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Question Paper Code : 23501

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fourth Semester

Electrical and Electronics Engineering

EE 2254 — LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

(Common to Instrumentation and Control Engineering and Electronics and Instrumentation Engineering)

(Regulations 2008)

(Also common to PTEE 2254 – Linear Integrated Circuits and Applications for B.E. (Part-Time) Third Semester – EEE – Regulations 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List advantages of IC's over discrete components.

2. State why buried layer is needed.

3. Mention the ideal characteristics of an operational amplifier.

4. For the opamp shown in Fig. 4 determine the voltage gain.

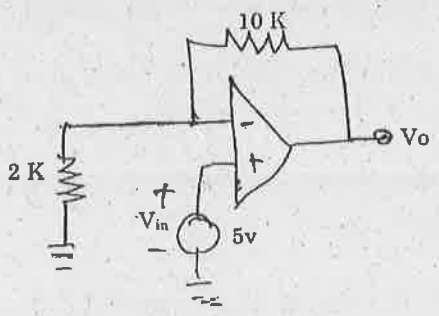

Fig. 4

5. Give any four important features of an instrumentation amplifier.

6. Write down the advantages of Flash type A/D converters.

7. Why invariably a suitable value of capacitor is connected to the pin 5 of 555 Timer applications?

8. Draw the block diagrammatic representation of a frequency multiplier using PLL.

9. What is the principle of switch mode power supplies?

10. How many resistors are required in a 12-bit weighted resistor DAC?

PART B — (5 × 16 = 80 marks)

11. (a) Explain about the following:

(i) Epitaxial growth and diffusion. (8)

(ii) Photolithography masking and Photo etching. (8)

Or

(b) Discuss briefly about the fabrication methods for transistors and diodes. (16)

12. (a) List the six characteristics of an ideal op-amp and explain in detail. Give the practical op-amp equivalent circuit.

Or

(b) Explain in detail about DC characteristics of op-amp.

13. (a) (i) Illustrate the working principle of dual slope type A/D converter. What are the advantages and limitations? (10)

(ii) Design a second order Butterworth HPF with cut-off frequency of 4 KHz and draw the designed circuit. (6)

Or

(b) (i) Explain a R-2R ladder type D/A converter, (12)

(ii) State the advantages and applications of sample and hold circuits. (4)

14. (a) (i) Draw the functional block diagram and explain the Characteristics of IC 555. (12)

(ii) Write a short note on Analog multiplier. (4)

Or

(b) (i) Explain the functioning of IC 566 as a PLL. (12)

(ii) Explain the application of PLL as a frequency translator. (4)

15. (a) Design a Voltage regulator using IC 723 regulator to satisfy the following specifications

(i) $V_o = 12$ V,

(ii) $I_o = 500$ mA,

(iii) $V_{in} = 18 \pm 20\%$,

(iv) $I_{SC} = 600$ mA,

(v) $V_{Sense} \simeq 0.7$ V. Give the complete schematic diagram. (Assume and Justify if any data required).

Or

(b) Discuss in detail the operation and applications of the following circuits.

(i) Isolation amplifier. (8)

(ii) Optocoupler. (8)