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Register Number:

DATE:

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALURU-27**

**B.Sc Electronics - II SEMESTER**

**SEMESTER EXAMINATION-APRIL-2017**

**EL 215 - Amplifiers and Oscillators**

**Time : 2½ Hours Maximum Marks: 70**

*This question paper has* ***two*** *printed pages and* ***three*** *parts.*

**PART-A**

**Answer any FIVE questions: 8 x 5 = 40**

1 a) Explain the need for multistage amplifiers. Draw the block diagram of an n-stage

Multistage amplifier and derive an expression for overall gain.

b) Differentiate between voltage and power amplifiers. 4+4

2 a) Derive an expression for efficiency of Single Ended Class A amplifier.

b) With a circuit diagram explain the operation of Complementary Symmetry

Class B Push-Pull Amplifier. 4+4

3 a) State Barkhausen Criterion for oscillation.

b) Draw the circuit diagram of Hartley Oscillator and derive and expression for the frequency

of oscillation. 2+6

4 a) Explain IC fabrication steps (i) Epitaxial Growth

(ii) Photolithography

b) What is a multivibrator? Draw the block diagram of IC 555 4+4

5 a) List the configurations of differential amplifier.

b) Explain the principle of Current Mirror circuit. Describe the uses of Current Mirror circuit in

differential Amplifier. 2+6

6 a) Define the following Op-Amp parameters (i) Input offset voltage

(ii) Input Bias current

(iii) CMRR

(iv) Slew Rate

b) Derive an expression for voltage gain for a Non-Inverting feedback circuit using Op-Amp .

4+4

7 a) Derive an expression for output voltage of an Op-Amp Integrator.

b) With necessary circuit diagram and waveforms explain the working of Non-Inverting

comparator. 4+4

EL-215-A-17

**PART-B**

**Answer any FIVE questions: 4 x 5 = 20**

8. A Class A transformer coupled power amplifier has zero signal collector current of 50mA. If

the collector supply voltage is 5V, find the maximum ac power output and the maximum

collector efficiency.

9. The capacitor used in a Wien Bridge oscillator has a value of 0.5nF. The resistors can

be adjusted between 10KΩ and 100KΩ. Find the maximum and minimum values

of oscillation frequency.

10. A Colpitt’s Oscillator is used to generate the frequency of 15MHz. The capacitors to

be used are 200pF and 20pF. Find the value of inductance.

11. An Astable multivibrator is constructed with RA = 22KΩ, RB = 100KΩ and CT = 0.01µF.

Calculate the frequency of oscillation and duty cycle of the circuit.

12. An Emitter biased dual input, unbalanced output differential amplifier has the following

specifications: Vcc = VEE = 10V, RC1 = RC2 = 2.2KΩ, RE = 4.7KΩ, βac = βdc = 100 and

VBE = 0.7V. Calculate the (i) Operating current and voltage values of each transistor

(ii) Voltage gain

13. In a negative feedback amplifier A = 100, β =0.04 and Vi = 50mV. Find (i) Gain with

feedback (ii) output voltage (iii) feedback voltage.

14. Design an active low pass filter with pass band gain of 10 and cut-off frequency 18KHz.

Select C = 0.033µF and draw the circuit diagram.

**PART-C**

**Answer any FIVE questions: 2 x 5 = 10**

15. What is the importance of heat sinks in electronic devices?

16. Darlington pair is called super beta transistor. Why?

17. LC Oscillators cannot be used at very low frequencies. Justify.

18. A certain voltage regulator has 9V output when there is no load, when load current is

10mA, the load voltage is 8.7V. Find the percentage load regulation.

19. Ideally the Common –mode gain of a differential amplifier is zero. But practically it is

non-zero. Why?

20. Sketch output waveform for a differentiator circuit for a square wave input.

21. Write an advantage and disadvantage of higher order filters over first order filters.

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