BT/CH/CE/CS/EC/EE/EI/IT/ME-112
14PY102

Hall Ticket Number:

I/IV B.Tech (Regular / Supplementary – Repeat Exam) DEGREE EXAMINATION

January, 2021 **Common to all branches**

First Semester **Engineering Physics -I**

Time: Three Hours **Maximum:** 60 Marks

Answer All Questions from Part - A (1X12 = 12 Marks)
Answer ANY FOUR questions from Part - B. (4X12=48 Marks)

Part - A

1. Answer all questions (1X12=12 Marks)
   a) Define cosine law.
   b) What is meant by diffraction?
   c) What is coherence?
   d) What is meant by active medium?
   e) What is the principle involved in Holography?
   f) Define the principle involved in an optical fiber.
   g) State Gauss's law in electricity.
   h) What is Hall coefficient?
   i) What is resonant frequency in LCR?
   j) Write any two properties of matter waves.
   k) State Heisenberg's uncertainty principle applications.
   l) What is physical significance of wave function?

Part – B

2.	a)	Give the theory of Fraunhoffer diffraction due to single slit..	6M
	b)	Explain briefly the construction of Michelson's interferometer.	6M
3.	a)	Explain the construction and orking of a Nicol prism.	8M
	b)	Define quarter wave plate and half wave plate	4M
4.	a)	Explain the construction and working of a ruby laser.	6M
	b)	Explain recording and reproduction of holography.	6M
5.	a)	What are the properties of Lasers?	4M
	b)	What is acceptance angle of an optical fiber? Derive an expression for it.	6M
	c)	Write the applications of lasers?	2M
6.	a)	With a neat diagram, explain the construction, working and limitations of a cyclotron.	6M
	b)	Derive the impedance of L, C and R in series A.C. circuit.	6M
7.	a)	Write Maxwell equations and give its significance.	8M
	b)	b) What are electromagnetic waves? Obtain expression for velocity of EM wave.	4M
8.	a)	Give the experimental support for de-Broglie's hypothesis.	6M
	b)	State and explain the Heisenberg's uncertainty principle.	6M
9.	a)	What is tunneling and explain Scanning tunneling microscope.	6M
	b)	Derive Schrodinger time independent wave equation.	6M

I/IV B.Tech (Regular) DEGREE EXAMINATION

(First Semester)

Engineering Physics – I

(Common to all Branches)

Time: Three Hours **Maximum Marks: 60**

Answer Question No.1 compulsorily (1 x 12 = 12 Marks)
Answer ONE question from each unit (4x12 = 48)

1. Answer all questions (12 x 1 = 12 Marks)

a) Write the difference between interference and diffraction.
b) What is meant by double refraction?
c) What is Kerr effect?
d) What is meant by population inversion?
e) What is the principle involved in Holography?
f) Define the principle involved in an optical fiber.
g) State Gauss's law in magnetism.
h) What is Hall effect?
i) Define quality factor.
j) Write the properties of matter waves.
k) State Heisenberg's uncertainty principle.
l) What is normalized wave function?

UNIT – I

2. a) Give the theory of plane diffraction grating for normal incidence. (6M)
b) Explain briefly the working of Michelson's interferometer. (6M)

(OR)

3. a) Explain the construction and working of a Nicol prism. (8M)
b) Plane polarized light is incident on a piece of quartz cut parallel to the axis. Find the least thickness for which the ordinary and extra-ordinary rays combine to form plane polarized light. Given μ_0 = 1.5442, μ = 1.5533 and $\lambda = 5 \times 10^{-5}$cm (4M)

UNIT - II

4. a) Explain the construction and working of a He-Ne laser. (6M)
b) Explain recording and reproduction of holography. (6M)

(OR)

5. a) What are the characteristics of Lasers? (4M)
b) What is numerical aperture of an optical fiber? Derive an expression for it. (6M)

c) Write the applications of Holography? (2M)

UNIT-III

6. a) With a neat diagram, explain the construction and working of a cyclotron. (6M)
b) Calculate the impedance of L, C and R in series A.C. circuit. (6M)

(OR)

7. a) Write Maxwell equations in integral and differential form. (8M)
b) What are electromagnetic waves? Obtain expression for velocity of electromagnetic wave. (4M)

UNIT-IV

8. a) Give the experimental support for de-Broglie's hypothesis. (6M)
b) State and explain the applications of Heisenberg's uncertainty principle. (6M)

(OR)

9. a) What is de-Broglie hypothesis? The K.E of neutron is 0.025 eV. Calculate its de-Broglie's wavelength. (4M)
b) Write a short note on Scanning tunneling microscope. (8M)