

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
FIRST/SECOND SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

**Course Code: PH100**

**Course Name: ENGINEERING PHYSICS**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 2 marks.*

- |    |  | Marks |
|----|--|-------|
| 1  | What is the effect of damping on the frequency and time period of an oscillator?               | (2)   |
| 2  | Distinguish between transverse and longitudinal waves.   | (2)   |
| 3  | What are coherent sources?   | (2)   |
| 4  | What is grating element? Write the grating equation in terms of grating element.               | (2)   |
| 5  | What is Kerr effect?   | (2)   |
| 6  | Give two examples each for Type-I and Type-II super conductors.                                | (2)   |
| 7  | What is tunnel effect?   | (2)   |
| 8  | How the symmetry of wavefunction of a system of particles is related to the statistics obeyed? | (2)   |
| 9  | What is the difference between echo and reverberation?   | (2)   |
| 10 | What is magnetostriction effect? Write one application.  | (2)   |
| 11 | What are the advantages of semiconductor laser?  | (2)   |
| 12 | What is photovoltaic effect?   | (2)   |

**PART B**

*Answer any 10 questions, each carries 4 marks.*

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|----|--|-----|
| 13 | Explain the phenomenon of amplitude resonance and obtain the value of resonant frequency.  | (4) |
| 14 | A wave is represented by $\Psi = 3 \times 10^{-3} \cos(8.4 \times 10^{13} t + 2.8 \times 10^5 z) \text{Vm}^{-1}$ . Find the amplitude, frequency, wavelength, and wave velocity where z in metre and t in second.  | (4) |
| 15 | How an interference filter is constructed? Write its working.  | (4) |
| 16 | In Fraunhofer's diffraction due to a single slit a screen is placed <b>2m</b> away from the lens to obtain a pattern. If the slit width is <b>0.2mm</b> and the first minima lies <b>5mm</b> on either side of central maxima, find the wavelength of light. | (4) |

- 17 If a quartz plate act as a half wave plate for plane polarized light of wavelength  $\lambda$ , then show that the same plate would act as quarter wave plate for a wavelength  $2\lambda$ . (4)
- 18 What is superconductivity? Define transition temperature and critical magneticfield. (4)
- 19 Estimate the de Broglie wavelength of an electron moving with a kinetic energy of **100 eV**. (4)
- 20 What is Fermi level? Give it's physical significance (4)
- 21 A hall has dimensions of 25mX 20mX 8m. The reverberation time is 4 s. Determine the average absorption coefficient of the surfaces. (4)
- 22 Calculate the capacitance required to produce ultrasonic waves of frequency **1 MHz** with an inductance of **1 H**. (4)
- 23 Compare photographs and holograms. (4)
- 24 With a block diagram, explain the working of an optical communication system. (4)

### PART C

*Answer any three questions, each carries 6 marks.*

- 25 Solve the differential equation of a damped harmonic oscillator. Explain the time displacement curve of over damped, critically damped and under damped cases. (6)
- 26 Explain the formation of interference fringes using air wedge. How is it used to determine the thickness of a thin wire. (6)
- 27 Describe an experiment to produce elliptically polarized light beam out of a plane polarized one. How will you detect the same? (6)
- 28 Write the Schrodinger equation for a particle trapped in a one dimensional box of width L and solve it to obtain the energy eigen values. (6)

### PART D

*Answer any three questions, each carries 6 marks.*

- 29 Define intensity of sound. Write an expression for it. Distinguish between threshold of hearing intensity and pain intensity. (6)
- 30 What is inverse piezoelectric effect? With the help of a circuit diagram explain the production of ultrasonic waves using a piezoelectric oscillator. (6)
- 31 Explain construction and working of Ruby laser. (6)
- 32 Explain the principle of OFC. Distinguish between step index and graded index fibres. Give any two advantages of optical fibres. (6)

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