AAI-003-001603 Seat No. _____

B. Sc. (Sem. VI) (CBCS) Examination

March / April - 2016

Physics

(Solid State Electronics)

(New Course)

Faculty Code : 003

Subject Code : 001603

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) Digits on the right side indicate marks.
(3) Symbols have their usual meaning.

1 Pick the Select the correct answer from the given options : **20**

(1) If transistor is used as a switch, and if V_{CC} = 10 V, $R_C = 1K\Omega$ and $I_{CBO} = 10\,\mu A$. When transistor is at cutoff, the value of V_{CE} near to _____ V

(A) 99.9 (B) 9.99
(C) 0.99 (D) 0.099

(2) When transistor (in CE arrangement) is in the cutoff region, the collector current is _____.

(A) I_{CBO} (B) I_{CEO}
(C) $(\beta+1)I_{CEO}$ (D) $I_{C(sat)}$

(3) If a square wave is fed to a differential circuit, the output will be _____.

(A) sine wave (B) sharp narrow pulses
(C) triangular Wave (D) rectangular wave.

(4) A clamping circuit adds _____ component to the signal.

(A) ac (B) dc
(C) both ac and dc (D) none of these

(5) Which relation is correct for SCR anode current?

(A) $I_A = \left[\frac{\alpha_2 I_g}{1-(\alpha_1+\alpha_2)}\right]$ (B) $I_A = \left[\frac{\alpha_1 I_g}{1+(\alpha_1+\alpha_2)}\right]$

(C) $I_A = \left[\frac{\alpha_2 I_g}{1+(\alpha_1+\alpha_2)}\right]$ (D) none of these

(6) For first quadrant characteristic of TRIAC, the terminal MT_1 is _____

(A) positive (B) zero
(C) negative (D) (A) or (B) or (C)

(7) A TRIAC is a _____ layer device.

(A) Two (B) Three
(C) Four (D) Six

(8) A TIRAC is a resemble with _____

(A) Two parallel connection with common gate
(B) Two parallel connection with open common gate
(C) Two antiparallel connection with common gate
(D) Two antiparallel connection with open common gate

(9) The angle at which the thyristor is triggered is known as _____

(A) Phase angle (B) conduction angle
(C) firing angle (D) infinite

(10) Which of these thyristor is bidirectional?

(A) SCR (B) DIAC
(C) LASCR (D) SCS

(11) In monolithic ICs, all components are fabricated by _____ process.

(A) evaporation (B) oxidation
(C) sputtring (D) diffuson

(12) For noninverting Op-Amp, $R_f = 16\,K\Omega$ and $R_i = 14\,K\Omega$, the input imepedance is _____

(A) $64\,K\Omega$ (B) $4\,K\Omega$
(C) zero (D) infinite

(13) For noninverting Op-Amp, $R_f = 4\,K\Omega$ and $R_i = 16\,K\Omega$, its voltage gain is _____

(A) 4 (B) 64
(C) 50 (D) 5

(14) An ideal Op-OAmp has _____

(A) infinite A_v (B) infinite R_f

(C) zero R_i (D) above all

(15) In Op-Amp as integrator, the feedback component is _____

(A) resistor (B) inductor
(C) Capacitor (D) none of above

(16) A thermocouple is a _____ type transducer.

(A) voltage generating (B) variable resistance
(C) variable inductance (D) voltage divider

(17) In Strain gauge, strain is directly proportional to change in _____

(A) resistance (B) capacitor
(C) voltage (D) none of above

(18) In multiplexer, when, $ABCD$ = 0000, _____ data will be transmitted to output.

(A) Y_0 (B) Y_1
(C) Y_2 (D) None of these

(19) For flip-flop, outputs Q and $\bar{Q}$ should be _____

(A) complementary (B) In phase
(C) Equal (D) infinite

(20) If two input is shorted through inverter at one, terminal, the circuit is called _____ flip-flop.

(A) Clocked RS (B) J-K
(C) R-S (D) D

2 (a) Answer any **three** : **6**

(1) Write the advantages of electronics switches.
(2) How transistor can be use as a switch? Explain in brief.
(3) In astable multivibrator, if $R_2 = R_3 = 10\ K\Omega$ and $C_1 = C_2 = 0101\ \mu F$. Determine the time period and frequency of the output squarewave.
(4) What is firing angle and conduction angle?
(5) Explain voltage triggering of Thristor.
(6) Draw the layer diagram, symbol and characteristic curve of DIAC.

(b) Answer any **three** : **9**

(1) Explain biased and combinational clipper circuit.
(2) Explain types of multivibrators.
(3) Give the basic idea of the clamping circuit.
(4) Explain differentiating circuit.
(5) Explain structure and operation of TRIAC.
(6) Explain 'Off at dark" circuit.

(c) Answer any **two** : **10**

(1) Explain transistor free running multivibrator.

(2) Explain switching action of a transistor.

(3) Explain two transistor analogy of SCR.

(4) Explain application of DIAC-TRIAC as a static switch.

(5) Discus illumination control circuit using DIAC-TRIAC.

3 (a) Answer any **three** : **6**

(1) What is monolithic ICs?

(2) Write the disadvantages of monolithic ICs.

(3) What is the basic principle of self-generating, inductive transducer?

(4) Explain working of electrical transducer.

(5) Draw logic diagram of basic JK flip-flop and realize the truth table.

(6) Draw logic diagram and give truth table of D- flip-flop.

(b) Answer any **three** : **9**

(1) Explain hybrid ICs.

(2) Explain Op-Amp as Subtractor.

(3) Write a note on thin film IC.

(4) Explain resistive position transducer.

(5) Explain various types of microphones.

(6) Discuss D- flip-flop.

(c) Answer any two : **10**

(1) Explain use of Op-Amp as noninverting amplifier.

(2) Describe the fabrication of monolithic IC.

(3) Explain strain gauge.

(4) Explain Op-Amp as integrator.

(5) Write a note on multiplexer and demultiplexer.
