

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Back), April-May 2016

B. Tech in Electronics & Communication Engineering, Semester IV

Roll No.....

ECE401: ANALOG ELECTRONICS

Time: 3 hours

Max. Marks: 100

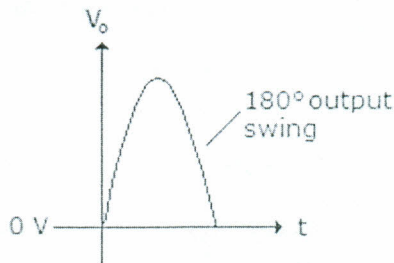
Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

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- i. Voltage shunt feedback is appropriate for a
 - a) Transconductance amplifier
 - b) transresistance amplifier
 - c) Current amplifier
 - d) Voltage amplifier
- ii. Colpitts and Hartley oscillation belong to a general class of oscillations that use _____.
 - a) voltage-shunt
 - b) Current-series
 - c) Voltage-series
 - d) Current-shunt
- iii. This is an example of the output swing for a class _____ amplifier.



- (a) A
 - (b) AB
 - (c) C
 - (d) B
- iv. Class B operation is provided when the dc bias leaves the transistor biased just off, the transistor turning on when the ac signal is applied.
 - (a) True
 - (b) False
 - v. The main features of a large-signal amplifier is the circuit's _____.
 - (a) power efficiency
 - (b) maximum power limitations

- (c) impedance matching to the output device
- (d) All of the above
- vi. Which of the push-pull amplifiers is presently the most popular form of the class B power amplifier?
 - (a) Quasi-complementary
 - (b) Transformer-coupled
 - (c) Complementary-symmetry
 - (d) None of the above
- vii. For a common-emitter amplifier, the purpose of the emitter bypass capacitor is
 - (a) no purpose, since it is shorted out by R_E .
 - (b) to reduce noise.
 - (c) to despike the supply voltage.
 - (d) to maximize amplifier gain.
- viii. You have a need to apply an amplifier with a very high power gain. Which of the following would you choose?
 - (a) common-collector
 - (b) common-base
 - (c) common-emitter
 - (d) emitter-follower
- ix. RC coupling is used for amplification
 - (a) Voltage
 - (b) Current
 - (c) Power
 - (d) None of the above
- x. In an RC coupling scheme, the coupling capacitor C_C must be large enough
 - (a) To pass d.c. between the stages
 - (b) Not to attenuate the low frequencies
 - (c) To dissipate high power
 - (d) None of the above

Q.2 Short answer type questions (4 questions @ 2.5 marks)

10

- i. What is the difference between voltage amplifier and power amplifier?
- ii. Differentiate amongst open loop and closed loop amplifiers.
- iii. An R-C coupled amplifier has $A_m=50,000$; $f_H=20\text{kHz}$; $f_L=30\text{Hz}$. A resistive negative feedback is added such that $B(\text{beta})=5 \times 10^{-5}$. Find A_{mf} , f_{Hf} and f_{Lf} .
- iv. Draw a model circuit for CE amplifier.

Q.3A Explain the origin of Cross over Distortion. Describe a method to minimize this distortion.

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Q.3B An Amplifier with a negative feedback provides an output voltage of 5V with an input voltage of 0.2 V. On removal of feedback, it needs only 0.1V input to give the same output. Determine (a) Gain without feedback (b) Gain with feedback (c) Feedback ratio.

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- Q.4A Categorize power amplifiers by its class. Compare the each class by its operation cycle and power efficiency. 05
- Q.4B List the procedure to obtain the basic amplifier configuration without feedback but taking the loading of the β network into account. 05
- Q.5A Draw hybrid π equivalent circuit for common emitter transistor. Also derive the expression for input conductance ($g_{b'e}$). 05
- Q.5B Write a short note on two stages RC - Coupled amplifier. 05
- OR
- Q.5B Define conversion efficiency of power stage amplifier. Derive an expression for it.
- Q.6A Classify the oscillator. Also explain RC-phase shift oscillator with neat circuit diagram. 05
- Q.6B Show that the max conversion efficiency of class B push pull amplifier is 78.5%. 05
- OR
- Q.6B Explain why even harmonics are not present in a push pull amplifier? Give 2 additional advantages of this circuit over that of a single transistor amplifier.
- Q.7 (a) Sketch the topology for a generalized resonant-circuit oscillator, using impedances Z_1 , Z_2 and Z_3 . 10
(b) At what frequency/condition, will the circuit oscillate?
(c) Under what conditions does the configuration reduce to a Colpitts and Hartley oscillator?
- Q.8 Derive the expression of the input and output resistance with feedback for current series feedback amplifier. 10
- OR
- Q.8 Derive input resistance and output resistance equation for voltage series feedback for op-amp.
- Q.9 Draw the circuit and explain the operation of transistorized Wien bridge oscillator. 10
- OR
- Q.9 Explain operation of push pull amplifier with the help of circuit and wave form.
- Q.10 In a transistorized Hartley oscillator the two inductances are 2mH and 20 μ H while the frequency is to be changed from 950kHz to 2050 kHz. Calculate the range over which the capacitor is to be varied. 10
- OR
- Q.10 Calculate the bandwidth of an amplifier when 6% negative feedback introduced to 300kHz bandwidth and 100 voltage gain? Also calculate gain bandwidth product after and before application of feedback? Finally calculate amount of feedback if bandwidth is calculate to 1 MHz.

