Reg. No.:



MANIPAL UNIVERSITY, MANIPAL DEPARTMENT OF SCIENCES FIRST SEMESTER MSc END SEMESTER EXAMINATION NOV / 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

- (A) What are clippers and clampers? Discuss briefly, the positive clamper and negative clamper using appropriate diagrams
 - (B) Draw output of the following circuits



(C) Draw the circuit diagram of RC differentiator

[5+4+1]

2. (A) Determine the dc bias voltage V_{CE} and the current I_C for the voltage-divider configuration shown below:



(B) Describe the construction of n-channel depletion type MOSFET and explain its working in (i) depletion mode (ii) enhancement mode

(C) A Differential amplifier has a voltage gain of 150 and a CMRR of 90 dB. The input signals are 50mV and 100 MV with 1 MV noise of each input. Find ouput voltage and noise at the output [3+5+2]

- (A) What is a comparator? Explain how op-amp can be used as Inverting and non-inverting Comparator using proper diagrams
 - (B) Explain briefly, the working of mono-stable multi-vibrator using IC 555 timer
 - (C) Design a low-pass filter at a cut-off frequency of 1 kHz with a pass band gain of 2.2. Assume capacitance = $0.1 \,\mu\text{F}$ [4+4+2]
- 4. (A) Define load regulation and line regulation. Using a circuit diagram, explain the working of op-amp series regulator.
 - (B) With logic diagram, explain working of J-K flip flop.
 - (C) Plot the following Boolean expression in Karnaugh map and simplify

(i) $X = \overline{A} \ \overline{B} \ \overline{C} \ \overline{D} + \overline{A} \ \overline{B} \ \overline{C} \ \overline{D} + A \ \overline{B} \ \overline{C} \ \overline{D} + A \ \overline{B} \ \overline{C} \ \overline{D} + \overline{A} \ \overline{B} \ C \ D + A \ \overline{B}$

- 5. (A) What are decoders? Explain the working 3 to 8 line decoder with logic diagram(B) What are MUX and DEMUX? Explain the working of 4 input multiplexer using logic Diagram
 - (C) (i) Convert $(10101010)_2$ to Hexadecimal system (ii) Convert $(6B2)_{16}$ to decimal system [4+4+2]
- 6. (A) Explain microprocessor 8085 bus structure with block diagram.
 - (B) Mention the 5 types of instruction sets used in microprocessor 8085, explain with one example to each type
 - (C) Write an assembly language program to load two hexadecimal numbers 37H and 14H in registers B and C respectively. Add the sum and place the sum in output PORT 02

[5+3+2]
