Seat No.:_____

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SARDAR PATEL UNIVERSITY
M.Sc. (PHYSICS) (IInd Semester) Examination
Saturday, 29th October, 2016   Time: 10:00 am to 1:00 pm
Course No.: PS02EPHY01
ANALOG AND DIGITAL ELECTRONICS

Note: All questions are compulsory.

Total Marks:70

Q.1 Multiple choice questions.   (8)
  (i) A diode clipper circuit ____ the desired portion of an input wave.
    (a) removes   **(b)** shifts   **(c)** amplifies   **(d)** none.
  (ii) Which of the following is not a photonic semiconductor device?
    (a) LDR   **(b)** UJT   **(c)** LED   **(d)** Solar Cell
  (iii) In case of IC-555 timer circuit when charging time equals the discharging time the output waveform will be of
    (a) Exponential   **(b)** Triangular **(c)** Square **(d)** DC   form.
  (iv) The Gray code for decimal number 6 is
    (a) 1001   **(b)** 1101   **(c)** 0101   **(d)** 1110
  (v) A de-multiplexer is a
    (a) 1 to N device   **(b)** N to1 device   **(c)** 1 to 1 device **(d)** N to N device
  (vi) Nonvolatile memory is
    (a) Memory that loses stored information on removal of electrical power
    (b) Memory that retains stored information on removal of electrical power
    (c) Optical memory **(d)** Magnetic memory
  (vii) Successive approximation is a method used for
    (a) DAC   **(b)** ADC   **(c)** both a and b   **(d)** none
  (viii) The maximum clock frequency for microprocessor Intel-8085 is
    (a) 3.0 GHz **(b)** 3.0 KHz   **(c)** 3.0 MHz **(d)** 1.5 MHz.

Q.2 Attempt any seven.   (14)
  (a) What do you understand by dead zone in a series noise clipper?
  (b) Why direct band gap materials are used for the fabrication of light emitting diode (LED)?
  (c) What is positive and negative logic? Explain.
  (d) Discuss the use of diode as a switch.
  (e) Define combinational and sequential circuits giving suitable examples.
  (f) What is a multiplexer circuits? Mention its applications.
  (g) What is a digital comparator circuit? Discuss in brief.
  (h) Explain the working principle of DAC.
  (i) Define the role of timing and control unit of microprocessor IC-8085.

Q.3(a) Write a short note on BCD code. **(6)**

(b) With necessary circuit diagram explain the working of negative and positive clamping circuit. **(6)**

OR

(b) Draw the block diagram, equivalent circuit diagram and static emitter characteristic curve of UJT and explain its working. **(6)**

Q.4(a) Explain in detail the construction and working of astable multivibrator using IC-555. **(6)**

(b) Sketch the block diagram of IC-565 and explain its working. **(6)**

OR

(b) Describe how a Karnaugh map is different from truth table. Also discuss in detail Karnaugh mapping. **(6)**

Q.5(a) What are counter circuits and mode of a counter? Explain the operation of any positive edge triggered up using neat circuit diagram, timing diagram and truth table. **(6)**

(b) Explain in detail the following circuits, **(6)**

    (i)   Subtractor

    (ii)   De-multiplexer

OR

(b) Discuss in brief about the classification of semiconductor memory. **(6)**

Q.6(a) Taking suitable example, discuss the working principle of an ADC. **(6)**

(b) How an analog voltage is converted in to digital form? Enlist methods of DAC and explain any one in detail. **(6)**

OR

(b) Discuss on following in reference to Intel-8085 microprocessor **(6)**

    (i)   Internal registers

    (ii)   Data and address bus

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