

- (10) The input resistance of common base BJT is of the order of \_\_\_\_\_  
 (a) 100 ohm (b) 1000 ohm (c) 10 ohm (d) 1 ohm
- (11) MOSFET is ideal for :  
 (a) Low switching frequency (b) High switching frequency  
 (c) Low voltage applications (d) medium voltage applications
- (12) Which of the following does not belong to MOSFET?  
 (a) Drain (b) Gate (c) Base (d) Source
- (13) Which of following is universal GATE?  
 (a) NOR (b) XOR (c) EXOR (d) OR
- (14) Simplify  $A(A+B)$   
 (a) AB (b) 1 (c)  $(1+AB)$  (d) A
- (15) The output will be a LOW for any case when one or more inputs are zero in a/an .....  
 (a) OR Gate (b) NOT Gate (c) AND Gate (d) NAND Gate
- (16) A decoder converts  $n$  inputs to \_\_\_\_\_ outputs.  
 (a)  $n$  (b)  $2^n$  (c)  $n+1$  (d)  $2^{n+1}$
- (17) Which of the following can be represented for decoder?  
 (a) Sequential circuit (b) Combinational circuit (c) Logical circuit (d) None of the mentioned
- (18) The standard TTL gates are marketed as \_\_\_\_\_ series.  
 (a) 80 (b) 82 (c) 74 (d) 08
- (19) CMOS gates are commercially available as which of the following series?  
 (a) 1000 (b) 3000 (c) 2000 (d) 4000
- (20) Which logic gate has low power consumption?  
 (a) RTL (b) TTL (c) DTL (d) CMOS
- (21) Latch can be called Memory device as it has the capability of \_\_\_\_\_.  
 (a) storing 1-bit (b) storing 1-byte (c) storing 16-bit (d) storing 24-bit
- (22) R indicates \_\_\_\_\_ in SR-latch.  
 (a) Re-arrange (b) Reset (c) Recombine (d) Residue
- (23) The number of input in case of D-flip flop is/are:  
 (a) 1 (b) 3 (c) 2 (d) 4
- (24) Identify the flip flop which can be used to make D-flip flop  
 (a) JK (b) SR (c) T (d) MS

- RSE Sem. C.  
Date: \_\_\_\_\_
- Q22) The output of sequential circuit depends on \_\_\_\_\_ CO5, L3  
(a) Present input (b) Past output (c) Present and Past output (d) Present input and Past output
- Q23) Which of the following logic expressions represents the logic diagram shown? CO5, L3  
(a)  $X \oplus AB \oplus A \oplus B$  (b)  $X \oplus (AB) \oplus AB$  (c)  $X \oplus (AB) \oplus A \oplus B$  (d)  $X \oplus A \oplus B \oplus AB$
- Q24) A 4-bit full adder contains \_\_\_\_\_ CO5, L3  
(a) 1 combinational inputs (b) 2 combinational inputs (c) 3 combinational inputs (d) 8 combinational inputs
- Q25) What is a multiplexer? CO5, L3  
(a) It is a type of decoder which decodes several inputs and gives one output  
(b) A multiplexer is a device which converts many signals into one  
(c) It takes one input and produces many outputs  
(d) It is a type of encoder which decodes several inputs and gives one output
- Q26) In parts of the processor, adders are used to calculate \_\_\_\_\_ CO5, L3  
(a) Addresses (b) Table indices (c) Increment and decrement operations (d) All of the Mentioned
- Q27) Total number of inputs in a half adder is \_\_\_\_\_ CO5, L3  
(a) 2 (b) 3 (c) 4 (d) 1
- Q28) Explain: (i) Phase voltage and Induced voltage (ii) rms value of a.c. signal with the help of relevant example. Part-B  
(iii) Explain the power calculation in RL, RC, and RLC circuits with the help of relevant example. CO2, L1, [10 marks]
- Q29) Explain the working principle of DC motor. Write the various types of DC motor. CO1, L2, [10 marks]
- Q30) Explain single and three phase induction motors. CO1, L2, [10 marks]
- Q31) Explain intrinsic and extrinsic types of semiconductors. How are the type semiconductors are made? Explain majority, and minority charge carriers in both cases. Explain the donor and acceptor semiconductors. CO1, L2, [10 marks]
- Q32) Design full adder with half adders and full subtractor with half subtractors. you can use other required logic gates also. CO4, L4, [10 marks]
- Q33) Explain JK flip-flops in detail, along with their Truth-Table and logic diagram. Also, explain what is Race around condition and how can be avoided. CO4, L4, [10 marks]

End of Question paper

|         |     |
|---------|-----|
| 75-80%  | 4%  |
| 81-85%  | 6%  |
| 86%-90% | 8%  |
| 90% -   | 10% |

BMT | AMT

Registration No.:

Course Code: ECE249

Course Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time Allowed: 3hrs.

Max 1

- Read the following instructions carefully before attempting the question paper.
1. Match the Paper Code shaded on the OMR Sheet with the Paper code mentioned on the question paper and ensure that both are same.
  2. This question paper is divided into two parts A and B.
  3. Part A contains 30 questions of 1 mark each, 0.25 marks will be deducted for each wrong answer.
  4. Part B contains 5 questions of 10 marks each. Attempt any 4 questions out of these 5 questions. In case all the 5 questions are then only the first four attempted questions will be evaluated.
  5. Attempt all the questions in serial order.
  6. Do not write or mark anything on the question paper except your registration no. on the designated space.
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Part-A

Q1)

- (1) If Set and Reset, both are disabled in case of SR flip flop then output is \_\_\_\_\_.  
(a) Reset (b) Set (c) Previous output (d) Previous input
- (2) Each stage of Shift register is capable of storing \_\_\_\_\_.  
(a) 1 bit (b) 1 byte (c) 2 bit (d) 2 byte
- (3) Synchronous counter is also called \_\_\_\_\_.  
(a) asynchronous counter (b) parallel counter (c) ring counter (d) tripple counter
- (4) Identify the basic building block of Shift register.  
(a) T flip flop (b) SR flip flop (c) JK flip flop (d) D flip flop
- (5) Shift counter is also known as \_\_\_\_\_.  
(a) Johnson counter (b) Ring counter (c) synchronous counter (d) Asynchronous counter
- (6) The arrow direction in the Bode symbol indicates \_\_\_\_\_.  
(a) Direction of electron flow.  
(b) Direction of hole flow (Direction of conventional current)  
(c) Opposite to the direction of hole flow  
(d) None of the above
- (7) A semiconductor is formed by ..... bonds.  
(a) Covalent (b) Electrovalent (c) Co-ordinate (d) None of the above
- (8) A semiconductor has ..... temperature coefficient of resistance.  
(a) Positive (b) Zero (c) Negative (d) None of the above
- (9) Which region is heavily doped in case of BJT.  
(a) Collector (b) Base (c) Emitter (d) Gate

- (11) XOR gate is also called \_\_\_\_\_  
 (a) Inverter (b) amplifier (c) comparator (d) BCD CO5, L5
- (12) The number of inputs in case of Half adder are \_\_\_\_\_  
 (a) 1 (b) 2 (c) 3 (d) 4 CO4, L5
- (13) Carry is obtained in case of:  
 (a) Subtraction (b) Addition (c) Multiplication (d) Both addition and subtraction CO5, L5
- (14) The binary addition of  $1 + 1 = ?$   
 (a) Sum = 1, Carry = 1 (b) Sum = 0, Carry = 0 (c) Sum = 1, Carry = 0 (d) Sum = 0, Carry = 1 CO5, L5
- (15) Number of AND gates required to for a 1 to 8 Mux  
 (a) 2 (b) 6 (c) 8 (d) 10 CO5, L5
- (16) 1 to 8 Demux require \_\_\_\_\_ select lines.  
 (a) 2 (b) 3 (c) 4 (d) 5 CO5, L5
- (17) \_\_\_\_\_ NOT gates will be required for 4 to 1 MUX  
 (a) 3 (b) 1 (c) 2 (d) 4 CO5, L5
- (18) Identify the building blocks for Encoder.  
 (a) OR gate (b) AND gate (c) XOR gate (d) NOR gate CO5, L5
- (19) Identify the type of circuit for decoder?  
 (a) Logical circuit (b) Sequential circuit (c) Combinational circuit (d) None of the mentioned CO5, L5
- (20) TCTL stands for:  
 (a) Transistor-complementary transistor logic (b) Transistor-complemented transistor logic  
 (c) Transistor-capacitor transistor logic (d) Transistor-coupled transistor logic CO5, L5
- (21) D flip-flop is also known as \_\_\_\_\_ flip-flop.  
 (a) transparent (b) TTL (c) non-transparent (d) None of these CO5, L5
- (22) T flip-flop is known as \_\_\_\_\_ flip-flop.  
 (a) Toggle (b) Transparent (c) Set-Reset flip-flop (d) None of these CO5, L5
- (23) The output of JK flip-flop when  $J=1$ ,  $K=1$ , and present state output=1 is \_\_\_\_\_  
 (a) 1 (b) 0 (c) Both 1 and 0 (d) None of these CO5, L5
- (24) The output of SR flip-flop when  $S=1$ ,  $R=1$ , and present state output=1 is \_\_\_\_\_  
 (a) Invalid State (b) Memory State (c) Toggle State (d) Race Around Condition CO5, L5
- (25) The race around condition is related with \_\_\_\_\_  
 (a) SR flip-flop (b) JK flip-flop (c) D flip-flop (d) T flip-flop CO5, L5

## Course Code: ECE249

## Course Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time Allowed: 3hrs.

Max Marks: 70

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## Part-A

Q1) (1) An ideal diode under reverse bias condition operates as \_\_\_\_\_

- (a) open switch (b) closed switch (c) either open switch or closed switch (d) None of these

CO4, L4

(2) An ideal diode under forward bias condition operates as \_\_\_\_\_

- (a) closed switch (b) open switch (c) either open switch or closed switch (d) None of these

CO4, L4

(3) If the voltage across the p-type and n-type terminals of a diode is 5 V and 2 V respectively. This diode is operating in \_\_\_\_\_

- (a) reverse bias (b) forward bias (c) both in forward bias and reverse bias (d) none of these

CO4, L4

(4) Enhancement mode is present in \_\_\_\_\_

- (a) MOSFET (b) JFET (c) Tunnel diode (d) pn junction diode

CO4, L4

(5) The concept of virtual ground is applicable in \_\_\_\_\_

- (a) BJT (b) MOSFET (c) Diode (d) Operational Amplifier

CO4, L4

(6) MOSFET acts as an amplifier in \_\_\_\_\_

- (a) saturation region (b) active region (c) cut-off region (d) None of these

CO4, L4

(7) BJT acts as an amplifier in \_\_\_\_\_

- (a) saturation region (b) active region (c) cut-off region (d) None of these

CO4, L4

(8)  $A \oplus B$  is equivalent to \_\_\_\_\_

- (a)  $A \oplus B$  (b) Complement of  $(A \oplus B)$  (c)  $A \vee B$  (d) None of these

CO4, L4

(9)  $A \oplus B \oplus C$  is equivalent to \_\_\_\_\_

- (a)  $A \oplus B \oplus C$  (b) Complement of  $(A \oplus B \oplus C)$  (c)  $A \cdot B \cdot C$  (d) None of these

CO4, L4

(10) The BJT as acts a closed switch in \_\_\_\_\_

- (a) linear region (b) cut-off region (c) saturation region (d) None of these

CO4, L4



(26) The one of the major differences between flip-flop and latch is that a flip-flop is \_\_\_\_\_ while the latch is \_\_\_\_\_  
 (a) level triggered, edge triggered (b) edge triggered, level triggered  
 (c) level triggered, level triggered (d) edge triggered, edge triggered

CO5, L5

(27) In \_\_\_\_\_ there are different clock signals used to produce the output.  
 (a) Asynchronous counters (b) Synchronous counters  
 (c) Both Asynchronous counters and Synchronous counters (d) None of these

CO5, L5

(28) \_\_\_\_\_ is a \_\_\_\_\_ in which the output from the last flip flop is inverted and fed back as an input to the first.  
 (a) Johnson counter, modified ring counter (b) modified ring counter, Johnson counter  
 (c) Johnson counter, Johnson counter (d) ring counter, modified ring counter

CO5, L5

(29) The next state output of D flip-flop when input D=1 and present state output=1 is \_\_\_\_\_  
 (a) 0 (b) 1 (c) Invalid State (d) None of these

CO5, L5

(30) The next state output of T flip-flop when T=1 and present state output=1 is \_\_\_\_\_  
 (a) 1 (b) 0 (c) Invalid State (d) None of these

CO5, L5

#### Part-B

Q2) Perform steady state analysis on RLC circuits.

CO2, L1, [10 marks]

Q3) Explain the working principle of electric machines in detail.

CO1, L2, [10 marks]

Q4) Explain Op-amps and their ideal characteristics, what do you understand by inverting and non-inverting configuration of Op-amp?

CO1, L2, [10 marks]

Q5) Explain Multiplexer (MUX) in detail. Show how a 32 X 1 MUX can be implemented using 8 X 1 and 4 X 1 MUX.

CO4, L4, [10 marks]

Q6) Design a Mod-12 Asynchronous counter with the help of JK flip-flop. Draw its waveform and truth table also.

CO4, L4, [10 marks]

--End of Question paper--