

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

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[Total No. of Questions: 09]

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Uni. Roll No. ....

04 Oct 2023

Program: B.Tech. (Batch 2018 onward)

Semester: 4

Name of Subject: Analog Circuits

Subject Code: PCEC-106

Paper ID: 16222

Scientific calculator is Allowed.

Detail of allowed codes/charts/tables etc. Not Required.

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory.
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice.
- 3) Any missing data may be assumed appropriately.

Part – A

[Marks: 02 each]

Q1.

- (a) Define Frequency response of coupled amplifier.
- (b) Compare crossover distortion and harmonic distortion in an amplifier.
- (c) Show the block diagram of current series feedback circuit.
- (d) List two LC and RC Oscillators for each.
- (e) Given that CMRR is 100dB. Input common-mode voltage is 12V. Differential voltage gain is 4000. Determine output common-mode voltage of an op-amp.
- (f) Distinguish between inverting and non-inverting operational amplifier.

Part – B

[Marks: 04 each]

Q2. Make use of push-pull configuration and explain class B push-pull amplifier.

Q3. Classify and explain coupling techniques in amplifiers.

Q4. Explain working of op-amp as an integrator.

Q5. Voltage gain of an amplifier without feedback is 60dB. It decreases to 40dB with feedback. Evaluate the feedback factor.

Q6. Analyze the operation of IC 555 as monostable multivibrator.

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Q7. Determine collector efficiency, if transformer coupled class A large signal amplifier has maximum and minimum values of collector-emitter voltage of 25V and 2.5V respectively.

Part – C

[Marks: 12 each]

Q8. Explain the impact of negative feedback on gain, input impedance, output impedance, bandwidth of an amplifier and derive mathematical expressions.

OR

Compare Hartley Oscillator and Colpitt Oscillator in terms of circuit diagram, working and frequency of oscillation.

Q9. A 10mV, 2 kHz sinusoidal signal is applied to the inverting input terminal of an op-amp integrator for which  $R = 50k\Omega$  and  $C = 2\mu F$ . Determine the output voltage.

OR

(a) Determine input bias current and input offset current if  $I_{B1}=10\mu A$  and  $I_{B2}=7.5\mu A$ .

(b) Two input terminals of an op-amp are connected to voltage signals of strength  $745\mu V$  and  $740\mu V$  respectively. The gain of an op-amp in differential mode is  $5 \times 10^5$  and its CMRR is 80dB. Determine output voltage and %age error due to common-mode.

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