



Paper ID : 260795

Subject Code:KAS201

Roll No:

BTECH

(SEM. II) THEORY EXAMINATION 2025-26

PHYSICS

TIME: 3 HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

2x10 = 20

(a)	Write two differences between inertial and non-inertial frame of reference.	CO-1	K1
(b)	State Einstein's postulates of special theory of relativity.	CO-1	K1
(c)	State faraday's law of electromagnetic induction.	CO-2	K1
(d)	What is the physical significance of Gauss Divergence theorem?	CO-2	K1
(e)	What is meant by wave particle duality?	CO-3	K1
(f)	Write the characteristics of wave function.	CO-3	K1
(g)	Why Newton's rings are circular fringes?	CO-4	K2
(h)	What is a grating element?	CO-4	K1
(i)	What do you mean by pumping?	CO-5	K1
(j)	What do you mean by total internal reflection?	CO-5	K1

SECTION B

2. Attempt any *three* of the following:

10 x 3 = 30

(a)	What was the objective of Michelson Morley experiment? Describe the experiment. How is the negative result of the experiment interpreted?	CO-1	K2
(b)	Write down Maxwell's equations in conducting media. Show that Electromagnetic waves travel with the speed less than the speed of light in conducting media.	CO-2	K3
(c)	What do you understand by Wave particle duality? Give experimental evidence which verifies de-Broglie Matter wave.	CO-3	K2
(d)	Explain the formation of Newton's rings in reflected monochromatic light. Prove that in reflected light diameters of the bright rings are proportional to the square root of odd natural numbers.	CO-4	K3
(e)	Describe the essential components of a Ruby laser. Explain its working on the basis of the relevant energy level diagram.	CO-5	K3

P.T.O.

SECTION C

3. Attempt any *one* part of the following:

10 x 1 = 10

(a)	Explain Time dilation effect using Lorentz transformation equation. At what speed should a clock be moved so that it may appear to lose 1 minute in each hour?	CO-1	K2
(b)	Derive Einstein's mass energy relation. If 4 kg of a substance is fully converted into energy, how much energy is produced?	CO-1	K2

4. Attempt any *one* part of the following:

10 x 1 = 10

(a)	State Poynting theorem? Assuming that all the energy from a 2000 watt lamp is radiated uniformly; calculate the average values of the intensities of electric and magnetic fields of radiation at a distance of 4 m from the lamp.	CO-2	K3
(b)	Explain the concept of displacement current. How it makes the Ampere's law to be valid for non steady state?	CO-2	K2

5. Attempt any *one* part of the following:

10 x 1 = 10

(a)	Derive time independent Schrödinger wave equation for a particle wave. What would happen to equation if particle is free?	CO-3	K2
(b)	What is Compton effect? Deduce the expression for Compton shift.	CO-3	K2

6. Attempt any *one* part of the following:

10 x 1 = 10

(a)	Discuss the phenomena of interference of light due to thin films of uniform thickness in reflected light and find the conditions of maxima and minima.	CO-4	K2
(b)	What do you understand by missing order spectrum? What particular spectra would be absent if the width of the transparencies and opacities of the grating are equal?	CO-4	K3

7. Attempt any *one* part of the following:

10 x 1 = 10

(a)	Discuss spontaneous and stimulated emission of radiation. Why is spontaneous radiation incoherent? Explain.	CO-5	K2
(b)	What is an optical fiber? A step index fiber has core and cladding refractive indices 1.466 and 1.460 respectively. If the wavelength of light 0.85 μm is propagated through the fiber of core diameter 50 μm find the normalized frequency and the number of mode supported by the fiber.	CO-5	K3