

- Please Attempt All Questions. **The Full Mark: 50 Marks.**
- The Time Allowed: 120 Minutes. **Please check your personal data.**
- No need for external papers.

**Q1. SO1 (1-15) [15 points]**

**1. In which of the following are operational amplifiers (op-amps) used?**

- a. Oscillators
- b. Filters
- c. Instrumentation circuits
- d. All of the above**

**2. For a JFET, the value of  $V_{DS}$  at which  $I_D$  becomes essentially constant is the**

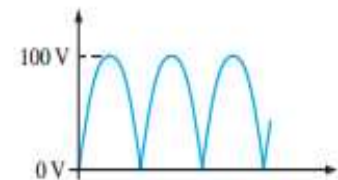
- a. pinch-off voltage.**
- b. cutoff voltage.
- c. breakdown voltage.
- d. Ohmic voltage.

**3. What type(s) of gate-to-source voltage(s) can a depletion MOSFET (D-MOSFET) operate with?**

- a. zero
- b. positive
- c. negative
- d. any of the above**

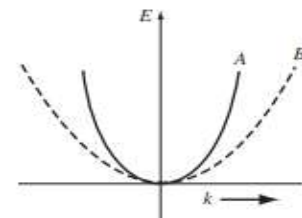
**4. Calculate the average value of the voltage**

- a. 25.3
- b. 63.7**
- c. 70.7
- d. 50



**5. Two possible conduction bands are shown in the E versus k diagram given in Figure below. State which band will result in the lighter electron effective mass.**

- a. A**
- b. B



**6. Single-element semiconductors are characterized by atoms with \_\_\_\_ valence electrons.**

- a. 3
- b. 4**
- c. 5
- d. None of the above

7. The three fundamental gates are:

- a. AND, NAND, XOR.
- b. OR, AND, NAND.
- c. NOT, NOR, XOR.
- d. NOT, OR, AND.

8.  $\int_{-\infty}^{\infty} e^{-t} \delta(t) dt$  Evaluate this integral

- a. 1
- b. 0
- c.  $e^{-1}$
- d. None of the above

9. How many ways can the letters in the word "COMPUTER" be arranged in a row?

- a. 10!
- b. 9!
- c. 8!
- d. None of the above

10. When pulse code modulation is applied to non-binary symbols we obtain waveform called as:

- a. PCM
- b. PAM
- c. M-ary
- d. line codes

11. The method used for representing convolution encoder are:

- a. Connection pictorial
- b. State diagram
- c. Tree diagram
- d. All of the mentioned

12. Modulation refers to a low-frequency signal controlling the

- a. amplitude of the carrier
- b. frequency of the carrier
- c. phase of the carrier
- d. may be any one of these

13. Gauss statement for magneto-static equals

- a.  $\nabla \cdot E = \rho_v$
- b.  $\nabla \cdot B = 0$
- c.  $\nabla \times E = -\frac{\partial B}{\partial t}$
- d.  $\nabla \cdot D = \rho_v$

14. Three point charges, Q1 = 30 nC, Q2 = 150 nC, and Q3 = -70 nC, are enclosed by surface S. What net flux crosses S?

- a. 110 nC
- b. 250 nC
- c. 220 nC
- d. 500 nC

15. The collection of related data with an implicit meaning is called\_\_\_\_\_.

- a) File System
- b) Database
- c) DBMS
- d) State

Q2. \_\_\_\_\_ SO2 (1-15) [15 points]

1. Each diode in a center-tapped full-wave rectifier is \_\_\_\_\_ -biased and conducts for \_\_\_\_\_ of the input cycle.

- a. forward, 90°
- b. reverse, 180°
- c. forward, 180°
- d. reverse, 90°

2. The output frequency of a half-wave rectifier is \_\_\_\_\_ the input frequency.

- a. one-half
- b. twice
- c. equal to
- d. none of the above

3. In the active region, while the collector-base junction is \_\_\_\_\_-biased, the base-emitter is \_\_\_\_\_-biased.

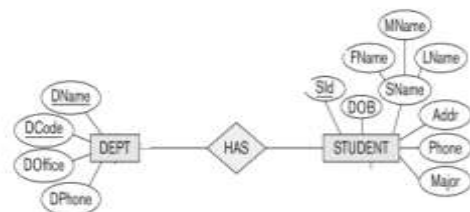
- a. forward, forward
- b. forward, reverse
- c. reverse, forward
- d. reverse, reverse

4. \_\_\_\_\_ is used for retrieval, insertion, deletion, and modification of the data.

- a) DDL
- b) DML
- c) SDL
- d) DRL

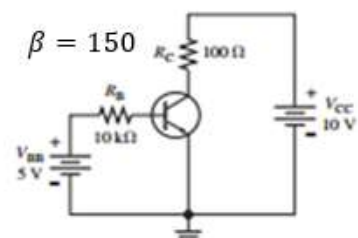
5. Assuming each department must have N of students. The relationship type has is of cardinality ratio\_\_\_\_\_.

- a) 1:1
- b) 1:M
- c) M:N
- d) 1:N



6. The base current equals

- a) 230  $\mu$ A
- b) 450  $\mu$ A
- c) 366  $\mu$ A
- d) No correct answer

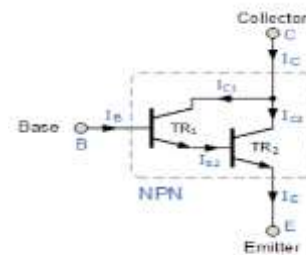


**7. The use of non-uniform quantization leads to:**

- a) Reduction in transmission bandwidth
- b) Increase in maximum SNR
- c) Increase in SNR for low level signals
- d) Simplification of quantization process

**8. The name of the shown configuration is**

- a) Darlington
- b) Cascode
- c) Differential Amplifier
- d) Cascade



**9. The following circuit can be used as**

- e)
- f) Integrator
- g) Summer
- h) Differentiator
- i) subtractor

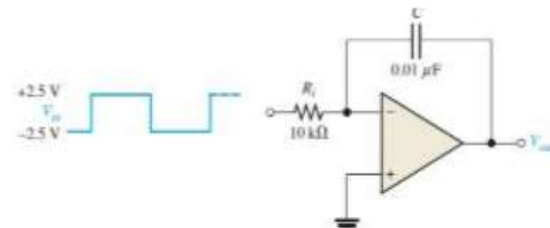


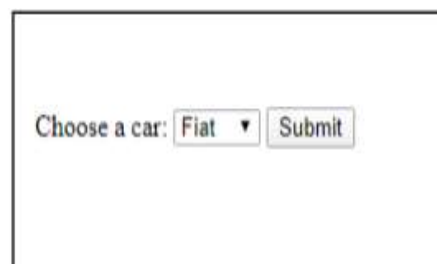
Figure (b)

**10. Multiplexer can be designed by only AND & OR gates?**

- a) True
- b) False

**11. To design the opposite web page, we need to use \_\_\_\_\_.**

- a) Form tag
- b) Select tag
- c) a and B
- d) No correct Answer



**12. Which of the following loops will execute at least once even if the condition is false?**

- a) for
- b) do-while
- c) while
- d) All of the above

**13.** In maximum likelihood detector the error probability is

- a) Maximum
- b) Minimum**
- c) Zero

**14.** The minimum Nyquist bandwidth needed for baseband transmission of  $R_s$  symbols per second is

- a)  $R_s$
- b)  $2 R_s$
- c)  $R_s/2$**
- d)  $4 R_s$

**15.** In Java, which of the following declares and initializes a one dimensional array named values of size 5 so that all entries contain 1?

- a) **`int [] values = {1,1,1,1,1};`**
- b) `int [] values = {1};`
- c) `int values = {1,1,1,1,1};`
- d) `int values [] = {1,1,1,1};`

**Q3. SO4 (1-10) [10 points]**

**1. Which of the following techniques is used to preserve integrity and the security of the signal?**

- a) Spread spectrum
- b) FHSS
- c) DSSS
- d) All The above**

**2. IBM 360 is an examples of**

- a) Register-Register architecture**
- b. Register-Memory architecture**
- c. Memory -Memory architecture
- d. None of above

**3. Binary addition of  $1 + 1$  gives the result**

- a. 0**
- b. 10
- c. 1
- d. 2

**4. 4-bit is a valid IEEE- format.**

- a. True
- b. False**

**5. The result of  $0 - 1$  in binary is**

- a. 0
- b. 1**
- c. 11
- d. 10

**6. The IEEE standard followed by almost all the computers for floating point arithmetic**

- a) IEEE 260
- b) IEEE 488

c) IEEE 754

d) IEEE 610

7. Which protocol is used by Http protocol:

- a. UDP
- b. TCP
- c. RTP
- d. None of above

8. Internet uses

- a. Circuit switching
- b. Packet switching
- c. No switching
- d. None of above

9. IEEE stands for \_\_\_\_.

- a) Institute of Electrical and Electronics Engineering
- b) Institute of Electrical and Electronics Engineers
- c) Institute Ethernet and Electronics Engineering
- d) None of the

10. HTML stands for \_\_\_\_.

- a) Hyper Text Markup Language
- b) High Text Markup Language
- b) Hyper Tabular Markup Language
- d) None of these

**Q4. SO6 (1-10) [10 points]**

1. The following device is

- a) Transformer
- b) Regulator
- b) Rectifier
- d) Bridge



2. The following device is

- a) Transformer
- b) Regulator
- b) Rectifier
- d) Bridge



3. The value of the capacitance of the following capacitor reads

- a) 154 PF
- b) 154 nF
- b) 150 nF
- c) 150 PF



4. The following device is

- c) Ultrasonic
- b) LDR
- d) Bluetooth
- d) IR Sensor



5. The following is ..... sensor

- a) Temperature
- b) Light
- c) Sound
- d) Flow



6. The following is ..... sensor

- b) Ultrasonic
- b) LDR
- d) IR
- d) BME 200



7. The type of the following motor is

- a) Stepper
- b) DC
- e) Servo
- d) Brushes



8. The function used to reload the drawing again in the Applet is called

- a) main()
- b) paint()
- c) repaint ()
- d) init ()

9. && operator is used to express which operation?

- a) Logic AND Gate
- b) Logic OR Gate

- 
- c) Logic NAND Gate
  - d) Logic NOT Gate

**10. BRAMs inside the FPGA are used to**

- a) Store data and programs.
- b) Implement the required logic
- c) Manage clock signals
- d) None of the above

**With Best Wishes**

**CCE Staff – ECE Staff – CSE Staff**