

Code: AE54/AC54/AT54/AE104

Subject: LINEAR ICs &amp; DIGITAL ELECTRONICS

**AMIETE – ET/CS/IT (Current & New Scheme)**

Time: 3 Hours

**December - 2017**

Max. Marks: 100

**PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.**

**NOTE: There are 9 Questions in all.**

- Question 1 is compulsory and carries 20 marks. Answer to Q. 1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions, selecting at least TWO questions from each part, each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

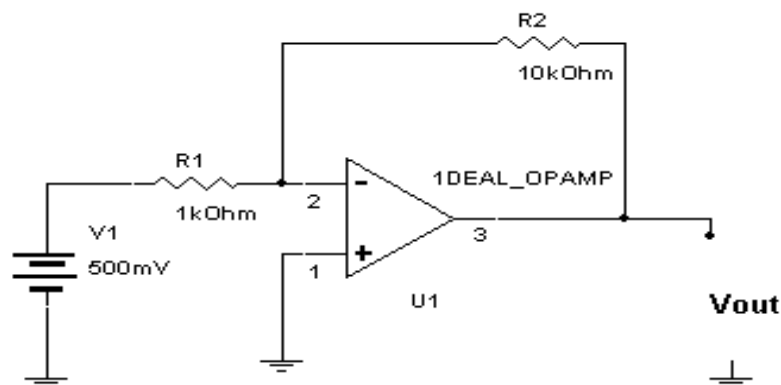
**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- What type of packing is suitable for Integrated Circuits?
 

(A) Metal can package	(B) Dual-in-line package
(C) Ceramic flat package	(D) All of these
- The number of transistors used in Very Large-Scale Integration is
 

(A) $10^7$ transistors/chip	(B) $10^6 - 10^7$ transistors/chip
(C) $20^3 - 10^5$ transistors/chip	(D) $10^2 - 20^3$ transistors
- An astable multivibrator is also known as
 

(A) one-shot multivibrator	(B) free-running multivibrator
(C) bistable multivibrator	(D) monostable multivibrator
- What is the output voltage of the following circuit?



- |          |           |
|----------|-----------|
| (A) 15 V | (B) 5 V   |
| (C) -5 V | (D) -15 V |

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- e. Which of the following is minimum error code?  
(A) Grey Code (B) Binary Code  
(C) Excess 3 Code (D) Octal Code
- f. In a multiplexer the output depends on its  
(A) Data input (B) Select input  
(C) Select output (D) None of these
- g. The sequential circuit is also called  
(A) Flip Flop (B) Latch  
(C) Strobe (D) None of these
- h. A decimal counter has \_\_\_\_\_ stages.  
(A) 5 (B) 19  
(C) 15 (D) 20
- i. A shift register is defined as  
(A) the register capable of shifting an information to another register  
(B) the register capable of shifting an information either to the right or to the left  
(C) the register capable of shifting an information to the right only  
(D) the register capable of shifting an information to the left only
- j. If A, B and C are the input of full adder then the sum is given by  
(A) A AND B AND C  
(B) A OR B OR C  
(C) A AND B OR C  
(D) A XOR B XOR C

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**PART - A****Answer at least TWO questions. Each question carries 16 marks.**

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- Q.2** a. What is the difference between monolithic and hybrid ICs? (6)
- b. Draw the inverting Operational amplifier configuration and derive the expression for the voltage gain. (10)
- Q.3** a. Derive the expression for slew rate of an op-amp. (10)
- b. Explain the frequency response curve of an op-amp. (6)
- Q.4** a. With the help of neat diagram and waveform explain, how operational Amplifier acts an integrator? (10)
- b. What is a Sample-and-hold circuit? Why is it needed? Briefly explain its operation (6)

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- Q.5** a. Describe monostable mode of operation of IC555 with necessary Waveforms and expressions. (10)
- b. What are the important specification of ADC and DAC? (6)

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**PART - B****Answer at least TWO questions. Each question carries 16 marks.**

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- Q.6** a. (i) Convert from octal to decimal:  $(214)_8 = ( \quad )_{10}$   
(ii) Convert from binary to decimal:  $(01011.1011)_2 = ( \quad )_{10}$   
(iii) Convert 1100 1010 into gray code.  
(iv) What is ASCII code for D?  
(v) Number of bits of double word is ..... (2×5)
- b. Differentiate between analog and digital systems. (6)
- Q.7** a. Explain with the help of truth table, the working of AND, OR, NOT and EXOR gate. (8)
- b. Using Karnaugh map simplify the following functions. (8)  
 $F1 = \sum m (2,3,5,6,7,11,13)$   
 $F2 = \sum m (0,2,4,8,9,10,11,12,13)$
- Q.8** a. Design a circuit for a multiplexer and discuss its working. What are its applications? (8)
- b. Explain Full Adder. Design Full Adder using Multiplexors. (8)
- Q.9** a. Explain the difference between a sequential and combinational circuit. (4)
- b. Explain the working of a JK flip flop. (6)
- c. What is a ripple counter? How it works? Explain with logic diagram. (6)