JC-003-001603 Seat No. _____

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

August - 2019

Physics : P - 603

(Solid State Electronics) (Old Course)

Faculty Code : 003
Subject Code : 001603

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

Instructions :

(1) All questions are compulsory.
(2) Numbers on right side indicate marks.
(3) Symbols have their usual meanings.

1 Answer the questions : **20**

(1) When a transistor is driven to cutoff, ideally the I_c = _____ and V_{cE} = _____.
(2) Bistable multivibrator is also known as _____ multivibrator.
(3) Which component decides the frequency of an astable multivibrator.
(4) When differentiating circuit fed with the triangular wave, its output wave form will be _____.
(5) For the integrating circuit, the capacitive reactance X_C, should be _____ than the resistance R.
(6) What is the relation between anode and gate current of SCR ?
(7) For the regenerative action of SCR, the value of $(\alpha_1 + \alpha_2)$ should be near to _____.
(8) The angle at which the device is triggered is known as _____.
(9) SCR is a bidirectional thyristor. True or false ?
(10) _____ cannot be fabricated in monolithic IC.
(11) The input resistance is _____ and open loop gain is _____ in ideal OP-AMP.

(12) An ideal OP-AMP is a _____ controlled device.

(13) In non-inverting amplifier for OP-AMP, the feed back resistance R_f is $10\,K\Omega$ and input resistance R_i is $1\,K\Omega$, find the voltage gain.

(14) OP-AMP is basically design to perform _____ operations.

(15) For OP-AMP as integrator, the feedback is taken through _____.

(16) A microphone is classified as a _____ transducer.

(17) Generally, output of transducers is proportional _____.

(18) In multiplexer, when, ABCD = 1111, data will be transmitted to output will be _____.

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

(20) If two extra input through AND gate as inverter is added to 1-bit memory elements the circuit is called _____ flip-flop.

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

(1) Write the limitations of mechanical switches.

(2) In astable multivibrator, if $R_2 = R_3 = 10\,K\Omega$ and $C_1 = C_2 = 0.01\,\mu F$, determine the time period and frequency of the output squarewave.

(3) What is differentiating circuit ? What is the essential conditions for differentiating circuit?

(4) What is Thyristor ? Among of all, list only three of them.

(5) What is firing angle and conduction angle ?

(6) Draw the circuit diagram of transistor astable multivibrator.

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

(1) What is integrating circuit? Draw circuit diagram and prove the relation between output and input voltage.

(2) Explain positive clipper with proper circuit diagram.

(3) Explain multivibrator with proper block diagram.

(4) Explain operation of SCR only in terms of its junctions for forward biasing.

(5) Explain structure and operation of DIAC.

(6) Explain 'Water level indicator' circuit.

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

(1) Explain mechanical switch and electronics switch with proper diagram.

(2) Explain SCR with its operation and I-V characteristic.

(3) Explain two transistor analogy of SCR.

(4) Explain methods of triggering a Thyristor.

(5) Explain working of an Automatic street light circuit using SCR and LDR.

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

(1) Classify ICs based on scale of integration.

(2) Explain OP-AMP as comparator.

(3) What is transducer ? Explain it.

(4) Explain working of electrical transducer.

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

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

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

(1) Explain thin film and thick film IC fabrication.

(2) Compare Monolithic and film ICs.

(3) Explain Tachometer with proper diagram.

(4) What is transducers ? Explain with block diagram and explain the two fold functions of transducers.

(5) What is combinational and sequential logic circuits ?

(6) Explain 1-bit memory cell using NAND gate.

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

(1) Explain use of Op-Amp as adder and subtractor.

(2) Explain strain gauge.

(3) Explain constructive and working of LVDT.

(4) Explain S-R flip flop with circuit diagram and realize truth table.

(5) Write a note on multiplexer.
