 15 Marks)

Answer All Questions.

1. What is specific heat capacity of a substance?
2. Differentiate specific heat and heat capacity.
3. State Dulong Petti law.
4. Infer phase space.
5. Review Photon gas.

## Part - B

(5 x 12 = 60 Marks)

Answer All Questions.

6. a) Explain Einstein's theory of specific heat of solids. Discuss the success and limitations of this theory.

OR

- b) Discuss the Debye's theory of specific heat of solids as an improvement over Einstein's theory.

7. a) How do determine the specific heat capacity of water by Joule's Electrical Method. Explain in detail.

OR

- b) i) solve:  $1 \text{ dm}^3$  of hydrogen at STP has a mass of 0.09g. if  $2 \text{ dm}^3$  of gas at STP has a mass of 2.880 g. Calculate the vapour density and molecular mass of the gas.

ii) Discuss Joly's Steam Calorimeter.

8. a) Explain the law of equipartition of energies and hence find the mean energies from the partition function.

OR

b) Discuss the Vibrational partition functions of diatomic and polyatomic molecule.

9. a) Obtain the expression for rotational partition function of hetero and homo nuclear Diatomic molecules.

OR

b) Mention any four methods of calculation of thermal Conductivity of Gases.

10. a) Discuss the relation between the thermodynamical potentials with their variables and hence derive the Maxwell's thermodynamical relation.

OR

b) Derive Maxwell's relations for i) internal energy ii) enthalpy.

## U.G. DEGREE EXAMINATION – JUNE 2021

## PHYSICS

## SECOND YEAR

## ELECTICITY AND MAGNETISM

Time: 3 Hours

Maximum Marks: 75

## Part -A

(5 x 3 = 15 Marks)

## Answer All Questions

1. Deduce Coulomb's inverse square law from Gauss's law.
2. State and explain Peltier effect.
3. Find an expression for the decay of charge of a capacitor through resistance.
4. Compare between series and parallel resonant circuits.
5. Mention any three properties of diamagnetic and paramagnetic materials.

## Part - B

(5 x 12 = 60 Marks)

## Answer All Questions

6. a) For uniformly charged non conducting sphere calculate the potential due to an external and internal points.

OR

- b) State and prove Coulomb's law to find the balancing condition for Wheatston's bridge.

7. a) Apply Kirchoff's law to find the balancing conditions for Wheatstone's bridge.

OR

- b) What do you understand by thermo electric diagrams? Explain the Peltier and Thomson effect.

8. a) i) Explain self induction.

- ii) Describe the Rayleigh's method for determination of self inductance of a coil.

OR

- b) i) Explain mutual induction.

- ii) Deduce an expression for coefficient of coupling.

9. a) Obtain an expression for resonant frequency for a series resonant circuit.

OR

b) Describe the construction and working of a transformer with load and without load

10. a) Explain the Langevin's theory of Paramagnetism.

OR

b) Describe the experiment to draw B-H curve of a iron sample in the form of an anchoring.

**U.G. DEGREE EXAMINATION – JUNE 2021****PHYSICS****THIRD YEAR****ATOMIC AND SOLID STATE PHYSICS****Time: 3 Hours****Maximum Marks: 75****PART- A****(5 x 3 = 15 Marks)****Answer ALL questions.**

1. What do you mean by excitation and ionization potentials of an atom?
2. Define Stark effect.
3. X-rays are more penetrative than visible light. Why?
4. Mention the applications of photo electric cells.
5. Explain Basis.

**PART - B****(5 x 12 = 60 Marks)****Answer ALL questions.**

6. a) Explain the concept of vector atom model. Give an account of the different quantum numbers used in this model.  
Or  
b) Explain J-J coupling. State under which condition it is predominant.
7. a) Give Debye's explanation for normal Zeeman effect.  
Or  
b) Derive an expression for magnetic dipole moment of an electron in an orbit. Also Calculate the magnetic dipole moment due to spin of electron.
8. a) Give the theory of Compton effect.  
Or  
b) State and explain Moseley's law. Explain the importance of Moseley's work on X-rays.
9. a) Explain the action of photo conductive and photo voltaic cell with neat diagrams.  
Or  
b) Give an account of Millikan's experimental verification of Einstein's photoelectric equation

10. a) What is meant by symmetry element in a crystal? Illustrate the various symmetry elements exhibited by a cubic crystal.

Or

b) (i) What are Miller indices? How they are determined?

(ii) Determine the coordination number for FCC structure with neat diagram.

**U.G. DEGREE EXAMINATION - JUNE 2021**  
**PHYSICS**  
**THIRD YEAR**  
**WAVE MECHANICS AND NUCLEAR PHYSICS**

**Time : 3 Hours**

**Maximum Marks : 75**

**PART - A**

**(5 x 3 = 15 Marks)**

Answer all **FIVE** of the following questions.

1. What do you mean by wave and group velocity.
2. Mention any 3 properties of wave function.
3. Give any two evidences in favour of shell model of nucleus.
4. What is the importance of the determination of half life?
5. Distinguish between nuclear fusion and fission.

**PART - B**

**(5 x 12 = 60 Marks)**

Answer all **FIVE** of the following questions.

6. a) Describe with relevant theory of Davisson and Germer experiment. Discuss the significance of the result of the experiment.  
(or)  
b) Explain De-Broglie's concept of matter waves and derive an expression for wavelength of matter waves.
7. a) Obtain Schrodinger's time independent wave equation for matter waves.  
(or)  
b) (i) What are the postulates of wave mechanics?  
(ii) Write short note on operators (Any two operators) in wave mechanics.
8. a) Write down the semi-empirical mass formula & Give arguments for each term. What are the conclusions drawn from this formula.  
(or)  
b) Give short notes of the (i) angular momentum  
(ii) Size and (iii) density of the nucleus

- 9 a) Describe giving necessary theory and the working of a Betatron.  
(or)  
b) Compare and Contrast briefly the properties of  $\alpha, \beta, \gamma$  rays.
10. a) Describe the construction and working of a nuclear reactor  
(or)  
b) Write a note on artificial radioactivity and discuss the applications of radio isotopes.



## U.G. DEGREE EXAMINATION - JUNE 2021

## PHYSICS

## THIRD YEAR

## BASIC AND DIGITAL ELECTRONICS

Time: 3 Hours

Maximum Marks: 75

## PART - A

(5x3=15 Marks)

Answer ALL the questions.

1. Write the applications of MOSFET.
2. Write the Barkhausen's criterion.
3. Write the DeMorgan's theorem.
4. What is called a Flip flop?
5. What do you mean by a microprocessor?

## PART - B

(5 x 12 = 60 Marks)

Answer ALL the questions.

6. (a). Explain half wave and full wave rectifiers with neat diagram.

Or

- (b). Draw the FET circuit and discuss its characteristics.

7. (a). Discuss the astablemultivibrator using transistors.

Or

- (b). Explain the AM and FM transmitters.

8. (a). Show that NAND and NOR gates can be used as an universal gates.

Or

- (b). Explain DTL and TTL gates.

9. (a). Explain about shift registers.

Or

- (b). Discuss the analog to digital converters.

10. (a). Explain the architecture of a microprocessor.

Or

(b). Discuss the 8085 microprocessor instruction set.

**U.G. DEGREE EXAMINATION - JUNE 2021****PHYSICS****THIRD YEAR****MATHEMATICAL PHYSICS****Time: 3 Hours****Maximum Marks: 75****PART - A****(5x3=15 Marks)****Answer all the questions.**

1. Write the D' Alembert's principle.
2. Define phase space.
3. What is called Gamma function?
4. Define Hermitian and skew Hermitian matrices.
5. What is called divergence?

**PART - B****(5 x 12 = 60 Marks)****Answer all the questions.**

6. (a). Discuss the applications of Lagrange's equation of motion of linear harmonic oscillator.

Or

(b). Discuss the applications of Lagrange's equation of motion to simple pendulum.

7. (a). Explain Hamilton's canonical equations of motion.

Or

(b). Discuss the applications of Hamilton's equation of motion of linear harmonic oscillator.

8. (a). Evaluate the Beta function.

Or

(b). Evaluate the Gamma function.

9. (a). Explain the Cayley Hamilton theorem.

Or

(b). Explain the symmetric and antisymmetric functions.

10. (a). Explain the line integral of a vector field around an infinitesimal rectangle.

Or

(b). Explain the Gauss divergence theorem.

**U.G. DEGREE EXAMINATION - JUNE 2021****PHYSICS****FIRST YEAR****DIFFERENTIAL EQUATIONS****Time: 3 Hours****Maximum Marks: 75****PART - A****(5 x 5 = 25 Marks)**Answer any **FIVE** of the following.

1. Solve:  $xyp^2 + (x + y)p + 1 = 0$ . (Where  $p = \frac{dy}{dx}$ )
2. Solve:  $(px - y)(py + x) = 2p$ .
3. Solve:  $(D^2 + 4D + 3)y = e^{-3x}$ .
4. Solve:  $x^2y'' - 3xy' = x + 1$ .
5. Solve:  $yz \log z dx - zx \log z dy + xy dz = 0$
6. Solve:  $p^2 + q^2 = x + y$
7. Find Laplace transform of  $\sin^2 t \cos^3 t$ .
8. Find inverse Laplace transform of  $\frac{s-1}{2s^2+s+6}$

**PART - B****(5 x 10 = 50 Marks)**Answer any **FIVE** of the following.

9. Solve:  $yp^2 - xp + 2y = 0$
10. Solve:  $(D^2 - D + 1)y = x^3 - 3x^2 + 1$
11. Solve:  $y'' + y = \operatorname{cosec} x$  using variation of parameter method.
12. Solve:  $yz dx + (xz - yz^3) dy - 2xy dz = 0$
13. Solve:  $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$
14. Solve:  $(p^2 + q^2)y = qz$  ( $p = \frac{\partial z}{\partial x}$ ,  $q = \frac{\partial z}{\partial y}$ ) by Charpit's method.

15. (i) Find  $L\left(\frac{\cos 3t - \cos 2t}{t}\right)$   
(ii) Find  $L^{-1}\left(\frac{s+2}{(s-4)(s^2+1)}\right)$
16. Using Laplace transform solve the equation  
 $y'' + 6y' + 5y = 2e^{-2t}$ ; given  $y(0) = 0, y'(0) = 1$ .

## U.G. DEGREE EXAMINATION - JUNE 2021

## PHYSICS

## FIRST YEAR

## DIFFERENTIAL EQUATIONS

Time: 3 Hours

Maximum Marks: 70

## PART - A

(5 x 2 = 10 Marks)

Answer all FIVE questions

- Form the differential equation for which  $xy = ae^x + be^{-x} + x^2$  is a solution.
- Solve:  $y'' + 4y' + 13y = 2e^{-x}$  given  $y(0) = 0$  and  $y'(0) = -1$
- Solve:  $\frac{xdx}{y^2z} = \frac{dy}{xz} = \frac{dz}{y^2}$
- Solve:  $x\frac{\partial z}{\partial x} = 2x + y + 3z$
- Write sufficient conditions for the existence of the Laplace transformation.

## PART - B

(4 x 5 = 20 Marks)

Answer any FOUR questions

- Find the solution of the Clairauts' equation  $xyp^2 + p(3x^2 - 2y^2) - 6xy = 0$ .
- (i) Solve the exact differential equation  $(a^2 - 2xy - y^2)dx - (x + y)^2dy = 0$ .  
(ii) Solve:  $xy' + y = y^2 \log x$ .
- Solve  $\frac{dx}{y^2(x-y)} = \frac{dy}{-x^2(x-y)} = \frac{dz}{z(x^2+y^2)}$ .
- Solve  $(y + z)p + (z + x)q = x + y$  by Lagrange's method.
- Find Laplace transform of  $\sin^2 t \cos^3 t$ .
- Using Laplace transform, solve the differential equation  $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} - 3y = \sin t$  given that  $y(0) = 0$  and  $\frac{dy}{dt}\Big|_{t=0} = 0$ .
- Solve the differential equation  $xy'' - (2x + 1)y' + (x + 1)y = x^2e^x$ .

**Answer any FOUR questions**

13. Solve:  $(x^3 - 3xy^2)dx - (y^3 - 3x^2y)dy = 0$ .
14. Apply the method of variation of parameters to solve  $x^2y'' + 4xy' + 2y = e^x$ .
15. Solve (i)  $\frac{dx}{x} = \frac{dy}{y} = \frac{dz}{z}$ ; (ii)  $\frac{dx}{x(y^2-z^2)} = \frac{dy}{y(z^2-x^2)} = \frac{dz}{z(x^2-y^2)}$ .
16. Solve  $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$ .
17. Using Laplace transform techniques, solve the simultaneous equations:  
 $3\frac{dx}{dt} + \frac{dy}{dt} + 2x = 1$ ;  $\frac{dx}{dt} + 4\frac{dy}{dt} + 3y = 0$ , given that  $x(0) = 0 = y(0)$ .
18. (i) Find the Laplace transform of  $\frac{\cos 2t - \cos 3t}{t}$ , (ii) Find  $L^{-1} \left[ \frac{s}{s^2 a^2 + b^2} \right]$
19. Show that the solution of the differential equation  $\frac{d^2y}{dt^2} + 4y = A \sin pt$ , which is such that  $y(0) = 0$  and  $\frac{dy}{dt} \Big|_{t=0} = 0$  is  $y = \frac{A}{4-p^2} (\sin pt - \frac{1}{2} p \sin 2t)$  if  $p \neq 2$ . If  $p = 2$  then show that  $y = \frac{A}{8} (\sin 2t - 2t \cos 2t)$ .



## U.G. DEGREE EXAMINATION - JUNE 2021

## PHYSICS

## FIRST YEAR

## GENERAL CHEMISTRY

Time: 3 Hours

Maximum Marks: 75

## SECTION - A

(5x5 = 25 Marks)

Answer any FIVE questions.

1. Write notes on indicators.
2. With suitable examples explain molarity and normality.
3. Explain fractional crystallization.
4. Explain catalyst and its properties.
5. What are the types and properties of polymers?
6. Define antibiotics. List out the uses of penicillin and streptomycin.
7. Give brief account on common safety methods in a laboratory.
8. Bring out the causes and effects of water pollution.

## SECTION - B

(5 x 10 = 50 Marks)

Answer any FIVE questions.

9. What are the types of chemical bonds? Describe any three types of bonds with examples.
10. With suitable examples explain the following organic reaction  
(i) Addition (ii) Substitution (iii) Polymerization
11. Define chromatography. Write the principles and applications of thin layer chromatography.
12. Explain the Michaelis-Menten equation.
13. Write preparation and applications of the following:  
(i) Polythene (ii) Teflon

14. Classify carbohydrates with suitable examples. Write the properties of disaccharides.
15. Define water soluble vitamins. Discuss sources and deficiency states of any three of them.
16. Define pollution. Bring out the reasons and effects of air pollution.

**UG DEGREE EXAMINATION – JUNE 2021****PHYSICS****FIRST YEAR****PRACTICAL-1****Time : 3 Hours****Maximum Marks: 80****Answer any One question**

1. Determine the coefficient of viscosity of the given liquid by Poiseuille's flow method.
2. Determine the frequency of AC using sonometer
3. Determine the Refractive index of the prism using spectrometer.
4. Determine the radius of curvature of planoconvex lens surface by forming Newton's rings with it.
5. Find the Young's modulus of the given material bar by uniform bending using pin and microscope method.
6. Determine the thermal conductivity of a bad conductor taken in the form of a circular disc by Lee's disc method.

**UG DEGREE EXAMINATION – JUNE 2021****PHYSICS****FIRST YEAR****PRACTICAL-1****Time : 3 Hours****Maximum Marks: 70****Answer any One question**

1. Determination of Thickness of A Thin Wire – Air Wedge Method
2. Determine the frequency of AC using sonometer
3. Determine the Refractive index of the prism using spectrometer.
4. Determine the radius of curvature of planoconvex lens surface by forming Newton's rings with it.
5. Find the Young's modulus of the given material bar by uniform bending using pin and microscope method.
6. Determine the thermal conductivity of a bad conductor taken in the form of a circular disc by Lee's disc method.

**U.G. PRACTICAL EXAMINATION – JUNE - 2021****PHYSICS****PRACTICAL - II****Time: 3Hours****Maximum Marks: 80****Answer any One**

1. Determine the moment of inertia of the metallic disc and the rigidity modulus of the material of the wire.
2. Study the characteristics and to determine the breakdown voltage of a zener diode.
3. Determine the reduction factor of the given tangent galvanometer ( $K$ ) and find out the horizontal component of earth's magnetic field ( $B_h$ ).
4. Compare the e.m.f.'s of two given primary cells by using a potentiometer.
5. Find the refractive index and Cauchy's constants of a prism using spectrometer.
6. Determine the specific resistance of the given coil of wire by comparing two nearly equal resistances using a Carey-Foster Bridge.

**UG DEGREE EXAMINATIONS – JUNE 2021**

**PHYSICS**

**THIRD YEAR**

**PRACTICAL - III**

**Time: 3 Hours**

**Maximum Marks: 80**

**Answer any One**

1. Design a fixed bias Bistable Multivibrator and to measure the stable state voltages before and after triggering.
2. Wiring of a RC coupled single stage BJT amplifier and determination of the gain frequency response, input and output impedances.
3. Design a colpitts oscillator of frequency 10KHZ  $C_1=0.1\mu\text{F}$ ,  $C_2=0.01\mu\text{F}$  and plot the waveforms.
4. Design and determine the period and frequency of oscillations of an a stable multi vibrator with the component value  $R_1=R_2=150\text{K}\Omega$ ,  $R_{C1}=R_{C2}=3.3\text{K}\Omega$ .
5. Design and construct the integrator and differentiator circuits and obtain the output response for various input frequency range.
6. Plot the V-I Characteristics of the solar cell and hence determine the fill factor.

**U.G. PRACTICAL EXAMINATION – JUNE - 2021****PHYSICS  
PRACTICAL - IV****Time : 3Hours****Maximum Marks: 80****Answer any One**

1. Study and verify the Truth Tables of AND, OR, NOT, NAND, NOR and EXOR logic gates for positive logic.
2. Implement Boolean expression using AOI logic. To design basic gates using NANDgate.
3. Verify the rules and regulations of Boolean Algebra, simplify and modify Boolean logic functions by means of Demorgan's theorem and design and implement a logic circuit.
4. Design shift Register & verify truth table. used as a serial/parallel shift. Resistor.
5. Design and implement an asynchronous counter using decade counter IC to count up from 0 to n ( $n \leq 9$ ) and demonstrate its working.
6. Design and implement 4-bit adder and subtractor using IC 7483.