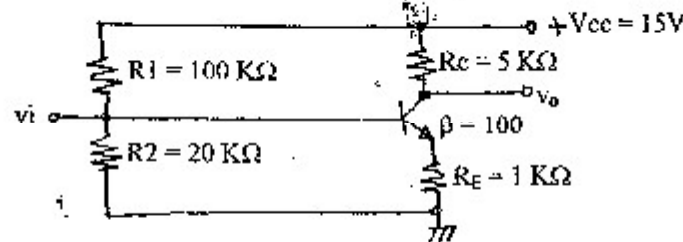


Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

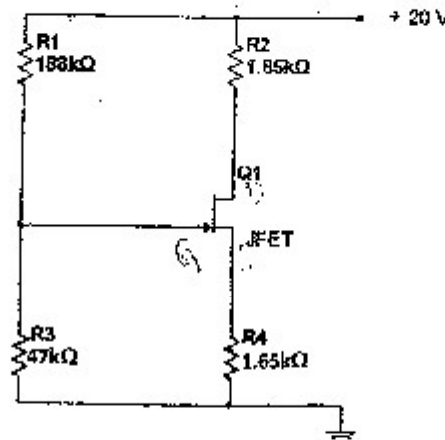
Subject: - Electronic Device and Circuits (EX301)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Draw full wave bridge rectifier circuit with 5 ohm load resistor connected at its output. If input ac voltage is 10V, calculate the power dissipation in the load resistor (Assume diodes operate at forward voltage of 0.7V). [4]
2. Explain the small signal model of PN junction diode and derive the expression for AC or dynamic resistance. [2+4]
3. Draw the ac equivalent circuit for given circuit and find its input and output resistances. Assume $\beta = 100$ for the BJT. [8]



4. Define transconductance (g_m). Derive g_m for BJT. [2+4]
5. Describe in brief the operation of BJT as a switch. [4]
6. Describe with necessary graphs and expressions the principle of operation of N-channel JFET. [6]
7. The n-channel JFET in the figure below has $I_{DSS} = 18 \text{ mA}$ and $V_P = -5\text{V}$. Determine the values of I_D and V_{DS} . [8]



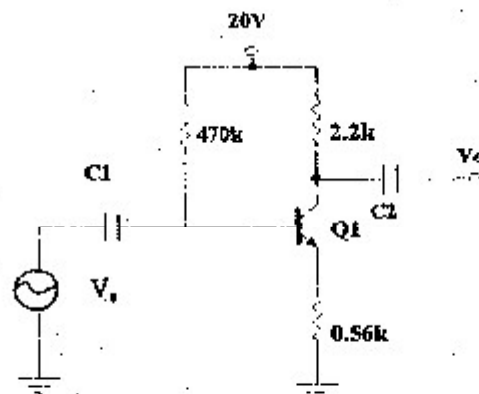
8. State the difference between BJT and FET. [4]
9. Determine the general efficiency of Transformer Coupled Class-A power Amplifier. [6]
10. Draw the circuit diagram of Complementary-Symmetry Class-AB Amplifier. [2]
11. Calculate the efficiency of transformer coupled push pull Power Amplifier for a supply voltage of 20V and output of (i) $V_P = 20V$ (ii) $V_P = 16V$. [3+3]
12. Draw Wien Bridge Oscillator circuit and derive the expression for frequency of Oscillation and gain of the amplifier circuit. [2+3+3]
13. Draw standard series dc voltage regulator and find its voltage stability factor (S_V). [6]
14. Design a 4.2 V to 12 V variable dc voltage regulator using IC LM317. [4]
15. Draw the circuit diagram of square wave generator. [2]

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, REX, BCT	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

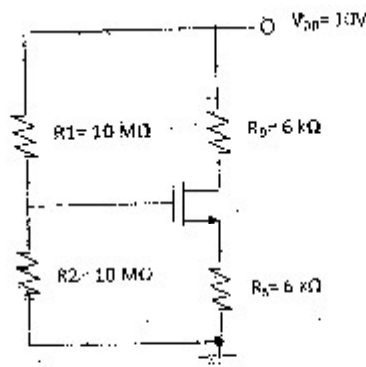
Subject: - Electronic Devices and Circuit (Ex 501)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Explain the large signal models of PN junction diode. [4]
2. A diode conducts 1mA at 20°C. If it is operated at 100°C, what will be its current? Given data are: $\eta=1.8$ and negative temperature coefficient value $= -1.8\text{mV}/^\circ\text{C}$. [4]
3. For the figure shown below with $\beta = 120$ find the a) input impedance (b) Output impedance (c) voltage gain (d) current gain. Use small signal model. [2+2+2+2]



4. Draw ac equivalent circuit of common collector amplifier. Find its input and output resistances. [2+3+3]
5. Describe the physical structural of N-channel JEET and explain its working principle and characteristics clearly marking the various regions of operation. [2+6]
6. Derive the expression to obtain the transconductance of E-MOSFET. [4]
7. Find the drain current (I_{DQ}) and drain to source voltage (V_{DS}) for the following circuit. Given parameters are: $V_t = 1\text{V}$ and $k = 0.5\text{mA}/\text{V}^2$. [4]



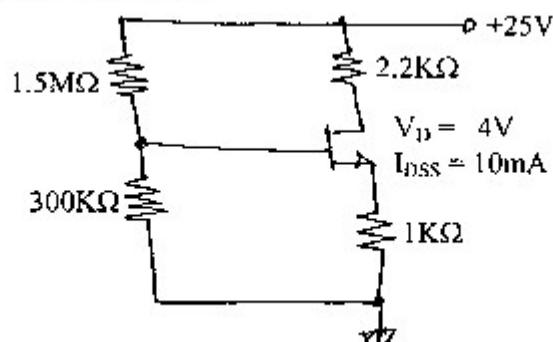
8. Draw the circuit diagram of class B push pull amplifier with output transformer and explain how push pull action is achieved. Determine the general efficiency of class B push pull amplifier. [1+3+4]
9. Draw class A tuned amplifier circuit and derive the expression for 3dB bandwidth of the amplifier. [2+6]
10. Describe the operation of IC 555 as square wave oscillator and find its frequency of oscillation. [6+2]
11. Estimate voltage stability factor (S_V) for standard series dc voltage regulator using BJT. Also, explain the operation of overload protection circuit that could be used in series voltage regulator circuit. [5+3]
12. A class B audio amplifier is providing 20V peak sine wave signal to 8Ω speaker with power supply of 25V ($=V_{CC}$). At what efficiency is it operating? [4]
13. Define and explain the reverse breakdown effect in diodes. [4]

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Electronic Devices and Circuits

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Draw graphs of IV characteristics of ordinary PN junction diode and zener diode. Draw ac equivalent model for PN junction diode and derive its ac resistance. [7]
2. Define and explain reverse break down effect. [3]
3. Design β -independent type dc biased common collector amplifier, and find its current gain and input resistance. Given parameters are: $V_{CC} = 20V$, $I_C = 2mA$, $\beta = 100$ and use firm biasing method. [8]
4. Derive an expression to find output resistance for emitter unbypassed common emitter amplifier circuit. [5]
5. Draw Ebers Moll model and ac equivalent T- model for BJT. [4]
6. Describe the principle of operation of EMOSFET with the help of IV characteristic curves and algebraic expressions. Also show its ac equivalent circuit model. [7]
7. Find I_D and V_{DS} for the given circuit. [5]



8. Derive an expression to find the transconductance for JFET. [2]
9. Draw standard series dc voltage regulator circuit and find its voltage stability factor (S_v). [6]
10. Draw a voltage regulator circuit using IC LM317. [3]
11. Draw a circuit diagram for Bandgap reference voltage source. [3]
12. Define cross over distortion in class B amplifier. Draw quasi-complementary symmetry class AB amplifier. And explain how crossover distortion is eliminated in class AB amplifier. [7]
13. What is the maximum efficiency of class B amplifier? State the condition when it occurs. [4]
14. Why heat sink is necessary in power transistor? Explain with the help of thermal Ohm's law or thermal resistance method. [4]
15. State Barkhausen criteria and explain the principle of oscillation. [4]
16. Draw Wien Bridge Oscillator circuit and write the expression for frequency of Oscillation. [6]
17. Draw crystal oscillator circuit. [2]