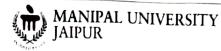
## Name:

## **Enrolment No:**



## Odd Semester Mid Term Examination, December 2024 Faculty of Engineering Department of Physics

Instructions: All questions are compulsory.

Missing data, if any, may be assumed suitably.

Calculator is allowed.

SECTION A			
S. No.		24	
	Which of the following is a condition for sustained interference?	Marks	CO
Q 1	A. Sources should be independent	2	COI
	B. Sources must be coherent		
	C. Sources must have equal intensity		
	D. Both A and B		
Q 2	Which law explains the shift in the peak wavelength of black body radiation with temperature?  A. Stefan's Law		
		2	CO2
	B. Wien's Displacement Law C. Rayleigh-Jeans Law		
	D. Planck's Law		
	The Davisson-Germer experiment confirmed the:		
	A. Wave nature of electrons	2	CO2
	B. Particle nature of electrons		
	C. Quantum theory of light		
	D. Principle of superposition		
	SECTION B		
Q 4	A cavity radiator has its maximum spectral radiancy at a wavelength of 25.0 µm, which lies in the infrared region of the em-spectrum. The temperature of the left of 25.0 µm, which lies in		
		. 4	CO2
	(a) What is the new temperature of the cavity radiator?		
	(b) At what wavelength will the spectral radiancy now have its manifestation as		
Q 5	are phenomenon of diffraction of light and distinguish hoters on F		
<b>4</b> 3	annuctions, with Diffice Schematic diagram	4	CO1
Q 6	A-rays of wavelength $\lambda_0 = 0.20$ nm are scattered from a block of material.		
	and observed at all alighe 01.45° 10 the incident beam direction. Calculate the wavelength	4	CO2
	Tay's and kindle energy of scattered electrons	~	CO2
Q 7	State and prove Brewster's law with a proper schematic diagram, depicting the polarization of		
	the rays involved.	4	COL
	SECTION-C		
Q 8	Define interference of light, and hence explain the coherent sources.		
	Derive the expression for fringe width for the interference fringes obtained from Young's	8	COI
	double slits experiment (YDSE). Support the derivation with a proper schematic diagram.		

<u>Useful Physical constants</u>: Planck's Constant (h) = 6.62607015×10<sup>-34</sup> J·sec, Stefan Boltzmann Constant ( $\sigma$ ) = 5.67 × 10<sup>-8</sup> W/( $m^2$ ·K<sup>4</sup>) Speed of light (c) = 3 x 10<sup>8</sup> m/s, Mass of electron ( $m_e$ ) = 9.1 x 10<sup>-31</sup> kg