Reg. No.:



MANIPAL UNIVERSITY, MANIPAL DEPARTMENT OF SCIENCES FIRST SEMESTER MSc END SEMESTER (MAKE-UP) EXAMINATION DEC-2015 SUBJECT: FUNDAMENTALS OF ELECTRONICS (PHY-607) (CREDIT SYSTEM)

TIME: 3 HOURS

MAX. MARKS: 50

Note (i) ANSWER <u>ANY FIVE</u> FULL QUESTIONS (ii) Any missing data may be suitably assumed

- 1. (A) Describe the important characteristics of a p-n junction using a schematic graph.
 - (B) Discuss briefly, the positive clipper and negative clipper using appropriate circuit diagrams
 - (C) Draw output of the following circuit



2. (A) Explain the working of RC differentiator and integrator circuit using appropriate diagrams(B) Describe the working of UJT relaxation oscillator and hence derive an expression for

frequency of saw-tooth output.

- (C) The data sheet of a JFET gives the following information: $I_{DSS} = 3 \text{ mA}$, $V_{GS(off)} = -6V$ and $g_{m(max)} = 5000 \text{ }\mu\text{s}$. Determine the transconductance for $V_{GS(off)} = -4V$ and find drain current I_D at this point. [4+4+2]
- 3. (A) Describe the working of Schmitt trigger circuit
 - (B) Explain the working of BJT differential amplifier using appropriate diagrams
 - (C) Peak output voltage of an amplifier is 100 mV. What is the maximum operating frequency of the amplifier? Given: Slew rate = $0.5 \text{ V/}\mu\text{s}$ [4+4+2]
- 4. (A) What are Oscillators? Explain the principle of crystal oscillator.
 (B) (i) Convert (101011010)₂ to Hexadecimal system (ii) Convert (3B3)₁₆ to binary system.
 - (C) Plot the following Boolean expressions in Karnaugh map and simplify
 - (i) $X = \overline{A} \ \overline{B} \ \overline{C} \ \overline{D} + \overline{A} \ \overline{B} \ \overline{C} \ \overline{D} + A \ \overline{B} \ \overline{C} \ \overline{D} + A \ \overline{B} \ \overline{C} \ D + \overline{A} \ \overline{B} \ \overline{C} \ D + \overline{A} \ \overline{B} \ C \ \overline{B} \ C \ \overline{B} \ \overline{B} \ C \ \overline{B} \ \overline{B} \ \overline{B} \ \overline{B} \ \overline{B} \$

- 5. (A) Explain digital to analog conversion with R/2R ladder network.
 - (B) What are synchronous and asynchronous counters? Draw the logic diagram of a 3 bit synchronous binary counter.
 - (C) What is DEMUX? Explain 1 to 4 line demultiplexer with logic diagram. [4+3+3]
- 6. (A) Explain microprocessor 8085 bus structure with block diagram.
 - (B) With reference to microprocessor 8085, explain following instructions.

(i) DCR A (ii) MVI B, 17H (iii) CMP B

(C) Write a program to add two numbers stored in registers A and B. Display the result in PORT01 [5+3+2]
