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**M.Sc. (First Semester)  
EXAMINATION, Dec. - Jan., 2021-22**

**PHYSICS  
Paper Fourth  
(Electronics)**

*Time : Three Hours]**[Maximum Marks:80**[Minimum Pass marks :***Note : Attempt all question as directed.****Section - A****(Objective/Multiple Choice Questions)****(1 mark each)****Note: Attempt all questions.****Choose correct/most appropriate answer -**

- OP-AMP have become very popular in industry mainly become -
  - They are dirt cheap
  - Of their extremely small size
  - Their external characteristics can be change to suit any application
  - They are available in different package

**P.T.O.**

- An Inverting amplifier has  $R_f = 2m$  and  $R_i = 2k$  its scale factor is
  - 1000
  - 1000
  - $10^{-3}$
  - $-10^{-3}$
- The OP-AMP comparator circuit uses
  - Positive feedback
  - Negative feedback
  - No feedback
  - regenerative feedback
- The feedback path in an OP-AMP differentiator courist of
  - A resistor
  - A capacitor
  - A resistor and capacitor in series
  - A resistor and a capacitor in parallel
- An XOR gate produces an output only when its two inputs are
  - High
  - Low
  - Different
  - Same
- Simplified from of Boolean expression.  $(A+\bar{B}+\bar{A}B) C$  is
 

|       |               |
|-------|---------------|
| (A) 1 | (B) 0         |
| (C) C | (D) $\bar{C}$ |

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7. The most obvious identifying feature of a T T L gate is its.  
(A) Large fan-out  
(B) High power dissipation  
(C) Interconnected transistor  
(D) Multimeter input transistor
8. A unique operating feature of ECL Circuit is its -  
(A) Very high speed  
(B) High power dissipation  
(C) Series bare resistor  
(D) Compatibility with other logic sense
9. A J-K flip-flop is in the toggle condition when  
(A)  $J = 1, K = 0$   
(B)  $J = 1, K = 1$   
(C)  $J = 0, K = 0$   
(D)  $J = 0, K = 1$
10. The IC 7490 is a  
(A) Synchronous decade counter  
(B) Synchronous div-by-16 counter  
(C) Asynchronous decade counter  
(D) Asynchronous div-by-16 counter
11. D/A Conversion will use an input as -  
(A) Hexa decimal number  
(B) An octal number  
(C) A binary number  
(D) An analog wave

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12. EPROM memory content can be erased by exposing it to  
(A) UV light  
(B) Intense heat radiation  
(C) IR rays  
(D) Microwaves
13. The number of output pins of 8085 microprocessor are -  
(A) 40  
(B) 27  
(C) 21  
(D) 19
14. Which one of the following flags is not used for branch operations in a microprocessor?  
(A) Carry flag  
(B) Auxiliary carry flag  
(C) Overflow flag  
(D) Parity flag
15. A microprocessor has 24 address lines and 32 data lines. If it uses 10 bits of opcode the size of its memory buffer register is -  
(A) 22 bits  
(B) 24 bits  
(C) 32 bits  
(D) 14 bits
16. The highest priority in 8085 microprocessor system is-  
(A) RST 7.5  
(B) RST 6.5  
(C) INTR  
(D) TRAP

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17. Program counter in a digital computer
  - (A) Count the number of programs run on the machine
  - (B) Counts the number of times a subroutine is called
  - (C) Counts the number of times loops are called
  - (D) Points to the memory address of the current or next instruction.
18. The instruction MOV A, B belongs to
  - (A) Immediate addressing
  - (B) Direct addressing
  - (C) Implied addressing
  - (D) Register addressing
19. The term hand - shaking is used in
  - (A) Interrupt data transfer scheme
  - (B) DMA data transfer scheme
  - (C) Synchronous data transfer scheme
  - (D) Asynchronous data transfer scheme
20. Subroutines are used in large programs
  - (A) For ease of programming
  - (B) to reduce storage requirements
  - (C) To reduce program execution time
  - (D) For ease of programme testing at the time of programs development.

### Section - B

#### (Very Short Answer Type Questions)

(2 marks each)

Note: Attempt all questions.

1. What is differential amplifier? Explain.
2. Define frequency response of OP-AMP.
3. Write the truth table and symbol of excessive OR gate.

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P.T.O.

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4. Sketch the circuit of a typical integrated circuit TTL gate.
5. What do you understand by D flip-flop?
6. What does the term "asynchronous" mean in relation to counters? Explain with an example.
7. What are the difference between EPROM, EEPROM and Harsh memory?
8. Draw a pin diagram of 8085. Explain the functions of each pin

### Section - C

#### (Short Answer Type Questions)

(3 marks each)

Note: Attempt all question.

1. Explain OP-AMP as differentiator and Integrator.
2. State and explain De Morgan's theorem.
3. How is a master solve flip-flop is different from a J K flip-flop? Explain with diagram and its truth false.
4. Explain the working of successive approximation method for A to D conversions.
5. Explain the working of series in parallel one staff region with logic diagram and waveforms.
6. List all the instruction of branch group of 8055 microprocessor and give brief description of any two.
7. Consider the execution of the fohouring instruction by a 8085 microprocessor.

LXIH, OIFFH

SHLD, 2050H

Determine the contents of HL pair register and memory location. 2050H and after use execution.

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8. IN the program given below, determine how many times will the JNZ instructions be executed?

```
MM      D      07H
LOOP   MM      E      05H
      DCR      E
      JNZ      LOOP
```

**Section - D**

**(Long Answer Type Questions)**

**(5 marks each)**

Note: Attempt all question.

1. Explain the OP-AMP application in brief

(A) Adder      (B) Comparator

**OR**

Explain the main features i.e. characteristics, circuit operation and uses of the ECL logic family.

2. Define a de-multiplexer. Draw the logic block diagram of a 1 to 32 output de-multiplexer Tree using a trunk with 4 output lines.

**OR**

Design a 4-bit synchronous. Binary counter based on J-K flip-flop.

3. Explain the principle of ladder type D/A Converters and its advantages.

**OR**

What are the different methods of transforming data between CPU and I/o devices? Explain any one methods.

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4. Write down an assembly language programs to add two single byte numbers and store the result at memory location 3900H. Increment the result by one and move the resultant data from A to C register.

**OR**

Write down an assembly language program to complement the number store in memory location 8990H and to place the result in memory location 812H.