

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: PH100

Course Name: ENGINEERING PHYSICS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions. Each question carries 2 marks

Marks

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| 1 | What is meant by amplitude resonance? Give any two examples. | (2) |
| 2 | Define frequency and wavelength of a wave. | (2) |
| 3 | What are non reflecting films? | (2) |
| 4 | Compare interference and diffraction of light. | (2) |
| 5 | What is Kerr effect? Give the equation. | (2) |
| 6 | Write down four important applications of Super conductors. | (2) |
| 7 | What is tunnelling effect? | (2) |
| 8 | Define phase space. | (2) |
| 9 | Define intensity of sound .Give the values of threshold of hearing and threshold of pain. | (2) |
| 10 | What is meant by non destructive testing (NDT)? Name an NDT technique? | (2) |
| 11 | Define the terms population inversion and meta stable level. | (2) |
| 12 | What is an LED? Give its working principle. | (2) |

PART B

Answer any 10 questions. Each question carries 4 marks

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|----|---|-----|
| 13 | The frequency of a tuning fork is 250 Hz and its Q-factor is 4×10^4 . Find the relaxation time. Also calculate the time after which its energy becomes $1/10$ of its initial undamped value. | (4) |
| 14 | a Obtain the differential equation of the oscillation of an electric circuit. | (2) |
| | b Compare it with mechanical oscillator. | (2) |
| 15 | a What is Rayleigh's criterion for spectral resolution? | (2) |
| | b Obtain the expression for resolving power of a plane transmission grating. | (2) |
| 16 | What is the higher order spectrum which may be obtained with a light of wavelength 5500 \AA using a plane transmission grating having 4500 lines per cm. | (4) |
| 17 | The refractive indices of Quartz for light of wavelength 5890 \AA are 1.5539 for ordinary ray and 1.5634 for extra ordinary ray. Calculate the required thickness of the Quartz crystal for making a) a QWP and b) a HWP. | (4) |
| 18 | a What is Meissner effect? | (2) |
| | b What are Type I and Type II Superconductors (any two points)? | (2) |
| 19 | a What are the important postulates of Bose-Einstein Statistics? | (3) |
| | b Write down the distribution equation of BE Statistics. | (1) |
| 20 | State Uncertainty principle. Using this principle calculate the uncertainty in frequency of the emitted radiation if the uncertainty in time of an excited atom is | (4) |

5×10^{-8} s.

- 21 The volume of a hall is 6000 m^3 . It has a total absorption of 150 m^2 sabin. If the hall is filled with audience who add another 80 m^2 sabin, find the difference in reverberation time. (4)
- 22 An ultrasonic source of 0.085 MHz sends down a pulse towards the sea water which returns after 0.6 sec. The velocity of sound in water is 1800 m/s . Calculate the depth of the sea and wavelength of pulse. (4)
- 23 With the help of a diagram explain how a hologram is recorded? (4)
- 24 Give any four advantages of optical fibre over conventional transmission lines? (4)

PART C

Answer any three questions. Each question carries 6 marks

- 25 Considering transverse vibrations of a stretched string derive one dimensional wave equation. (6)
- 26 a Draw the neat diagram of air wedge experiment. (2)
b Derive an expression for the bandwidth of the interference fringes using this arrangement. (4)
- 27 Given two Nicol prisms and a Quarter wave plate. How can we produce and analyse plane, circularly and elliptically polarized light. (6)
- 28 Starting from the time dependent equation, derive Schrodinger's time independent wave equation. (6)

PART D

Answer any three questions. Each question carries 6 marks

- 29 Define Reverberation and Reverberation time. (6)
What is the significance of Reverberation time? Compare Reverberation and Echo.
- 30 a What is inverse piezoelectric effect? (2)
b Describe the method of producing ultrasonic waves using this effect. (4)
- 31 a Draw the energy level diagram and explain the working of He-Ne laser. (5)
b What are the important applications of He-Ne Laser? (1)
- 32 a Define numerical aperture and fibre acceptance angle of an optic fibre. (2)
b Derive an expression for numerical aperture (NA) of a step index fibre. (4)
