SEAT No._____

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SARDAR PATEL UNIVERSITY

M.Sc. (PHYSICS) II[nd] Semester Examination

Tuesday, 17th April, 2018 2:00 pm to 5:00 pm

Course No.: PS02EPHY01: Analog and Digital Electronics

All questions are compulsory. **Total Marks:70**

Q.1 Multiple choice questions. (8)

(1) Intrinsic stand-off ratio is an important characteristic parameter of _____.
(a) SCR (b) Photodiode (c) UJT (d) IC-555

(2) Short circuit current is an important device parameter of _____that is used to calculate its efficiency.
(a) Diode clipper circuit (b) Solar cell (c) UJT (d) IC-741

(3) Which of the following can be used as a waveform generator?
(a) IC-555 (b) IC-565 c) IC-741 (d) IC-7400

(4) Which of the following devices exhibit highest input impedance?
(a) SCR (b) IC-741 (c) Phototransistor (d) UJT

(5) X-NOR gate is used as a coincidence gate in _____circuit.
(a) Decoder (b) DAC (c) Comparator (d) Multiplexer

(6) The Gray code equivalent of binary number 1001 is
(a) 1010 (b) 1100 (c) 1001 (d) 1101

(7) A percentage resolution of a 12 bit DAC is _____%.
(a) 1.58 (b) 0.542 (c) 0.097 (d) 0.024

(8) A certain binary counter circuit uses eight Flip-Flops. What will be the modulus of this counter?
(a) 16 (b) 32 (c) 512 (d) 256

Q.2 Short answer questions.(Attempt any seven) (14)

(1) What is reverse recovery time? On what factors does it depend?
(2) Differentiate between clipping and clamping circuits.
(3) Why photo-transistor is more sensitive than photodiode? Explain.
(4) Construct a comparator circuit using IC-741 and show its input-output waveforms.
(5) With block diagram and I-V characteristic write a brief note on SCR.
(6) What is an encoder circuit? Mention its applications.
(7) Why synchronous counters are faster than asynchronous counters? Also mention limitations of synchronous counters.
(8) What are ROM and RAM? Are they permanent or volatile semiconductor memories?
(9) Discuss about the organization of internal registers of Intel-8085 microprocessor.

Q.3(a) Discuss in details about the diode clipping circuits. In what way it is used to eliminate noise? (6)

(b) Write a note on UJT. (6)

OR

(b) Discuss construction and working of a photovoltaic PN-junction solar cell. Describe its characteristics in the fourth quadrant and define different characterizing parameters. (6)

P.T.O.

Q.4(a) With the help of neat block diagram of a timer IC-555, explain its working. (6)

(b) What is Voltage Controlled Oscillator? Explain the working principle of PLL IC565. (6)

OR

(b) Write a note on Karnaugh map. (6)

Q.5(a) Describe the operation of a Multiplexer circuit. (6)

(b) Explain the working of a decoder with the help of logic diagram and truth table. What are its applications? (6)

OR

(b) Explain the operation of a digital Comparator circuit and mention its applications. (6)

Q.6(a) Sketch the block diagram of 4-bit DAC using a binary counter and explain its operation with the help of output waveform. Also discuss specification parameters of a DAC. (6)

(b) What are the methods used for Analog to Digital Conversion? Explain any one in detail. (6)

OR

(b) Sketch the block diagram of Intel-8085 microprocessor and describe its functioning. (6)

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