MODEL QUESTION

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY FIRST SEMESTER B.TECH DEGREE EXAMINATION DEC 2015 PH 100 ENGINEERING PHYSICS

Duration: 3 Hrs. Maximum Marks: 100

Part- A

Answer all questions . Each question carries 2 marks

- 1. What is amplitude resonance? What is the condition of amplitude resonance?
- 2. Will a 4 meter long string stretched between two points support waves of $\lambda = 33$ cm. Justify your answer.
- 3. State Rayleigh's criterion for resolution of spectral lines in the case of grating.
- **4.** What will happen to the diameter of the Newtons rings when the air film is replaced by water?
- **5.** What is Meissner effect?
- **6.** What is quarter wave plate?
- 7. Write the expressions for the linear operators corresponding to the energy E and momentum p of a system.
- **8.** Distinguish between Bosons and Fermions.
- **9.** What do you mean by intensity and loudness of sound.
- **10.** What is magnetostriction effect?
- **11.** What is population inversion?
- **12.** What are photo voltaic cells ?

(12 X2 = 24 Marks)

Part- B

Answer any 12 questions. Each question carries 2 marks

- 13. Obtain the One-dimensional differential wave equation and its solution.
- **14.** Establish the equation of motion of a forced harmonic Oscillator.
- **15.** An air wedge illuminated by light of wavelength of 6000A°. Find the angle of wedge? (There are 10 fringes in 1cm)
- **16.** How many lines per meter there in a plane diffraction grating which gives in the second order of an angle of diffraction 30 degree for the light of wave length 520nm incident normally on it?

- 17. A quarter wave plate is to be made of quartz. The refractive indices of quartz for blue light of wavelength 434nm are <u>n0=1.5539</u> and <u>ne=1.5634</u>. Calculate the required thickness.
- **18.** Unpolarised light is falling on a Nicol prism. Polarised light emerging from it falls on another crossed Nicol.If the crossed Nicol is rotated through 30°, calculate the percentage of incident light transmitted.
- 19. Calculate the de Broglie wavelength of an electron whose kinetic energy is 10 KeV.
- **20.** Electrons cannot be occupied inside the nucleus. Justify the statement with proof.
- **21.** Write any 5 applications of ultrasonic waves.
- **22.** Derive Sabine's formula for reverberation time and explain its importance.
- 23. Distinguish between spontaneous and stimulated emission
- **24.** Draw and explain the V-I characteristics of a phototransistor.

(10 X4 = 40 Marks)

Part- C

Group -1: Answer any 3 questions . Each question carries 6 marks

- **25.** Derive the expression for fundamental frequency of transverse vibrations in a stretched string.
- **26.** Explain the action of a plane transmission grating. Derive the grating equation.
- 27. Discribe the construction and working of Nicol prism
- **28.** Obtain Schrodinger's time dependent equation

(3 X6 = 18 Marks)

Group -2: Answer any 3 questions. Each question carries 6 marks

- **29.** How is magnetostriction effect used to produce ultrasonic waves?
- **30.** Explain the factors affecting acoustics of a building. How can we rectify these factors while constructing a building?
- **31.** Explain with necessary theory the working details of any four-level laser.
- 32. What is the principle of fiber optic cable? Derive an expression for numerical aperture.

(3 X6 = 18 Marks)