

Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

Third Semester B. Tech. (EE/CS/IT)

Summer Term-2016

Course Code: ETU311

Course Name: Electronic Devices and Circuits

Time: 2 hr. 30min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary and clearly state the assumptions made.
- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

1 Solve the following

- a A 220V, 50Hz ac voltage is applied to the primary of centre tapped transformer. Secondary is rated at 12-0-12V and is used in full wave rectifier circuit with load resistance of $1\text{k}\Omega$. Assuming diodes to be an ideal, determine the following: 6
- i) DC output voltage
 - ii) DC power delivered to the load
 - iii) PIV of each diode

The same 220V, 50Hz ac voltage is now applied to the

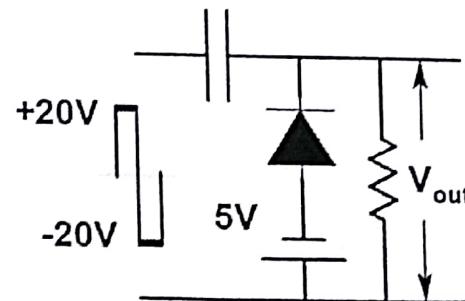
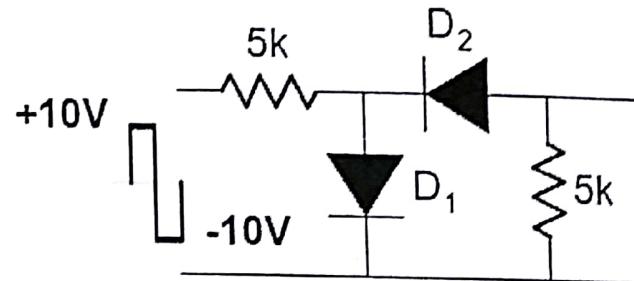
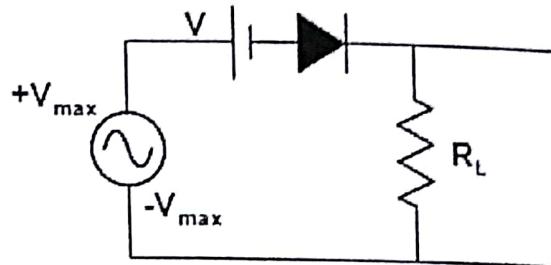
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primary of 4:1 step-down transformer, which is used in bridge rectifier, having load resistance of $1\text{k}\Omega$. Assuming diodes to be an ideal, determine the following:

- DC output voltage
- DC power delivered to the load
- PIV of each diode

b Draw the output waveform for following circuits

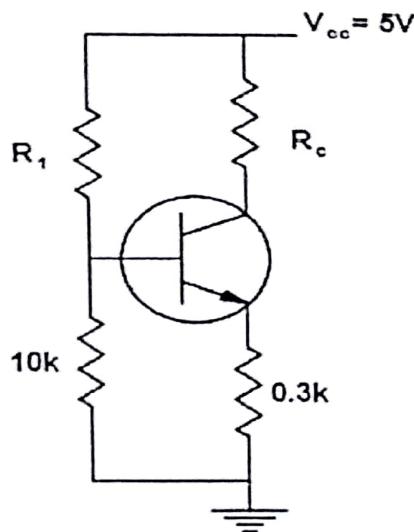
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2

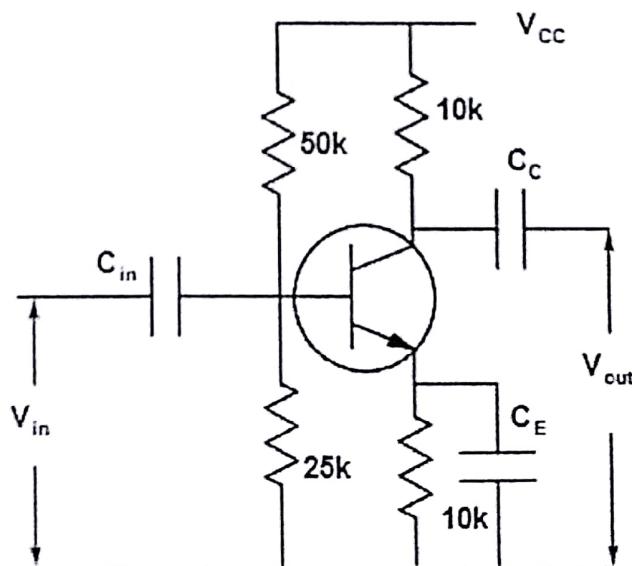
Solve Any Two of the following

- a The BJT amplifier of following figure has $h_{fe} = 100$, $V_{BE} = 0.7V$, $I_{CO} = 0$. Calculate the values of R_1 and R_c such that its $I_C = 1mA$ and $V_{CE} = 2.5V$



- b Tell us the need of biasing a transistor. Discuss the 6 stability of fixed bias circuit.
- c For following CE transistor amplifier circuit, determine 6 input and output impedances, current and voltage gains if transistor parameters are

$$h_{ie} = 2k\Omega, h_{fe} = 100, h_{re} = 5 \times 10^{-4}, h_{oe} = 25\mu S$$



Cont.

- 3 Solve Any Two of the following**
- a Draw neat circuit diagram of two stage RC coupled CE amplifier and sketch its frequency response. Describe the factors that affect the gain of the amplifier at low frequencies and at high frequencies. 6
- b Discuss all three biasing techniques of FET. 6
- c Draw to the scale, the transfer characteristics of an N-channel depletion type MOSFET with $I_{DSS} = 10mA$ and $V_P = -4V$. 6
- 4 Solve Any Two of the following**
- a Write in brief about Cross over distortion and Harmonic distortion. 6
- b An amplifier has an input of 10mV and a gain of 200 without feedback. The distortion produced at the output of the amplifier is 10%. It is desired to reduce the distortion to 1% by using negative feedback. Calculate the gain and output voltage with feedback. 6
- c With the help of circuit diagram and frequency response curve, explain the circuit operation of double tuned amplifier. 6
- 5 Solve the following**
- a Analyse Colpitt's oscillator. How will you improve its frequency response? 6
- b Write in brief about symmetrical and unsymmetrical triggering in bistable multivibrator. 6

Government College of Engineering, Amravati

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Third Semester B. Tech. (EE / CS / IT)

Winter = 2014

Course Code: ETU311

Course Name: Electronic Devices and Circuits

Time: 2 Hrs 30Min.

Max. Marks: 60

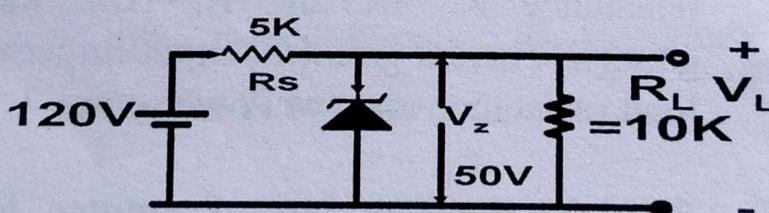
Instructions to Candidate

- 1) All questions are compulsory.
 - 2) Assume suitable data wherever necessary and clearly state the assumptions made.
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 - 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
 - 5) Figures to the right indicate full marks.

1 Solve the following questions.

12

- (a) For the circuit shown in figure ,find
(i)the output voltage ,(ii)the voltage drop across
Rs,(iii)the current through zener.



- (b) In half wave rectifier show that the maximum dc output power occurs when load resistance equals the forward resistance.

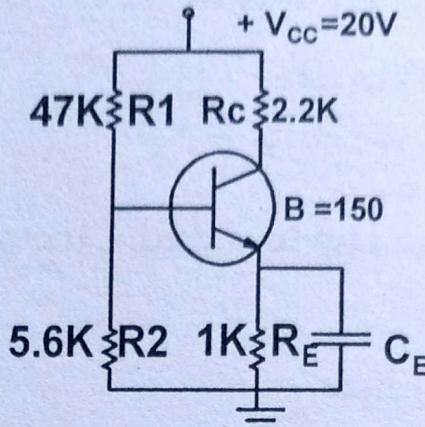
(c) Explain the working of choke input filter and obtain expression for the output dc voltage for full wave rectification.

2

Solve any two from the following questions.

12

- (a) For a voltage divider biasing circuit shown in figure, find I_C , V_{CE} , I_B , V_E and V_B .



3

- (b) Explain the need of stabilization for any bipolar junction transistor. List the types of stability factors.

12

- (c) Why is transistor biasing required? Describe different schemes of transistor biasing in CE-NPN transistor circuit .State their advantages.

Solve the following questions.

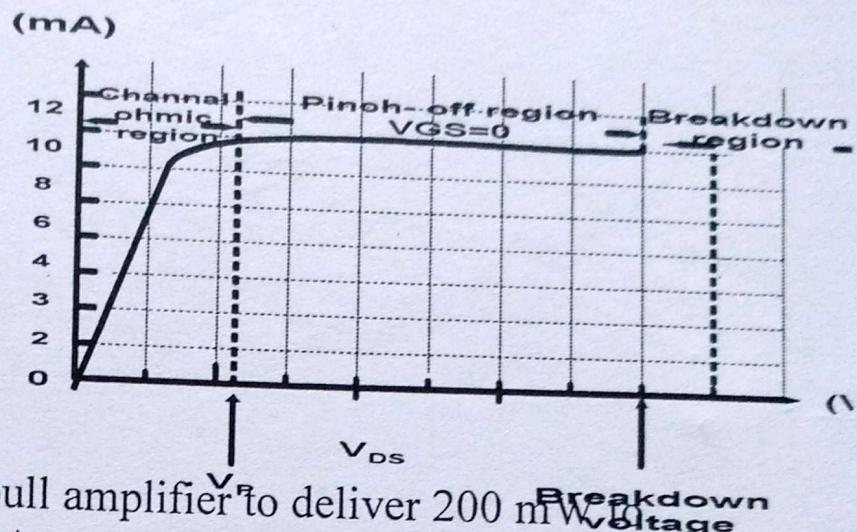
- (a) In C-E transistor amplifier when signal changes by $0.02V$,the base current changes by $10 \mu A$ and collector current by $1mA$.If the collector resistance $R_C=5K$ and $R_L=10K$.Find (i)voltage gain,(ii) current gain,(iii) input impedance (iv) AC load resistance and (v) Power gain.
- (b) Explain the working of emitter follower and show how it performs the function of impedance transformation.
- (c) Draw the circuit diagram of R-C coupled amplifier. Explain the importance of each component. Draw and explain its frequency response.

4

Solve any two from the following questions.

12

- (a) Figure shows the drain characteristics for n-channel JFET with $V_{GS} = 0$. Explain working of FET in each region and also explain important current and voltage levels.



- (b) Design a push pull amplifier to deliver 200 mW to a load of 6Ω . Assume transformer efficiency to be 70% and $V_{CC} = 12V$
- (c) Discuss the general characteristics of feedback amplifier in detail.

5

Solve any two from the following questions.

12

- (a) Explain the circuit of a UJT as a relaxation oscillator with provision for frequency adjustment and spike waveform.
- (b) Explain the difference between working of Millers sweep circuits and millers bootstraps sweep generator circuit.
- (c) Discuss the working of Self bias bistable multivibrator? What is the use of commutating capacitor?

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Third Semester B. Tech. (EE / CS / IT)

Winter – 2016

Course Code: ETU311

Course Name: Electronic Devices and Circuits

Time: 2 Hrs 30Min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
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- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

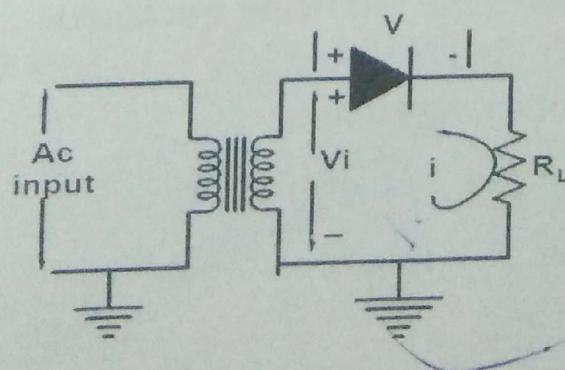
1

Solve the following questions.

12

(a) Derive an expression for ripple factor of a full wave rectifier with LC filter.

(b) A diode whose internal resistance is $20\ \Omega$ is to supply power to a $1K\Omega$ load from a $110V(rms)$ source of supply as shown in figure. Calculate (a) the peak load current,(b) the dc load current,(c) the ac load current,(d) the dc load voltage(e) the total input power to the circuit, and(f) the peak inverse voltage.



(c) Define regulation. Explain the operation of a voltage series regulator and the advantages of this circuit over a zener diode regulator.

2 **Solve ANY TWO from the following questions.** 12

(a) Compare the CB, CC and CE configurations of a transistor. (For a CE configuration prove that $I_c = \beta I_b + (\beta + 1)I_{co}$)

(b) What is mean by stabilization? Derive the three stability factors for bipolar junction transistor.

(c) Discuss analysis of transistor amplifier using h-parameter in CE configuration.

3 **Solve ANY TWO the following questions.** 12

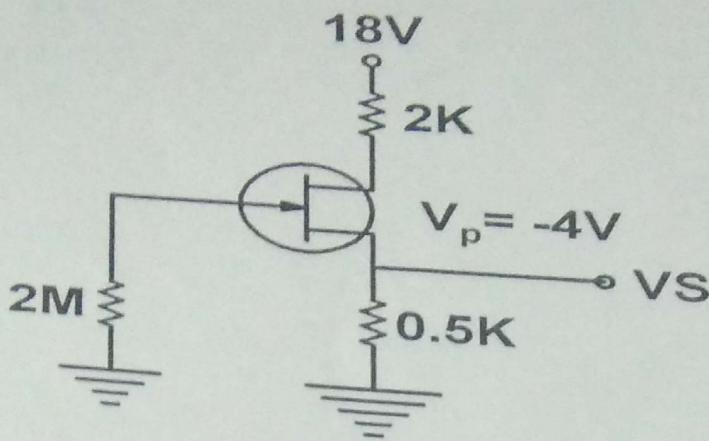
(a) In C-E transistor amplifier when signal changes by 0.02V, the base current changes by $10 \mu A$ and collector current by $1mA$. If the collector resistance $R_C = 5K$ and $R_L = 10K$. Find (i) voltage gain, (ii) current gain, (iii) input impedance (iv) AC load resistance and (v) Power gain.

(b) Explain the working of Bootstrap emitter follower and show how it performs the function of impedance transformation.

(c) Draw the circuit diagram of R-C coupled amplifier. Explain the importance of each component. Explain its frequency response.

4 **Solve the following questions.** 12

(a) If $V_s = 1.7 V$, find I_D, V_{GS}, V_D and V_{DS}, I_{DSS} for the following circuit:



- 5
- (b) Design a push pull amplifier to deliver 200 mW to a load of 6Ω . Assume transformer efficiency to be 70% and $V_{cc} = 12V$
- (c) Explain the general characteristics of negative feedback amplifier in detail.

Solve ANY TWO from the following questions. 12

- (a) Design and explain a UJT as a relaxation oscillator with provision for frequency adjustment and spike waveform.
- (b) Distinguish between Hartley and Colpitt's oscillator with at least six points.
- (c) Write a short note on commutating capacitor. What are the other names of commutating capacitor?

Government College of Engineering, Amravati
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III - Semester B. Tech. (EE/CS/IT)

Winter - 2015

Course Code: ETU311

Course Name: Electronic Devices and Circuits

Time: 2 hr. 30min.

Max. Marks: 60

Instructions to Candidate

1. All questions are compulsory. Attempt ANY TWO from Q1, Q2 and Q5.
2. Assume suitable data wherever necessary and clearly state the assumptions made.
3. Diagrams/sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

- 1 (a) Compare Half Wave, Centre tap and bridge rectifier. 6
- (b) Sketch the circuit diagram for Zener diode as a voltage regulator. Determine the range of R_L and I_L which will maintain the load voltage constant at 10V. Given $V_{in} = 50V$, $R_s = 1k\Omega$ and $I_{Zmax} = 32mA$. 6
- (c) Explain the operation of NPN transistor.
Show that $\frac{\beta}{1+\beta}$. 6
- 2 (a) What is the need of biasing? Define stability 6

Cont.

factors - S , S_v and S_β

- (b) Given $h_{ie} = 1k\Omega$, $h_{fe} = 100$, $h_{oe} = 25\mu A/V$, draw the h-parameter equivalent circuit of voltage divider biased CE amplifier. Calculate the input impedance, output impedance, current gain and voltage gain. 6
- (c) Describe transformer coupled transistor amplifier. 6

- 3 (a) Explain the working of JFET along with its construction. 6
- (b) Describe the most widely used JFET amplifier configuration. 6
- 4 (a) Draw circuit diagram of single tuned and double tuned amplifiers and their frequency response. 6
- (b) Explain the effect of negative feedback on: 6
a) input impedance, b) output impedance,
c) voltage gain, d) bandwidth
- 5 (a) Discuss the purpose of providing positive and negative feedback. 6
- (b) Write the expression for the frequency of oscillation of Hartley, Colpitt's and Clapp oscillator. Also draw the circuit diagrams for the same. 6
- (c) Discuss Monostable Multivibrator in detail. 6

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Third Semester B.Tech. (EE/CS/IT)

Winter – 2017

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Time: 2 Hrs. 30 Min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
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- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

1 Solve:

- (a) Derive the expression for ripple factor, rectifier efficiency and form factor for center tap full-wave rectifier **6**

- (b) Explain working of Zener diode as a shunt regulator **6**

2 Solve:

- (a) What is stability? How it is decided by DC load line & AC load line **6**

- (b) Explain input & output characteristics of **6**

Contd

Common Emitter configuration

3 Solve any two:

(a) Derive the expression for input impedance and current gain for CE configuration using H-parameter model 6

(b) Why coupling is done? Explain operation of Two stage RC coupled amplifier 6

(c) Give the classification of FET. Explain the construction of n-channel JFET 6

4 Solve any two:

(a) Explain the operation of Class A power amplifier 6

(b) Write down the advantages of negative feedback 6

(c) Explain single tuned amplifier in brief 6

5 Solve any two:

(a) Explain circuit operation of Colpitt's oscillator 6

(b) Draw circuit for astable multivibrator using transistor and explain its working 6

(c) Compare JFET & MOSFET 6