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Reg. No._____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST/SECOND SEMESTER B.TECH DEGREE EXAMINATION, JULY 2016

PH100 ENGINEERING PHYSICS

Max. Marks: 100   Duration: 3 Hours

Part-A

Answer all questions. Each question carries 2 marks.

1. What is the effect of damping on the frequency and time period of an oscillator?
2. Distinguish between longitudinal waves and transverse waves.
3. Write the expression for the radius of the nth dark ring in Newton's rings interference pattern. What happens to this radius when air is replaced by a liquid of refractive inde μ.
4. Define resolving power of grating.
5. What is a half wave plate? Write the expression for its thickness.
6. What is DC Josephson effect?
7. What is quantum mechanical tunnelling?
8. What do you mean by Fermi level of a system?
9. Define absorption co-efficient of sound.
10. What is piezo electric effect?
11. What is metastable state. How it is significant in the production of laser?
12. What is a phototransistor?

Part-B

Answer any 10 questions. Each question carries 4 marks

13. What is the condition for over damping in the case of a damped harmonic oscillator? With the help of displacement-time graph write how this condition affect the amplitud of the oscillator?
14. A string when stretched by a weight of 4kg gives a note of frequency 256 Hz. What weight will produce a frequency twice the above frequency?
15. What is an interference filter? How is it constructed?
16. A parallel beam of monochromatic light falling normally on a diffraction grating produces a deviation of $14^0\ 43^I$ in the second order. If the grating has 5200 lines/cm calculate the wavelength of the monochromatic radiation.
17. A plane polarized light of λ=6000Å is incident on a quartz crystal and parallel to th axis. If the refractive indices of the crystal for ordinary and extraordinary ray are 1.5

and 1.553, then find the least thickness for which the ordinary and extraordinary rays combines and emerge as plane polarized light.

18. What is Meissner effect? Show that a super conductor is a perfect diamagnet.

19. The time gap between the excitation of an atom and emission of radiation is $\Delta t=10^{-8}$ second. Find the uncertainty in the frequency of radiation.

20. Write three important postulates of Fermi-Dirac Statistics. Also write its distribution equation.

21. A cinema hall has a volume of 10000 m^3. It is required to have a reverberation time of 2 seconds. What should be the total absorption of the hall?

22. Calculate the frequency of ultrasonic waves that can be generated by a nickel rod of length 4cm. (Young's modulus of nickel = 207 GPa and density of nickel 8900 kg/m^3).

23. Calculate the ratio of spontaneous to stimulated emission by an incandescent bulb at 2000 K. Take frequency= 6 x 10^{14} Hz. Boltzmann Constant k = 1.38×10^{-23} J/K.

24. What are Fibre optic sensors? Name two different types.

25.

Part-C

Answer any 3 questions. Each question carries 6 marks.

26. Frame and solve the differer nonic oscillator.

27. With necessary theory write pattern in an air wedge and derive an expression for the

28. You are provided with two r ate. How will you produce plane polarized, circularly polarized and elliptically polarized light.

29. State Uncertainty principle. With the help of it, explain the absence of electrons inside the nucleus.

Answer any 3 questions. Each question carries 6 marks.

30. Name and explain two methods for the detection of ultrasonic waves. Name any four medical applications of ultrasonic waves.

31. What is reverberation and reverberation time? What is its significance? Write the factors on which the reverberation time depends. Write Sabine's formula.

32. Outline the principle and working of He-Ne laser.

33. What is the principle of holography? How is a hologram recorded? Write any two applications of holography.

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