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 $5x10^4$. Find the relaxation time, also calculate the time after which its energy becomes $1/10^{th}$ 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 λ = 550nm. 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 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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