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Supplementary/Improvement 2024
(For Even Semester Examination 2024)

Paper Name: Elementary Physics
Time: 2.5 Hours

Paper Code: BCA-204/BSC-204
Maximum Marks: 60

Section A

Attempt ALL Questions

(20 × 1 = 20)

Q.No.	Questions	Marks	CO	BL
1	In a forward biased p - n junction, the depletion region decreases. True/False?	1	5	1
2	The refractive index of a core is larger than that of cladding in an optical fiber. True/False?	1	3	1
3	The impure semiconductor is known as extrinsic semiconductor. True/False?	1	5	1
4	Helium-Neon laser is a three level laser. True/False?	1	4	1
5	In a step-index fiber, the refractive index of a fiber is constant. True/False?	1	3	1
6	The energy bandgap in a silicon semiconductor is	1	5	1
7	In SI units, the value of electronic charge is, $e =$	1	1	1
8	The electrostatic force is always attractive. True/False?	1	1	2
9	Stimulated emission needs to be maximised in a laser. True/False?	1	4	1
10	The Gauss's law in integral form is.....	1	1	2
11	If the two waves from coherent sources interfere constructively, their path difference is.....	1	2	2
12	Numerical aperture is high if the acceptance angle is large. True/False?	1	3	2
13	In order to obtain interference, the waves from two light sources must be coherent. True/False?	1	2	1
14	Metastable state is a long-lived state. True/False?	1	4	1
15	The bending of light as it passes through an obstacle is known as diffraction. True/False?	1	2	1
16	Like charges repel each other and unlike charges attract each other. True/False?	1	1	1
17	In a Young's double slit experiment, if the separation between two slits is increased, the fringe width decreases. True/False?	1	2	2
18	Population inversion is necessary to obtain laser action. True/False?	1	4	1
19	In order to have a total internal reflection, the incident angle must be greater than the critical angle. True/False?	1	3	1
20	Holes are the majority charge carriers in a n -type semiconductor. True/False?	1	5	1

Section B

Attempt any FOUR Questions

(4 × 5 = 20)

Q.No.	Questions	Marks	CO	BL
21	Write short notes on avalanche and zener breakdown.	5	5	2
22	State and explain Gauss's law in electrostatics. Deduce its differential form.	5	1	2
23	Write briefly about the properties of laser	5	4	2
24	Draw and explain the V-I characteristics of $p-n$ junction.	5	5	2
25	Write short note on superposition and interference of waves.	5	2	2
26	Write briefly about the different types of optical fiber.	5	3	2

Section C

Attempt any TWO Questions

(2 × 10 = 20)

Q.No.	Questions	Marks	CO	BL
27	(i) Explain the phenomenon of total internal reflection of light. How is it used in propagation of light in optical fiber? (5 marks) (ii) Draw the block diagram of an optical fiber communication. (5 marks)	10	3	2
28	(i) Obtain the expression for fringe width (β) in Young's double slit experiment. (6 marks) (ii) Calculate the wavelength of light used in Young's double slit experiment if the separation between slits, $d = 0.05$ cm, $D = 50$ cm and fringe width, $\beta = 0.05$ cm. (4 marks)	10	2	4
29	State and explain the Ampere's law. Discuss the inconsistency in Ampere's law.	10	1	4
30	Explain the construction and working of a Helium-Neon laser.	10	4	2

BL: Bloom's Taxonomy Level (1-Remembering, 2-Understanding, 3-Applying, 4- Analysing, 5-Evaluating, 6- Creating).