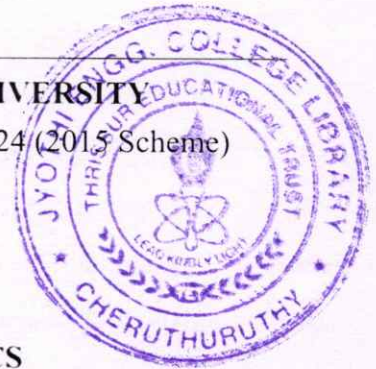


Reg No.: \_\_\_\_\_

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S1 (S,FE) S2 (S,FE) Examination May 2024 (2015 Scheme)

**Course Code: PH 100****Course Name: ENGINEERING PHYSICS**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer all Questions. Each question carries 2 Marks*

Marks

- |    |  |     |
|----|--|-----|
| 1  | List any four points to compare electrical oscillator with a mechanical oscillator | (2) |
| 2  | Distinguish between transverse and longitudinal waves with example?                | (2) |
| 3  | Two independent sources of light cannot produce interference fringes. Why?         | (2) |
| 4  | Define the Resolving power of an optical instrument.                               | (2) |
| 5  | Explain the phenomenon of double refraction in crystals?                           | (2) |
| 6  | Write any two applications of superconductors.                                     | (2) |
| 7  | Define a normalized wavefunction.  | (2) |
| 8  | Distinguish between bosons and fermions?   | (2) |
| 9  | Distinguish between echo and Reverberation.  | (2) |
| 10 | Define magnetostriction effect?  | (2) |
| 11 | Explain the terms population inversion and pumping?                                | (2) |
| 12 | Define Angle of acceptance of an optical fibre?                                    | (2) |

**PART B***Answer any 10 questions. Each question carries 4 Marks*

- |    |   |     |
|----|---|-----|
| 13 | What will happen to fundamental frequency when length of the string reduced to one third of original length kept under same tension   | (4) |
| 14 | The frequency of tuning fork is 600Hz and its Q-factor is $5 \times 10^4$ . Find the relaxation time, also calculate the time after which its energy becomes $1/10^{\text{th}}$ of its initial undamped value | (4) |
| 15 | Distinguish between interference and diffraction.   | (4) |
| 16 | Light of wavelength 550nm is incident normally on a plane transmission grating having 6000lines/cm. Calculate the angle at which the principal maxima of the first order is formed.                           | (4) |
| 17 | Calculate the thickness of a mica sheet required for making a quarter-wave plate  | (4) |

for  $\lambda = 550\text{nm}$ . The refractive indices for the ordinary and extraordinary rays in mica are 1.584 and 1.594 respectively

- 18 Define Meissner effect and Prove that diamagnetism is an essential property of superconductivity. (4)
- 19 Explain the absence of electrons in the nucleus based on uncertainty principle? (4)
- 20 Explain briefly the thermal detection method of ultrasonic waves. (4)
- 21 A theatre has a volume of  $12000\text{ m}^3$ . It is required to have a reverberation time of 2 seconds. What should be the total absorption of the hall? (4)
- 22 Write any four postulates of Fermi Dirac statistics. (4)
- 23 Calculate the numerical aperture and acceptance angle of a fibre with a core index of 1.54 and a cladding index of 1.50 when the fibre is inside the water of a refractive index of 1.33 (4)
- 24 What are the advantages of holography over photography? (4)

**PART C**

*Answer any three questions. Each question carries 6 Marks*

- 25 Derive the expression for the velocity of transverse vibrations on a stretched string. (6)
- 26 Explain formation of Newton's rings and show that the radius of dark ring is proportional to the square root of natural numbers. (6)
- 27 Explain the effect of magnetic field on superconductors and compare Type I and Type II superconductors. (6)
- 28 Describe the construction of Nicol prism. Show that it can be used as a polarizer and an analyser. (6)

**PART D**

*Answer any three questions. Each question carries 6 Marks*

- 29 With the necessary diagram explain the production of ultrasonic waves using Piezoelectric crystal. (6)
- 30 Explain the factors affecting the acoustics of buildings and give the remedial measures. (6)
- 31 With neat diagram describe the working of a Ruby laser? (6)
- 32 Explain the working of optical fiber communication system with block diagram? (6)

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