Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

M.Sc., Summer 2017-18 Examination

Semester: 1 **Date: 28/05/2018**
Subject Code:11204104 **Time: 10:30 am to 01:00 pm**
Subject Name: Solid State Physics & Electronics 1 **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Essay type **(08)**
(a) Explain in detail Kronig Penny Model.
(b) Write in detail about approximate solution near zone boundary.

Q.1. B) Answer the following questions (Any two)
(a) Brief note (Each of 02 marks) **(04)**
1. Differentiate between metals and insulators with the help of diagrams of energy band gap.
2. Write in brief about Bloch theorem.
(b) Briefly explain number of orbitals in a band. **(04)**
(c) Write the wave equation of electron in a periodic potential and explain it in detail. **(04)**

Q.2. A) Answer the following questions.
(a) Fill in the blanks. (Each of 02 marks) **(04)**
1. _____ is an effect to replace the complicated effects of the motion of the core electrons of an atom and it's nucleus with it's effective potential.
2. _____ is the surface in reciprocal space which separates occupied states from unoccupied electron states at zero temperature.
(b) Explain De Haas Van Alphen effect briefly. **(04)**

Q.2. B) Answer the following questions (Any two)
(a) Short note **(03)**
1. Define quantization of orbits.
2. Define Cohesive energy.
3. Define Extremal orbits.
(b) Explain Tight Binding method for energy bands. **(03)**
(c) Write briefly about Weigner Seitz Method. **(03)**

Q.3. A) Essay type **(08)**
(a) Write in detail about class A push pull amplifier.
(b) Explain Bistable Multivibrator in deatail.

Q.3. B) Answer the following questions (Any two)
(a) Schematically label the figures **(04)**
1. Draw the circuit diagram of Class B push pull amplifier and label it.
2. Draw the circuit diagram of Schmitt Trigger and label it.
(b) Describe Class A large signal amplifiers. **(04)**
(c) Explain the term multivibrator and differentiate monostable and bistable multivibrator. **(04)**

Q.4. A) Answer the following questions.
(a) Short note **(04)**
1. Write a short note on Operational amplifier Integrator circuit.
2. Write a brief note on saw tooth wave generators.
(b) Short note: Bridge amplifier. **(04)**

Q.4. B) Answer the following questions
(a) Multiple choice questions. **(03)**
1._____ is a circuit designed such that the output of the circuit is approximately directly proportional to the rate of change of the input.
i) Integrator ii) Differentiator iii) Schmitt trigger iv) Bridge amplifier
2. _____ is defined as the change of voltage or current, or any other electrical quantity, per unit of time.
i) Slew rate ii) Frequency compensation iii) Bridge Amplifier iv) None of the given
3. _____ is an electronic device that can increase the power of a signal.
i) Trigger ii) Logic Gate iii) Amplifier iv) None of the given
(b) Explain frequency compensation. **(03)**
(c) What are DC and AC amplifiers and discuss it briefly. **(03)**