Total No. of Questions :10] *[Total No. of Printed Pages :2*

Roll No .....

BE - 201

B.E. I & II Semester

Examination, June 2013

Engineering Physics

Time : Three Hours

http://www.rgpvonline.com/

Maximum Marks : 70

Note: Attempt five questions in all selecting one questions from each unit.
All questions carry equal marks.

Unit - I

1. a) State Heisenberg's uncertainty principle and derive it from hypothetical gamma ray microscope. 7

   b) Find the energy eigenvalues and corresponding de Broglie's wave length associated with lowest three energy state of particle enclosed in ones dimensional infinite potential well. 7

OR

2. a) Discuss the concept of wave function associated with particle. Give examples of admissible wave function. Why derivative of wave function should be continuous every where? 7

   b) Explain the term phase and particle velocity in context with De Broglie's hypothesis. Prove that for a relativistic and non-relativistic particle, phase velocity is not equal to particle velocity. 7

Unit - II

3. a) Give details of experimental arrangements to produce Newton's rings by reflected Sodium light. Prove that the diameter of bright fringe. is proportional to the square root of add natural numbers. 10

   b) In a Michelson's interferometer 790 fringes cross the field of view, when the movable mirror is displaced through 2.33×10^{-4}m. Calculate the wave length of mono chromatic light source. 4

OR

4. a) Describe Fraunhofer diffraction due to double slit with necessary theory and discuss the intensity distribution. What are the conditions of missing orders? 10

b) For a glass to air the critical angle of refraction is 40^{o}. Calculate the angle of polarization for glass. 4

Unit - III

5. a) Describe construction and working of cyclotron. What are its limitations. Show that the numbers of revolution particle takes inside the cyclotron is proportional to the square root of the radius of Dees. 10

b) What is meant by the magic numbers? Establish their existence with the help of Nuclear shell model. 4

OR

6. a) What is mass spectrograph? Describe the construction of Aston's mass spectrograph with necessary theory. Show that it can be used in detection of isotopes. 10

b) In a 80 MeV betatron, the radius of stable electron orbit is 32cm. Find the value of magnetic field B at the orbit for the given Energy.

Given [$C = 3x10^{8}$m/s and $e = 1.6x10^{-19}C$] 4

Unit - IV

7. Draw E-K curve for an electron moving in periodic potential. Define effective mass (m*) and prove that effective mass of an electron is given by

$$m^* = h^2 \Big/ \left(d^2 E / d K^2 \right)$$

and explain its physical significance. 14

OR

8. Explain constructional working, with the help of I-V characteristic for the following semiconductor devices (any two) : 14

a) Tunnel diode b) Solar cell c) Photo diode

Unit - V

9. State necessary conditions for strong stimulated emission and in this reference. Explain Einstein's A and B coefficients. Explain construction and working of Nd YAG or Ruby laser with energy level diagram. 14

OR

10. a) With the help of ray diagram, show how optical fibres can guide light waves. Derive an expression for angle of acceptance of fibre. What is meant by acceptance cone? 10

b) A 5mW laser beam passes through 26 km fiber of loss 0.2dB/km. Calculate the power at the output end. 4

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