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| **B.Tech I Year I Semester Regular Examinations, April 2021**  **Applied Physics**  **(Common to CSE,AIML)**  **Time: 3 hours Max Marks: 70** |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Instructions:**   1. Question paper comprises of **Part-A** and **Part-B** 2. **Part-A** (for 20 marks) must be answered at one place in the answer book. 3. **Part-B** (for 50 marks) consists of **five questions with internal choice,** answer all questions.   **PART – A**  **(Answer ALL questions. All questions carry equal marks)**  **10 \* 2 = 20 Marks** | | | | | | | | **1. a.** | Explain Black Body Radiation. | | **[2]** | | **CO 1** | **L1** | | **b.** | Describe Heisenberg’s Uncertainty principle. | | **[2]** | | **CO 1** | **L1** | | **c.** | Write a note on carrier generation and recombination in semiconductors. | | **[2]** | | **CO 2** | **L6** | | **d.** | What are Photo detectors? | | **[2]** | | **CO 2** | **L1** | | **e.** | What is an Avalanche Photodiode. | | **[2]** | | **CO 3** | **L1** | | **f.** | Write any two important applications of LED. | | **[2]** | | **CO 3** | **L3** | | **g.** | Classify between spontaneous and stimulated Emission. | | **[2]** | | **CO 4** | **L2** | | **h.** | Determine the magnetization and flux density of the diamagnetic material if its magnetic susceptibility is – 0.4 x 10-5 and the magnetic field in it is 104 A m-1. | | **[2]** | | **CO 4** | **L3** | | **i.** | Define Electric dipole and dielectric constant. | | **[2]** | | **CO 5** | **L1** | | **j.** | Define the terms (i) Magnetic Induction (ii) Magnetic Susceptibility | | **[2]** | | **CO 5** | **L1** | | **PART – B**  **(Answer ALL questions. All questions carry equal marks )**  **10 \* 5 = 50 Marks** | | | | | | | | **2.** | (a) Explain Photoelectric Effect.  (b) Obtain the solution for particle enclosed in a one dimensional potential box. | | **[3]**  **[7]** | | **CO 1** | **L2** | | **OR** | | | | | | | | **3.** | (a) Derive an expression for Schrödinger’s time independent wave equation.  (b) Explain the physical significance of Wave function | **[7]**  **[3]** | | **CO 1** | | **L2** | | **4.** | **(a)** Derive an expression for carrier concentration in n-type semiconductor and explain the position of Fermi level | **[10]** | | **CO 2** | | **L2** | | **OR** | | | | | | | | **5.** | **(a)** What is P-N junction diode? Explain the working of P-N junction diode in forward and reverse bias.  (b) Describe the construction and principle of operation of bipolar junction transistor. | | **[5]**  **[5]** | | **CO 2** | **L2** | | **6.** | **(a)** Explain the construction and working of LED.  **(b)** Describe the principle, construction and working of Semiconductor laser with relevant energy level diagram. | | **[5]**  **[5]** | | **CO 3** | **L2** | | **OR** | | | | | | | | **7.** | **(a)**  Explain the structure and working principle of  (I) p-i-n photodiode (II) Avalanche photodiode  **(b)** Write a short note on radiative and non-radiative recombination. | | **[5]**  **[5]** | | **CO 3** | **L2** | | **8.** | **(a**) What is population inversion and optical pumping in lasers? **(b)** Explain the principle, construction and working of He-Ne Laser with energy level diagram | | **[5]**  **[5]** | | **CO 4** | **L2** | | **OR** | | | | | | | | **9.** | **(a)**  Explain optical fiber communication link with help of block diagram  **(b)** Define and derive the expressions for acceptance angle and Numerical Aperture of optical fiber. | | **[5]**  **[5]** | | **CO 4** | **L2** | | **10.** | **(a)** What is electronic polarization? Derive an expression for it. **(b)** Write a short note on Type-I and Type –II super conductors | | **[5]**  **[5]** | | **CO 5** | **L3** | | **OR** | | | | | | | | **11.** | **(a)** Explain the hysteresis phenomenon based on domain theory of ferromagnetism.  **(b)** Write a short note on Meissner effect | | **[5]**  **[5]** | | **CO 5** | **L3** | |
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