SAHRDAYA COLLEGE OF ENGINEERING & TECHNOLOGY

KODAKARA

Combined First and Second Semester B. Tech. Degree Examination

April,2014

MODEL QUESTION PAPER

[Common for all B. Tech. Branches]

**EN09 103 – ENGINEERING PHYSICS**

Time: 3hours Maximum Marks: 70

**Part A**

Answer **all** the questions.

1. Explain double refraction with diagram?
2. Give the physical concept of wave function?
3. What do you meant by reciprocal lattice?
4. Explain Meissner effect?
5. How do you test, the planeness of a glass plate by interference method?

(5 x 2 = 10 marks)

**Part B**

Answer any **four** questions.

1. Distinguish between step index fiber and graded index fiber?
2. Explain the properties of Type I and Type II super conductors with suitable diagrams and examples?
3. Examine if two spectral lines of wavelengths 5890Å and 5896Å can be clearly resolved in the (1) first order and (2) second order by a diffraction grating 2 cm wide and having 425 lines/cm.
4. Explain the properties and application of carbon nanotube?
5. A tube 15 cm long is filled with a solution of 60 gms of sugar in 100 ml. of water. It is placed in the path of a plane polarized light. Find the angle of rotation of the plane of polarization of light if the specific rotation of sugar is 65o.
6. Explain how reverberation time affects the acoustic of building? Also give a brief account of corrective measures.

(4 x 5 = 20 marks)

**Part C**

Answer section (a) **or** section (b) of each question.

1. (a) Explain Bragg’s law. Explain Bragg’s X-ray spectrometer. How will you verify Bragg’s law using it?

OR

(b). Describe with theory diffraction caused by a plane transmission grating. Explain how the wavelength of a monochromatic source of light is experimentally determined using grating?

1. (a). With the help of a neat diagram explain the construction and working of Semiconductor laser. Mention the application of laser in Medical fields?

OR

(b).Explain the production and detection of a plane polarized light, circularly polarized light and elliptically polarized light?

14.(a).How does the Fermi level change with temperature in extrinsic semiconductor? Discuss the effect of increasing amount of dopants in extrinsic semiconductor.

OR

(b).What is Avalanche break down and Zener break down. Explain the working of a Zener diode. Explain the amplifier characteristics of NPN transistor?

15.(a).What are ultrasonic? Explain piezoelectric effect. How ultrasonic waves are produced using piezoelectric oscillator?

OR

(b).Derive Schrodinger time independent and time dependent wave equations for the free particle?

(4 x 10 = 40 marks)

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ANSWER KEY

**Part A**

Answer **all** the questions.

1. Double refraction definition - 1mark

Diagram - 1mark

1. Physical concept of wave function - 2marks
2. Reciprocal lattice steps - 1mark

Explanation - 1mark

1. Meissner effect definition - 1mark

Figure - 1mark

1. Explanations - 2marks

**Part B**

Answer any **four** questions.

1. Step index fiber - 2marks

Figure - ½ mark

Graded index fiber - 2 marks

Figure - ½ mark

1. Type I super conductors - 1½ marks

Type II super conductors - 1 ½ marks

Diagrams and examples - 2 marks

1. Equation - 1 mark

Substitution - 2marks

Result with unit - 2marks

1. Carbon nano tube explanation - 1 mark

Properties -2 marks

Applications -2 marks

1. Equation - 1 mark

Substitution -2marks

Result with unit -2 marks

1. Reverberation time definition - 1 mark

Explanation - 2 marks

Corrective measures - 2 marks

**Part C**

Answer section (a) **or** section (b) of each question.

1. (a) Bragg’s law -3 marks

Bragg’s X-ray spectrometer figure -1 mark

Bragg’s X-ray spectrometer working -3 marks

Verification of Bragg’s law -3 marks

OR

(b). Theory of plane transmission grating - 3 marks

Figure -2 marks

Determination of wavelength of light - 5 marks

1. (a). Construction - 3 marks

Working - 3 marks

Energy level diagram - 2 marks

Application of laser - 2 marks

OR

(b)Production - 5marks

Detection - 5marks

14.(a)Explanation - 2 marks

Derivation - 4 marks

Energy level diagram - 1mark

Final explanation - 3 marks

OR

(b) Avalanche break down -1½ marks

Zener break down. -1½ marks

Working of a Zener diode - 2 marks

Amplifier characteristics - 5 marks

15.(a)Ultrasonic wave - 1 mark

Piezoelectric effect - 2 marks

Figure - 2 marks

Production of ultrasonic waves - 5 marks

OR

(b)Explanation - 2 marks

Derivation of Schrodinger equation - 7marks