

[167]

SEAT No. \_\_\_\_\_

No. of printed pages: 02

**SARDAR PATEL UNIVERSITY**  
**M.Sc. (PHYSICS) First Semester Examination**  
**Day & Date: Monday & 25/03/2019**  
**Time: 02:00 P.M. to 05:00 P.M.**  
**Title: ANALOG AND DIGITAL ELECTRONICS**  
**SUBJECT CODE: PS01CPHY23**

**Instruction:** Figures to the right indicate marks.

**Total marks: 70**

**Q.1 Write answers of all questions by showing your choice against the question number. [8]**

(1) In a series noise clipper made from Si diode, if a noise of 0.8V amplitude is to be removed than what should be the dead zone.

- (a) greater than 0.8V (b) less than 0.8V  
(c) equal to 0V (d) none of them

(2) Which resistance in UJT is dynamic resistance? Between \_\_\_\_\_

- (a) Emitter – Base:1 (b) Emitter – Base:2  
(c) Base:1 – Base:2 (d) Emitter – Emitter

(3) In the LED, the semiconductor region in which the light is produced.

- (a) p-region (b) n-region  
(c) bottom and top metal contacts (d) none of them

(4) For an IC 555 timer, Pin number 2 is \_\_\_\_\_ pin.

- (a) Reset (b) Trigger  
(c) Threshold (d)  $V_{cc}$

(5) For a Binary number 0111 0010 0101 equivalent BCD number is \_\_\_\_\_.

- (a) 725 (b) 723  
(c) 752 (d) 732

(6) The 3 input decoder circuit has total \_\_\_\_\_ output lines.

- (a) 2 (b) 8  
(c) 4 (d) 16

(7) To convert Digital signal into equivalent Analog signal \_\_\_\_\_ method is used.

- (a) R-2R Ladder Network (b) Counter type  
(c) Dual Slope Integration (d) Successive Approximation

(8) The I-V characteristics of solar cell lies in \_\_\_\_\_ quadrant.

- (a) I<sup>st</sup> (b) II<sup>nd</sup>  
(c) III<sup>rd</sup> (d) IV<sup>th</sup>

**Q.2 Attempt any Seven of the followings:**

**[14]**

- (1) Discuss the working action of diode as a switch.  
(2) With suitable equations explain why a phototransistor is more sensitive than photodiode?  
(3) Discuss the reason for appearance of reverse recovery time?  
(4) With block diagram and I-V characteristics write a brief note on TRIAC.  
(5) With necessary circuit diagram and waveform explain series noise clipper.

- (6) Draw the schematics of IC555 as an Astable multivibrator.
- (7) Discuss about Tri-state logic.
- (8) Briefly explain Full adder circuit.
- (9) Enlist methods of Analog to Digital conversion. Define: Resolution of 8-Bit ADC.

Q.3(a) What are clamper circuits? Discuss in details the positive and negative clamper circuit. Draw a clamper circuit with its input-output waveform to clamp output at +5V maximum. [6]

Q.3(b) Why UJT is known as uni-junction transistor? Describe in details the construction and working of UJT. Derive the equation of intrinsic stand-off ratio and peak voltage. [6]

**OR**

Q.3(b) What are clipper circuits? Design a series noise clipper circuit using Si diodes ( $V_F = 0.7V$ ) having dead zone of 0.6V. [6]

Q.4(a) With neat diagram explain the construction and working of IC-555. [6]

Q.4(b) With circuits and waveform diagrams explain the working of different comparators. [6]

**OR**

Q.4(b) What is the need of Schmitt trigger compared to comparator? Describe the working of Schmitt trigger circuit with necessary circuit diagram. Derive the equations of lower and upper trigger point. [6]

Q.5(a) Describe the working principle of demultiplexer with suitable logic diagram and truth table. Write its applications. [6]

Q.5(b) Explain in detail the Karnaugh mapping. Define Minterms and Maxterms in context with Karnaugh mapping. [6]

**OR**

Q.5(b) Discuss the operation of following circuits. (i) Half Adder (ii) Shift Register [6]

Q.6(a) Discuss in detail working principle of Binary Weighted Resistor D/A converter with proper circuit diagram. Write its disadvantages. [6]

Q.6(b) Describe in detail any one Read Only Memory. [6]

**OR**

Q.6(b) Explain with suitable schematics counter type ADC. [6]

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