



NAO-003-001603 Seat No. _____

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

March / April - 2017

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 Answer the questions : 20

- (1) When a transistor is driven to cutoff, ideally the $I_c = \underline{\hspace{2cm}}$ and $V_{CE} = \underline{\hspace{2cm}}$.
- (2) Bistable multivibrator is also known as $\underline{\hspace{2cm}}$ multivibrator.
- (3) Which component decide the frequency of an astable multivibrator ?
- (4) When differentiating circuit fed with the triangular wave, its output wave form will be $\underline{\hspace{2cm}}$.
- (5) For the integrating circuit, the capacitive reactance X_c , should be $\underline{\hspace{2cm}}$ 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 $\underline{\hspace{2cm}}$.
- (8) The angle at which the device is triggered is known as $\underline{\hspace{2cm}}$.
- (9) SCR is a bidirectional thyristor. True or false ?
- (10) $\underline{\hspace{2cm}}$ cannot 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 feedback resistance R_f is $10\text{ K}\Omega$ and input resistance R_i is $1\text{ K}\Omega$, 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 propositional _____.
- (18) In multiplexer, when, ABCD = 1111, data will be transmitted to output will be _____.
- (19) For flip-flop, outputs Q and \bar{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 $R_2 = R_3 = 10\text{ K}\Omega$ 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 Thyristors.
- (5) Explain working of an Automatic street light circuit.

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.
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