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Examination: Even Semester Examination-2023

Paper Name: Elementary Physics

Time: 2.5 Hours

Paper Code: BCA 204

Maximum Marks: 60

Follow proper numbering for answering the questions.

Section-A

Write **TRUE** or **FALSE**

Marking scheme: 1 X 20=20

Q.N.	Questions	CLO	BL
1.	Gauss's law is used to determine the magnetic field produced by a current carrying wire.	CLO1	L1
2.	White light is a monochromatic light.	CLO1	L1
3.	Ruby laser produce green light.	CLO1	L1
4.	Stimulated emission is essential for laser action.	CLO1	L1
5.	Cladding has a higher refractive index then the core of the optical fiber.	CLO1	L1
6.	Conductors have higher electric conductivity than insulators.	CLO1	L1
7.	Depletion layer of the p-n junction diode is filled with free electrons and holes.	CLO1	L1
8.	In a semiconductor, the current flow due to both electrons and holes.	CLO1	L1
9.	Constructive interference produces the bright light for two sources.	CLO1	L1
10.	In population inversion, the number of atoms in the lower energy state is higher than that in the higher energy state.	CLO1	L1
<i>Fill in the blanks.</i>			
11.	Distance between two consecutive crests and troughs is 10 m. Wavelength is _____.	CLO4	L2
12.	Refractive index of core and cladding is 2 and $\sqrt{3}$. Numerical aperture is _____.	CLO4	L3
13.	State Ampere's law?	CLO1	L2
14.	What is the continuity equation in electromagnetism?	CLO1	L1
15.	The fringes width of the interference pattern will be _____, if a light of the shorter wavelength is used in Young's double slit experiment.	CLO4	L3
16.	Calculate the critical angle if the refractive index of the first and second medium are 2 and 3, respectively.	CLO4	L3
17.	What is the full form of the acronym LASER?	CLO1	L1
18.	Energy of ground state and first excited state are 5 eV and 7 eV, respectively. A proton of energy _____ is absorbed for transitions of atom from ground state to first excited state.	CLO4	L3
19.	In reverse biased p-n junction diode depletion layer becomes _____.	CLO1	L1
20.	Coherence is defined as _____.	CLO1	L1

Section-B

Attempt any **FOUR** questions out of **SIX**.

Marking scheme: 4 X 5 = 20

Q.N.	Questions	CLO	BL
1.	Differentiate between a p-type and n-type semiconductor? How a p-n junction is formed?	CLO5	L1
2.	Define Avalanche and Zener breakdown.	CLO5	L1
3.	What is total internal reflection? Draw the block diagram of the optical fiber communications system.	CLO4	L1
4.	Define interference of light. In Young's double slit experiment, find the wavelength of the light used if the screen is 1 m away from the slits, which are separated by a distance of 0.2 meters, and the width of the fringes is measured to be 0.5 mm.	CLO4	L3
5.	What is forward biased diode? Discuss the forward I-V characteristics.	CLO5	L1
6.	Define population inversion and discuss properties of a laser.	CLO1	L1

Section-C

Attempt any **TWO** questions out of **FOUR**.

Marking scheme: 2 X 10 = 20

Q.N.	Questions	CLO	BL
1.	Discuss the working of the He-Ne laser.	CLO5	L2
2.	What is principle of the optical fiber? Derive the expression for the numerical aperture of an optical fiber.	CLO5	L5
3.	What is Ampere's inconsistency? How did Maxwell Modify it?	CLO2	L2
4.	Write the Maxwell's equations. Find the expression for the electric field E at a distance r away from the point charge q using Gauss law.	CLO4	L3
