Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1,S2 (Special Examination) January 2026 (2015 Scheme)

Course Code: PH100
Course Name: ENGINEERING PHYSICS

Max. Marks: 100 Duration: 3 Hours

PART A
Answer all Questions. Each question carries 2 Marks

		Marks
1	What is amplitude resonance? Give one examples	(2)
2	State the laws of transverse vibration of a stretched string.	(2)
3	Write a note on interference filter.	(2)
4	Distinguish between Fresnel and Fraunhofer classes of diffraction.	(2)
5	With a neat diagram explain double refraction	(2)
6	Define critical temperature and critical field of a superconductor.	(2)
7	Obtain the expressions for energy and momentum operator.	(2)
8	Distinguish between bosons and fermions	(2)
9	Distinguish between musical sound and noise.	(2)
10	What is **SONAR**? Give one application	(2)
11	What are the basic components of a laser system?	(2)
12	Explain the principle of propagation of light through optical fibre.	(2)

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

13	Write down the differential equation of electrical and mechanical oscillators and give any four points of comparison between the two oscillators.	(4)
14	The equation of transverse vibration of a stretched string is given by $\mathbf{Y(x,t) = 2 \sin (20t + 0.021x + \frac{\pi}{6})}$ where x and y are in centimetres and t in seconds. Evaluate (i) Amplitude (ii) Initial phase (iii) Frequency and (iv) Velocity of wave.	(4)

15 In Newton's ring the radius of the **10^{th}** dark ring is **0.75cm**.when the air film is replaced by a drop of liquid, the radius reduces to **0.65cm**. find the refractive index of the liquid (4)

16 A grating has **6000lines/cm**. Find the angular separation between two yellow lines of mercury of wavelengths **577 nm** and **579.1 nm** in the second order (4)

17 What are quarter wave plate and half wave plate? Write down the equations for the thickness of the quarter wave plate and half wave plate. (4)

18 What is Meissner effect? Show that super conductors behave like perfect diamagnets. (4)

19 State Heisenberg's Uncertainty Principle and hence explain the natural line broadening of spectral lines. (4)

20 Write three postulates of FD statistics and its distribution equation. (4)

21 The volume of a room is **$7500m^3$** the reverberation time is **1.745s**. The sound absorbing surface of the hall has an area **$1100m^2$**. Calculate the average absorption coefficient (4)

22 A quartz crystal of thickness **0.05m** is vibrating at resonance. Find the fundamental frequency. Young's modulus of quartz **= $8 \times 10^{10} N/m^2$** , density of quartz = **2.65×10^3 Kg/m^3** (4)

23 Explain the method of construction and re-construction of image in holography (4)

24 Write any four advantages of optical fibre communication over conventional communication system (4)

PART C

Answer any three questions. Each question carries 6 Marks

25 Write the differential equation of a forced harmonic oscillator. Derive the expressions for the amplitude and phase difference (6)

26 Explain the theory of grating and derive grating equation (6)

27 Explain the principle, construction and working of a Nicol Prism. (6)

28 Starting from plane wave equation, formulate Schrodinger's time dependent equation by using De- Broglie formula and Einstein relation for photon energy (6)

PART D

Answer any three questions. Each question carries 6 Marks

29	Define reverberation and reverberation time. Write Sabine's formula. What is its significance?	(6)
30	With a neat circuit diagram explain the principle and working of piezoelectric oscillator	(6)
31	With necessary diagrams explain the construction and working of Ruby laser	(6)
32	Define numerical aperture of an optic fibre. Obtain an expression for the numerical aperture of a step index fibre	(6)

****