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R 3294

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Third Semester

Electronics and Instrumentation Engineering

EC 1261 — ELECTRONIC CIRCUITS

(Common to Instrumentation and Control Engineering)

(Regulation 2004)

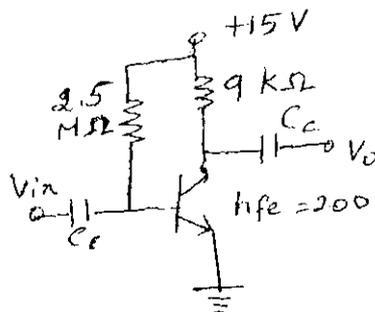
Time : Three hours

Maximum : 100 marks

Answer ALL questions.

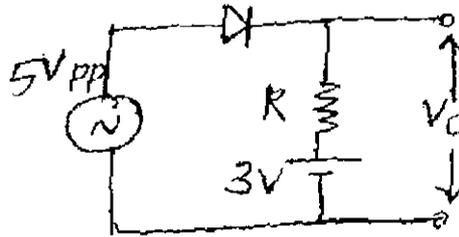
PART A — (10 × 2 = 20 marks)

1. What are the special features of Darlington Amplifier?
2. Determine the operating region of the Amplifier shown.



3. Define CMRR.
4. A coil of $3\mu\text{H}$ is used with Q of 200. What will be the series loss resistance R_s of the coil at 10 MHz?
5. Draw equivalent circuit of a trans conductance amplifier.
6. Draw the equivalent circuit of a Quartz crystal and mention the significance of each component.

7. Draw the input and output of the circuit shown.



8. Distinguish between Monostable and Bistable multivibrators.
9. Draw the block diagram of a power supply.
10. Define ripple factor. Mention the ripple factor of HWR and FWR (without filter).

PART B — (5 × 16 = 80 marks)

11. (a) With circuit diagram explain the line regulation and load regulation of SMPS.

Or

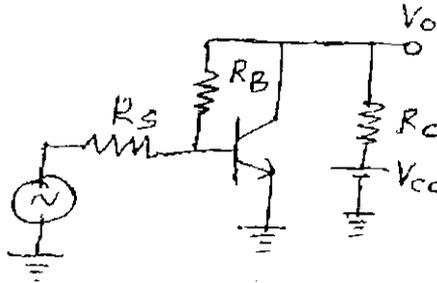
- (b) (i) Explain the working of FWR with inductor input filter. Derive its ripple factor. (12)
- (ii) Draw the circuit of a transistor series voltage regulator. (4)
12. (a) Draw a Schmitt trigger circuit and explain its working with its hysteresis characteristics.

Or

- (b) (i) With a neat circuit explain UJT based sawtooth oscillator. Derive its frequency of oscillation. (8)
- (ii) Design a simple active circuit to differentiate a pulse waveform. Draw the input and output waveforms. (8)
13. (a) (i) State Barkhausen Criterion of sinusoidal oscillation. (2)
- (ii) Derive the transfer function of a Wien network. (6)
- (iii) Design a RC oscillator to generate 5 kHz sinusoidal signal using Wien network as feedback network. (8)

Or

- (b) Identify the type of feedback in given amplifier circuit. Draw the basic amplifier and find its gain expression. Derive for β and hence find the gain of the amplifier with feedback.



14. (a) (i) With small signal equivalent circuit of differential amplifier derive expressions for differential mode and common mode gains A_d and A_c .
 (ii) How CMRR of differential amplifier can be improved?

Or

- (b) (i) Draw the circuit diagram and frequency response characteristics of single tuned and double tuned amplifier. What are the advantages of double tuned over single tuned amplifiers? (8)
 (ii) The tank circuit of a single tuned amplifier has $L = 1$ mH and $C = 10$ pF. Calculate the resonant frequency and the 3 dB bandwidth of the tuned amplifier, if the loaded Q of the amplifier is 10. (8)
15. (a) Define class B operation. Draw a pushpull class B power amplifier and explain its working. Derive its efficiency.

Or

- (b) (i) With small signal equivalent circuit of BJT, derive expressions for mid band voltage gain, input resistance and output resistance of a Common Emitter Amplifier. (12)
 (ii) Draw any two biasing circuits for FET. (4)