**Code: 20A04404T**

**R20**

B.Tech II Year II Semester (R20) Regular & Supplementary Examinations April/May 2024

**ANALOG ELECTRONIC CIRCUITS**

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Give the classification of amplifiers. 2M

(b) Explain the principle of multistage amplifiers. 2M

(c) Compare positive feedback and negative feedback.

(d) Write down the differences between RC and LC oscillators? 2M

(e) Write about distortion in power amplifiers. 2M

(f) Mention the limitation of Class-C amplifier and selection of Q-point? 2M

(g) Illustrate the power supply connections for an op-amp. 2M

(h) What is Slew rate? List out the causes of Slew rate? 2M

(i) Draw the input-output waveforms when differentiator is applied with square wave. 2M

(j) List the applications of Timer 555. 2M

**PART – B**

(Answer all the questions: 05 X 10 = 50 Marks)

2 (a) Explain various methods used for coupling multistage amplifiers with their frequency response. 6M

(b) Derive the expression for voltage gain and current gain of cascade amplifier. 4M

**OR**

3 (a) Explain the effect of cascading on bandwidth in multistage amplifiers. 4M

(b) Derive the expression for current gain and input resistance of Darlington amplifier along with diagram. 6M

4 (a) Explain the concept of Voltage Shunt feedback configuration and hence derive expressions for gain, Input Resistance and Output Resistance with feedback. 6M

(b) List out and explain about the characteristics of negative feedback amplifiers. 4M

**OR**

5 (a) Explain the working principle of Wien-bridge oscillator using BJT and derive the expression for frequency of sustained oscillations. 6M

(b) In a Hartley oscillator, the value of the capacitor in the tuned circuit is 500 pF and the two sections of coil have inductances $12\mu H$ and $38\ \mu H$. Find the frequency of oscillations and the feedback factor $\beta$. 4M

6 (a) Explain about the operation of a class A transformer coupled amplifier along with necessary circuit and waveforms. 6M

(b) Explain second harmonic distortion by three point method. 4M

**OR**

7 (a) What are the advantages and disadvantages of push pull configuration? Show that maximum conversion efficiency of Class –B push pull amplifier is 78.5%. 7M

(b) Explain about Class AB amplifiers. 3M

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| | | | |
|---|---|---|---|
| 8 | (a) | Draw and explain the block diagram of op- amp. | 4M |
| | (b) | Derive expressions for $A_F, R_{iF}\ and\ R_{oF}$ for non-inverting amplifier with feedback. | 6M |
| | | **OR** | |
| 9 | (a) | Explain the terms Input Offset Voltage, Input Offset Current, Large Signal Voltage Gain and CMRR of an op-amp. | 6M |
| | (b) | The response to the square wave input, the output of op-amp changed -3V to +3V over the interval of 0.25 micro sec. Then find out the Slew Rate of op-amp. | 4M |
| 10 | (a) | Discuss about basic Integrator, its drawbacks and explain how these drawbacks are overcome by Practical Integrator. | 6M |
| | (b) | Design a Low Pass Filter at a cut off frequency of $1\ kHz$ with pass band gain of **2** and plot its frequency response. | 4M |
| | | **OR** | |
| 11 | (a) | Mention the applications of instrumentation amplifier. Draw and explain the circuit diagram of Instrumentation Amplifier. | 6M |
| | (b) | Explain about fixed and variable voltage regulators. | 4M |

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**Code: 20A04404T**

**R20**

B.Tech II Year II Semester (R20) Regular & Supplementary Examinations August/September 2023

**ANALOG ELECTRONIC CIRCUITS**

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

| | | |
|---|---|---|
| (a) | What are the advantages of differential amplifier? | 2M |
| (b) | What is the coupling schemes used in multistage amplifiers? | 2M |
| (c) | What are the components of feedback amplifier? | 2M |
| (d) | What are the types of feedback? | 2M |
| (e) | What is the need of power amplifier? | 2M |
| (f) | Sketch ac-load line in case of class A power amplifier. | 2M |
| (g) | Define input offset current. State the reasons for the offset currents at the input of the op-amp. | 2M |
| (h) | What are the limitations in a temperature compensated zener-reference source? | 2M |
| (i) | Define low pass filter. | 2M |
| (j) | What are the demerits of passive filters? | 2M |

**PART – B**

(Answer all the questions: 05 X 10 = 50 Marks)

2 Draw the circuit diagram of two stages RC coupled transistor amplifier. Explain its working. 10M

**OR**

3 Discuss the frequency response of multistage amplifiers. Calculate the overall upper and lower cutoff frequencies. 10M

4 Explain the concept of feedback with respect to sampling network, feedback network and mixer network. 10M

**OR**

5 Explain negative feedback with respect to non-linear distortion and input impedance. 10M

6 Compare Class A, Class B, Class AB leser Signature Amplifiers. 10M

**OR**

7 Discuss Distaturn in Power Ampling and hence explain about Class ‘C’ Amplifiers. 10M

8 Explain in detail about voltage sources and voltage references using OPAMPS. 10M

**OR**

9 Discuss in detail about AC performance characteristics of an op-amp. 10M

10 Explain in detail about Square wave generator. 10M

**OR**

11 Design & explain about the following : 10M
(i) Integrater, (ii) Current to Voltage Converter, (iii) First older filters using OP AMP.

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