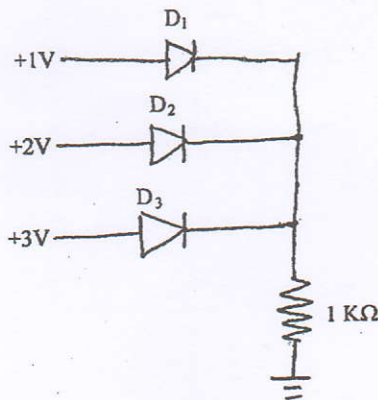


Exam.	Regular		
	Level	BE	Full Marks
Programme	All (Except B.Arch.)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electronics Engineering (EX451)

- ✓ 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. What do you mean by an ideal voltage source? Why is this voltage source practically unrealizable? Explain practical voltage source with an example. [1.5+1+1.5]
2. Why are resistors, inductors and capacitors called passive elements? How can these components be used to realize a filter circuit that passes high frequency signals only? [1+3]
3. Describe the small signal model of semiconductor diode. And derive the expression for dynamic resistance r_d . [6]
4. Assuming diodes used in the circuit are ideal. Find current through $1\text{ K}\Omega$ resistor. [4]



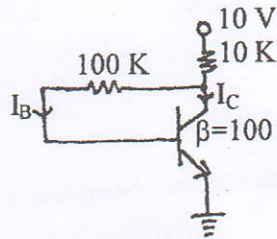
5. Design Op-amp circuit to get output $V_0 = 0.5V_1 - 2V_2 - V_3$. Here V_1 , V_2 and V_3 are three input voltage source. [4]
6. Explain the working of triangular wave generator with necessary diagram. [5]
7. Draw the circuit diagram of Wien bridge Oscillator. Write frequency of Oscillation. [3]
8. Explain the need of modulation in a communication system. [3]
9. Explain the block diagram of optical fibre communication and explain the advantages of optical communication over copper cable communication. [6]
10. Convert the following numbers as indicated. [1.5×2]
 - a) $(E1A)_{16} = ()_8$
 - b) $(35.7)_{10} = ()_2$
11. State and prove De-Morgan's Theorems. [3]
12. Define encoder. Explain the operation of octal to binary encoder with logical diagram. [6]

13. Obtain the simplified expression for the following boolean function using K-Map. [3]

$$F(x, y, z) = \sum m(0, 2, 4, 5, 6)$$

14. Construct clocked SR flip-flop with its characteristics table and equation. [5]

15. For the circuit given below determine I_B , I_C and V_{CE} . [2+2+2]



16. Explain the working principle of n-channel Enhancement type MOSFET. [6]

17. Explain the block diagram of data logger briefly. [4]

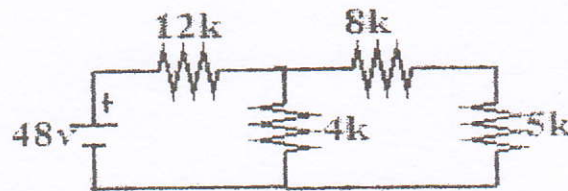
18. What is a digital multimeter? Draw its block diagram and explain how it measures resistance. [1+4]

Exam.	Back		
Level	BE	Full Marks	80
Programme	All (Except B. Arch)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electronics Engineering (EX451)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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1. Determine V_{th} , R_{th} and the current through $5\text{ K}\Omega$ resistor using Thevenin's theorem. [4]



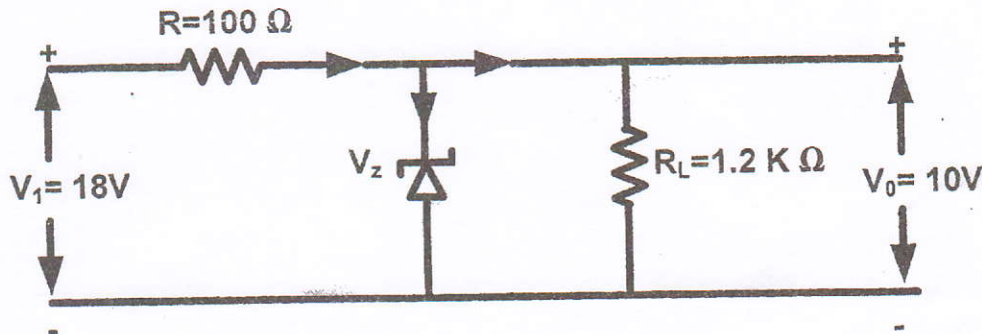
2. What do you mean by a filter circuit? Explain the operation of RC low pass filter with its transfer function and frequency response. [4]
3. Explain large signal models of PN junction diode. [4]
4. Explain the working principle of full wave bridge rectifier with necessary diagrams and expressions. [4]
5. Draw the DC load line and determine the Q point of the voltage divider biased transistor circuit having $V_{CC} = 20\text{v}$, $R_C = 2\text{K}$, $R_1 = 20\text{k}$, $R_2 = 10\text{k}$, $R_E = 4\text{k}$, $\beta = 100$. [6]
6. Describe the construction and working principle of n-channel depletion type MOSFET with necessary diagrams. [6]
7. Explain the operation of CMOS inverter with necessary diagram. [4]
8. Describe the working principle of square wave generator circuit using operational amplifier. [4]
9. What do you mean by virtual short circuit in OP amp? Draw the circuit diagram of the inverting integrator and show that the output is proportional to the time-integral of the input. [2+2+2]
10. State Barkhausen criteria for oscillation. Draw Wein bridge oscillator circuit to generate sine wave and derive the frequency of the generate sine wave. [2+2+2]
11. Explain working principle of optical fiber. List out the advantages of optical fiber communication over copper cable communication. [2+4]
12. Write short notes: (any two) [2×3]
- i) Data Logger
 - ii) Digital Multimeter (DMM)
 - iii) Regulated Power Supply
13. What is an antenna? Explain any two properties of the antenna. [2+2]
14. Simplify the expression using K-Map, $F(A,B,C) = A'B + BC' + AC'$. [4]
15. Explain the operation of JK flip-flop with necessary diagrams and characteristic table. [6]
16. What is multiplexer (MUX) Explain 4:1 Multiplexer. [6]

Exam.	Regular		
Level	BE	Full Marks	80
Programme	All (Except B. Arch)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electronics Engineering (EX451)

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1. What is Active and Passive Component? Define transconductance and voltage gain with reference to BJT. [2+4]
2. Draw the circuit diagram of RC High pass filter and explain its operation with the help of frequency dependent response at the output. [5]
3. Find the Zener Current in the given circuit when $R_L = 1.2 \text{ K}\Omega$. Assume $V_Z = 10 \text{ V}$. [5]



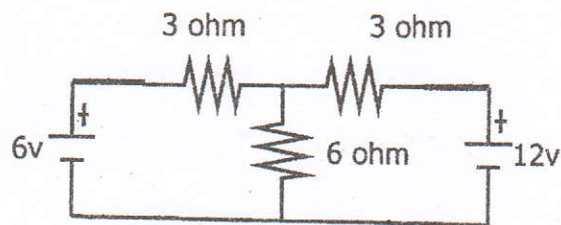
4. What is clipper and clamper circuit? [2]
5. Draw emitter feedback bias circuit of BJT by labeling all the circuit components. Find I_C and V_{CE} in the circuit if $V_{CC} = +12 \text{ V}$, $R_B = 430 \text{ k}\Omega$, $R_C = 2 \text{ k}\Omega$, $R_E = 1 \text{ k}\Omega$ and $\beta = 50$. [2+4]
6. Draw the circuit diagram of differential amplifier using BJT. [2]
7. Describe the working principle of n-channel enhancement type MOSFET. [6]
8. Mention any four properties of ideal Op-amp. Derive the expression of voltage gain of non-inverting amplifier using Op-amp. [2+4]
9. State Barkhausen criteria. Draw the circuit diagram of square wave generator and explain how it works. [2+4]
10. Draw the circuit diagram of Wien Bridge oscillator. [4]
11. Differentiate between following communication systems. [3+3]
 - i) Wired and wireless communication system
 - ii) Broadcasting and communication
12. What are the advantages and disadvantages of optical communication system? [4]
13. Write short notes on: (any two) [2×3]
 - i) Oscilloscope
 - ii) Data logger
 - iii) Regulated power supply using IC
14. State DeMorgan's theorem. Subtract $(1111)_2$ from $(1110)_2$ using 2's complement method. [3+3]
15. Simplify an expression $F(A, B, C, D) = \sum(1,3,7,9,11,14,15)$ by using K-map. [4]

Exam.	Regular		
Level	BE	Full Marks	80
Programme	All (Except B.Arch.)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electronics Engineering (EX451)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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1. Describe different types of controlled source with figures. [4]
2. Calculate the current flowing in each branch using superposition theorem. [6]



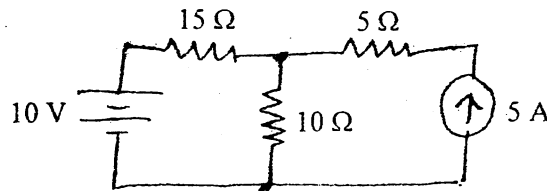
3. Describe the rectification process. Explain the operation of half wave rectifier with necessary diagrams. [1+4]
4. What is diode clamper? Describe the operation diode clamper circuit. [1+4]
5. Draw the DC load line and determine the Q point of the voltage divider biased transistor circuit having $V_{cc} = 15v$, $R_c = 1k\Omega$, $R_1 = 10 k\Omega$, $R_2 = 5k\Omega$, $R_e = 2k\Omega$ and $\beta = 75$. [6]
6. Why BJT is a bipolar and MOSFET is an unipolar device? And draw the circuit diagram of differential amplifier using BJT. [2+2]
7. Explain the operation of CMOS switch with necessary diagrams. [4]
8. Mention any four properties of an ideal OP amp. Derive the expression of voltage gain of an inverting amplifier using OP amp. [2+4]
9. Draw a circuit diagram of square wave generator using OP amp. Explain how it generates the square wave. Express the frequency of the square wave generated. [2+3+1]
10. What is Optical fiber? Explain the advantages of optical fiber communication over coaxial cable communication. [1+3]
11. Define communication system. And describe communication system in brief with the complete block diagram. [2+3]
12. Simplify the expression using K-Map, $F(x,y,z) = X'YZ + X'Y'Z + XYZ$ and realize it using logic gates. [5]
13. Mention the types of flip flops and explain the operation of J-K flip flop with necessary diagrams. [1+4]
14. Draw a block diagram of digital multimeter. Explain how it measures dc current flowing through it. [5]
15. Draw and explain the block diagram of data logger. [4]
16. Write short notes on: (any two) [2×3]
 - a) Light emitting diode
 - b) Output characteristics of common base configuration

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	All (Except B.Arch.)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

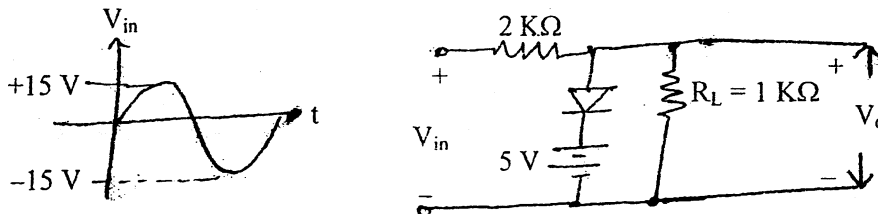
Subject: - Basic Electronics Engineering (EX451)

- ✓ 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.

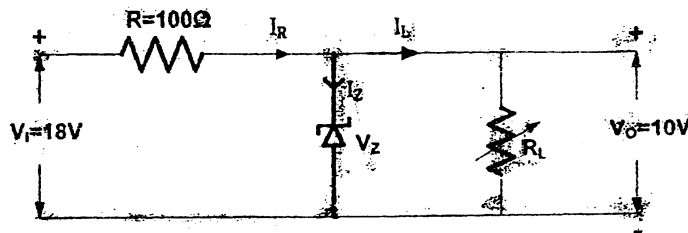
1. Define active and passive circuit component. Determine the color code of the following resistor $75\text{ K}\Omega \pm 10\%$. [2+2]
2. Determine the current through $10\ \Omega$ resistance using Thevenin's theorem. [4]



3. What is a filter? Explain the types of filter with necessary diagrams. [1+3]
4. Explain large signal models of PN junction diode. [4]
5. Define clipping circuits. Draw the output waveform of circuit shown below. Assume real silicon diode. [2+2]



6. Find the Zener current in the given circuit when $R_L = 1.2\text{ K}\Omega$. Assume $V_Z = 10\text{ V}$. [4]



7. Explain the common emitter configuration circuit of npn transistor with the help of input and output characteristics. [6]

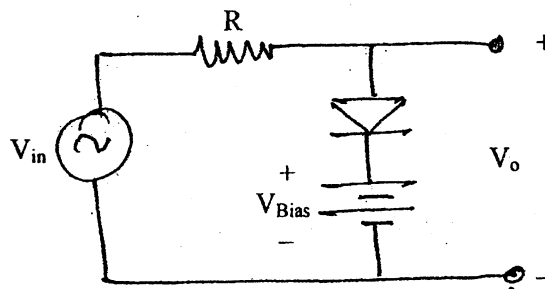
8. Explain the working principle of N channel depletion type MOSFET with necessary diagrams. [6]
9. State any four properties of an ideal op-amp. Design a summing amplifier using Op-Amp to get the output voltage $V_0 = -V_1 + 2V_2 + 3V_3$. [2+3]
10. Explain how square wave can be generated using Op-Amp and write the relation for frequency of oscillation. [4+1]
11. Define communication system and draw the complete block diagram of communication system. [2+3]
12. What is optical fiber? Explain the advantages of optical fiber communication over traditional communication system. [2+3]
13. Simplify the expression using K-map, $Y = A'BC' + ABC' + ABC$. [3]
14. Explain the operation of SR-flip flop with necessary diagrams and characteristics table. [6]
15. (a) $(10101.101)_2 = (?)_{10}$ (b) $(9001180)_{10} = (?)_{BCD}$ (c) $(2AB.5E)_{16} = (?)_8$ [1×3]
16. What is instrumentation system? Explain the instrumentation system with the help of simple block diagram. [1+3]
17. Write short notes of any two: [2×4]
- a) Data Logger
 - b) DMM
 - c) Strain Gauge

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	All Except (B.Arch.)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

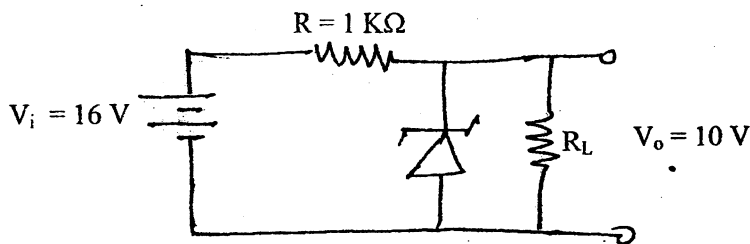
Subject: - Basic Electronics Engineering (EX451)

- ✓ 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.

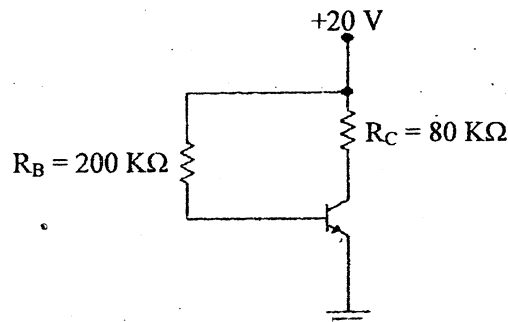
1. What do you mean by filter? Explain the RC low pass and high pass filter with corresponding transfer function and magnitude. [1+4]
2. State Thevenin's Theorem. Write down the steps for determining V_{th} and R_{th} with necessary circuit diagrams. [1+4]
3. What is rectification? Explain the operation of half wave rectifier with necessary diagrams. [1+4]
4. What are clippers? Draw the sinusoidal waveform of the following circuit and indicate the output voltage. Assume diode is ideal. [1+4]



5. Find the zener current from the given zener diode network when $R_L = 3\text{ K}\Omega$ and $V_o = 10\text{ V}$. [5]



6. For the given circuit with $\beta = 75$, determine I_B , I_C and V_{CE} . [2+2+2]



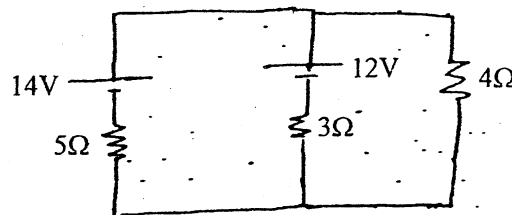
7. Explain the construction and working principle of enhancement type MOSFET? [6]
8. Explain the concept of feedback theory. Describe the working principle of square wave oscillator circuit using op-amp. [2+4]
9. State any 4 important properties of ideal Op-Amp. Draw the circuit diagram of differentiator using Op-Amp and show that output is the differentiation of input signal. [2+4]
10. What is modulation? Explain AM and FM modulated wave. [1+2+2]
11. What do you mean by electromagnetic waves? How are they propagated? Explain. [2+3]
12. Perform the following: [4×1]
- a) $(375.37)_8 = (?)_{16}$
 - b) $(169.03125)_{10} = (?)_2$
 - c) $(905)_{10} = (?)_{BCD}$
 - d) Subtract $(25)_{10}$ from $(49)_{10}$ using 2'S complement method
13. Simplify the following Boolean expression using K-map and realize it by using universal gate of your interest. [3+2]
- $$F(x, y, z) = xy + \bar{x}z + yz$$
14. Explain SR flip-flop with circuit. [4]
15. What is instrumentation system? Describe the instrumentation system with block diagram. [4]
16. Explain briefly about remote control or digital multimeter with necessary diagrams. [4]

Exam.	Regular		
Level	BE	Full Marks	80
Programme	All (Expect B.Arch.)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

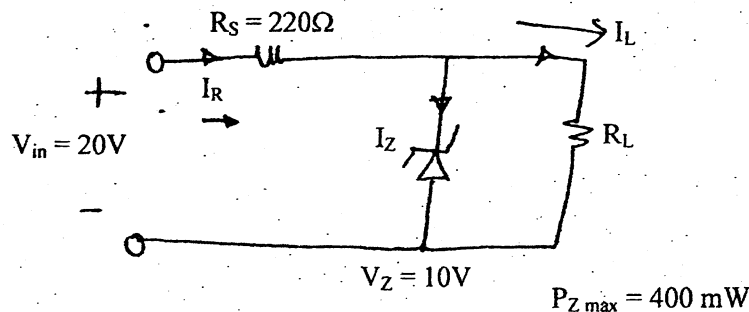
Subject: - Basic Electronics Engineering (EX451)

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1. State superposition theorem. In the following figure find the current flow in 4 ohm resistor using superposition theorem. [2+4]



2. Explain the principle of operation of RC low pass filter with necessary diagrams and derivation. [4]
3. Explain the working principle of full wave bridge rectifier circuit with the help of necessary circuit diagrams and expressions. [6]
4. Determine V_L , I_L , I_Z and I_R for the network shown in figure below for following condition. [3+3]
- a) If $R_L = 180 \Omega$
- b) If $R_L = 470 \Omega$



5. Define DC load line? Explain the common emitter configuration circuit with the help of input and output characteristics curve. [2+4]
6. Explain the construction and working principle of MOSFET. [6]
7. Write the four properties of ideal operational amplifier. ✓ [2+4]
8. Explain how square wave can be generated using Op-Amp. [6]

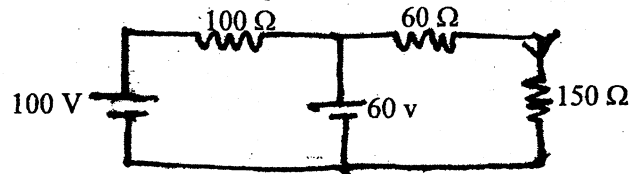
9. Define communication system. Explain amplitude modulation communication system with the help of necessary block diagrams. [6]
10. Discuss the role of antenna in communication system. What are the advantages and disadvantages of optical fiber communication? [2+4]
11. Draw the circuit of X-OR gate using NAND gates only. Perform the subtraction using 2's complement method. [2+2]
 $42_{(10)} - 115_{(10)}$
12. Simplify the expression using k-map [4]
 $F(x, y, z) = xyz + x'y'z + xy'z' + x'y'z' + x'yz$
13. Discuss the operation of S-R flip flop. [4]
14. Write short notes: (any two) [5×2]
- a) Clipper circuit
 - b) Strain gauge transducer
 - c) Data logger

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	All (Except B.Arch)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electronics Engineering (EX451)

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1. Find the current I in 150 Ω resistor using thevenius theorem. [6]



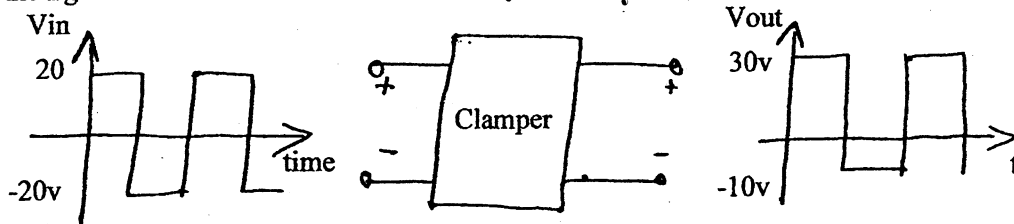
2. Find the value of resistor from following colour code. [2]

a) Red Orange Green Silver b) Yellow Black Gold Gold

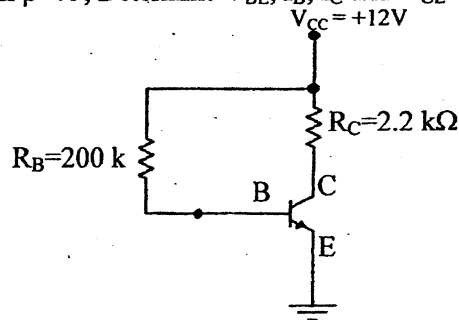
3. Explain the operation of RC high pass filter circuit with the help of necessary diagrams and figures. [4]

4. Describe IV characteristics of PN Junction diode. [6]

5. What is a clamper circuit? Design a clamper circuit to perform the function indicated in the figure below. [2+4]



6. For the given circuit with $\beta=75$, Determine V_{BE} , I_B , I_C and V_{CE} . [6]



7. Explain how BJT can be used as a switch. What are the difference between MOSFET and BJT? [4+2]

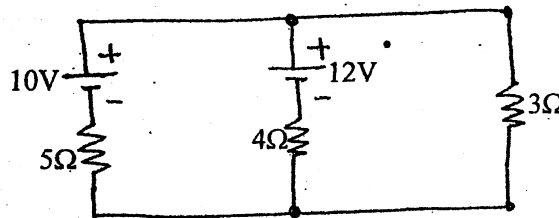
8. Explain the concept of virtual ground in op-amp. Design a summer circuit using op-amp to get the output voltage as: $V_0 = -(V_1 + 10V_2 + 25V_3)$ [2+4]
9. How do you define positive feedback? Draw the circuit for Wein bridge oscillator and explain the principle of operation. [2+4]
10. What are the advantages of optical fiber communication system? Draw and label the diagram of optical fiber. [3+3]
11. Explain why modulation is needed in Communication System. Mention any three parameters of antenna. [3+3]
12. Simplify the given function using K-map method. $F(A, B, C) = \Sigma (0, 1, 2, 5) + D (3, 4, 6)$ and implement the simplified circuit using NAND only. [3+3]
13. What is the difference between combinational and sequential circuit. Discuss JK flip-flop with the help of logic diagram. [2+6]
14. Write short notes on: (any two) [3×2]
- a) Data logger
 - b) Regulated power supply
 - c) Digital Multi-meter

Exam.	Regular (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	All (Except B, Arch)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

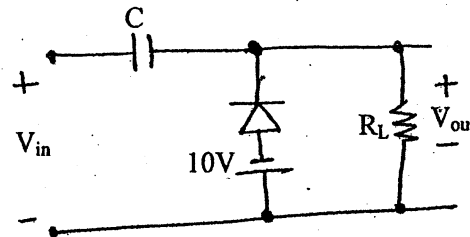
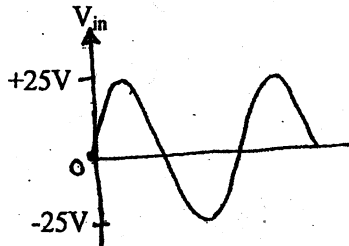
Subject: - Basic Electronics Engineering (EX451)

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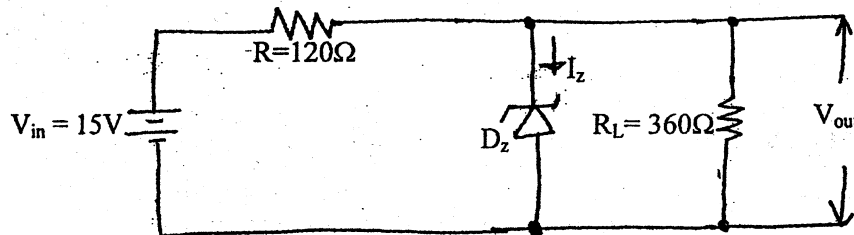
1. Define transconductance and voltage gain with reference to BJT. [3]
2. Draw RC high pass filter circuit and its characteristics graph. [2]
3. Find current flow in 3Ω resistance. Use superposition theorem to solve the problem. [5]



4. What is clamping circuit? Find the output waveform of the given circuit. [1+3]



5. Deduce AC resistance of PN junction diode at forward biased region. [3]
6. Draw bridge rectifier circuit and its output waveform. Assume input is Sinewave voltage. [3]
7. Find I_z , assuming $V_z = 9V$. [3]



8. Find the volume of collector current, Q-point, DC load line for common emitter circuit having $V_{CC} = 15V$, $R_C = 10K\Omega$, $I_B = 10\mu A$ and $\beta = 50$. [5]

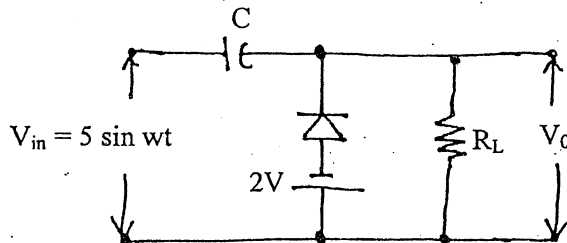
9. Draw the circuit diagram and I-V characteristic curve to investigate output static characteristics of common emitter amplifier configuration. [3]
10. Describe the operation of CMOS NOT-gate circuit. [4]
11. State four important properties of ideal op-amp. Draw the circuit diagram of a differentiator using op-amp and show that the output is the derivative of the input. [2+4]
12. Describe the operation of Wien bridge RC-sinewave Oscillator. State Barkhausen criteria. [4+2]
13. Draw the block diagram of communication system and explain each block. [4]
14. Define amplitude modulation and frequency modulation and draw the necessary waveforms. [2+3]
15. State DeMorgan's theorems with example in each case. [4]
16. a) Verify the following: [2+2]
- i) $AB + \bar{A}C = (A+C)(\bar{A}+B)$ ii) $XY + \bar{X}Z + YZ = XY + \bar{X}Z$
- b) Find: $(15)_{10} - (20)_{10} = ?$, use 2's complement method. [2]
17. Draw and explain the block diagram of data logger and remote control. [5+5]
18. Define encoder. Draw truth tables of NAND and XOR gates. [2+2]

Exam.	Regular		
Level	BE	Full Marks	80
Programme	All (Except B.Arch.)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

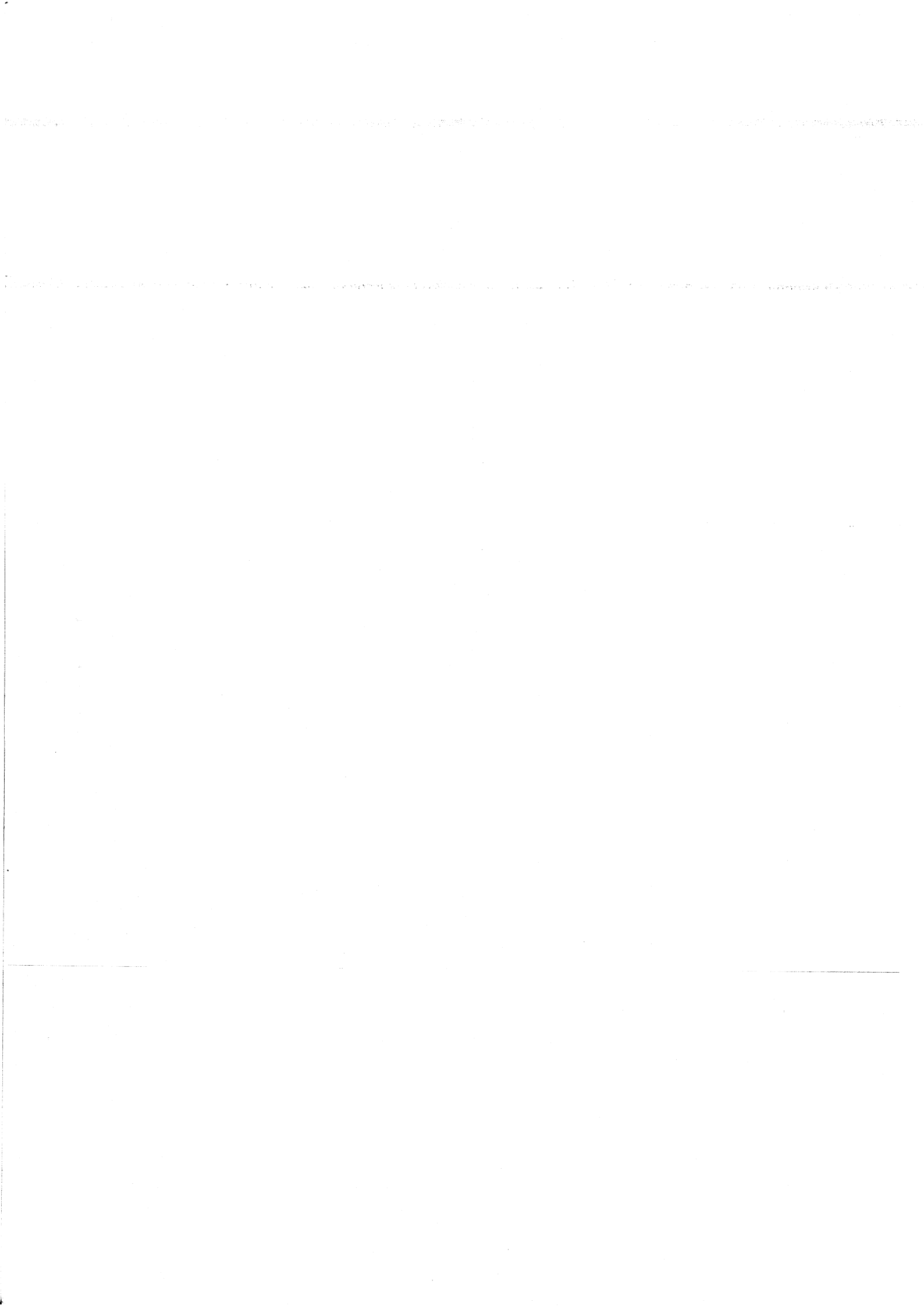
Subject: - Basic Electronics Engineering

- ✓ 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. What do you mean by a filter circuit? Explain in brief about RC high pass filter. [1+3]
2. Define capacitance. Find the equivalent capacitance when two capacitors of capacitance C_1 and C_2 are connected in series. [1+3]
3. Explain the small signal model of PN junction diode and derive the expression for AC or dynamic resistance. [8]
4. What is a clipper circuit? Find the output waveform for the following circuit. [1+3]



5. In BJT circuit if $V_{CC} = 10V$, and $R_C = 8k\Omega$, draw the dc load line. Determine the Q-point (operating point) for zero input signal if $I_B = 15\mu A$ and $\beta = 40$. [8]
6. Why BJT is a bipolar and MOSFET is a unipolar device? And draw the circuit diagram of differential amplifier using BJT. [2+2]
7. Design the summing amplifier using Op-Amp to get the output voltage: $V_o = 3V_1 + 2V_2 + V_3$. [6]
8. Explain how square wave can be generated using Op-Amp and write the relation for frequency of oscillation. [4]
9. Define communication system and draw the complete block diagram of communication system. [2+4]
10. What is optical fiber? Write short notes on optical fiber. [1+3]
11. Explain the working principle of n-channel Enhancement type MOSFET. [7]
12. Subtract $(111)_2$ from $(110)_2$ using 2's complement method. Draw the circuit of AND gate using NOR gates only. [3+3]
13. Explain the operation of SR-flip flop with necessary diagrams and characteristic table. [6]
14. Write short notes on: (any three) [3×3]
 - a) Regulated power supply.
 - b) Transducer
 - c) Oscilloscope
 - d) Data logger

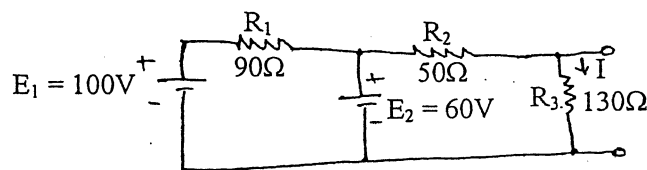


Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	All (Except. B. Arch)	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Basic Electronics Engineering

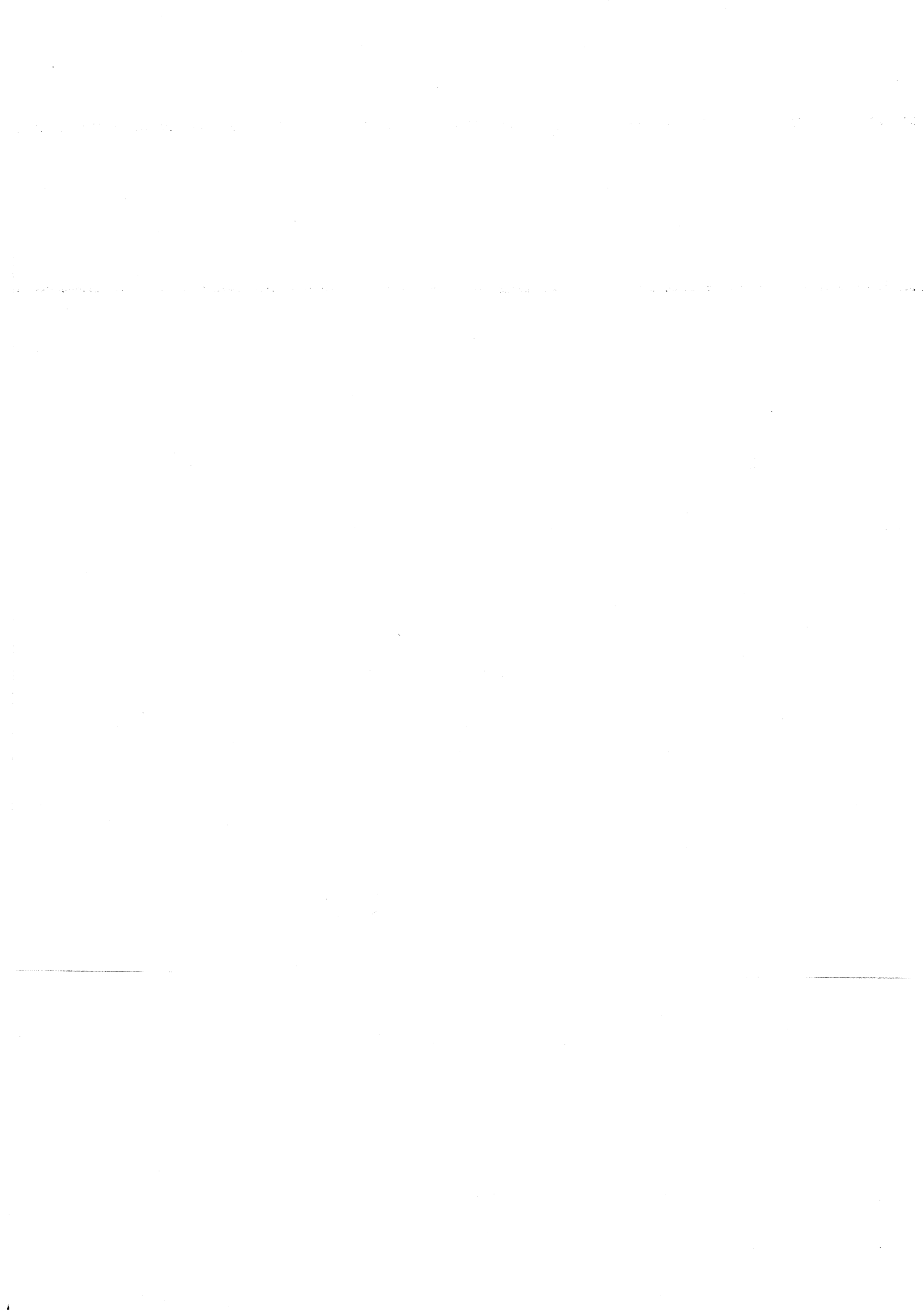
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Describe the principle of Thevenins theorem by solving following problem. [7]



Find the current I in R_3 .

- b) Draw the circuit diagram of RC low filter and explain its operation with the help of frequency dependent output waveform. [7]
2. a) Draw and explain the I-V characteristics curve of P-N junction diode for forward and reverse bias region. [7]
- b) Draw Zener voltage regulator circuit and explain clearly the working principle of this circuit to produce a regulated dc output. [7]
3. a) Describe output characteristics of common emitter configuration with the help of circuit diagram and IV characteristics graph. [7]
- b) Describe the construction and working principle of N Channel E-MOSFET. [7]
4. a) State four important properties of ideal op-amp. Draw the circuit diagram of differentiating amplifier using op-amp and derive the expression for V_{out} . [2+5]
- b) i) Draw the circuit diagram of Wien Bridge oscillator circuit for sinusoidal wave form. [4+3]
 ii) Draw square wave oscillator circuit.
5. a) Perform the conversion of the following: [6]
- i) $(10111.101)_2 = (?)_{10}$
 ii) $(AFC.00)_{16} = (?)_8$
 iii) $(901)_{10} = (?)_{BCD}$
- b) Simplify the expressions and draw the circuits [6]
- i) $\bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + A\bar{B}\bar{C} + A\bar{B}C$
 ii) $A\bar{C} + ABC + A(C+A\bar{C})$
6. Write short notes on any two: [2×6]
- a) Strain Gauge
 b) $\lambda/2$ Dipole Antenna
 c) Transducer
 d) Amplitude Modulation (AM)

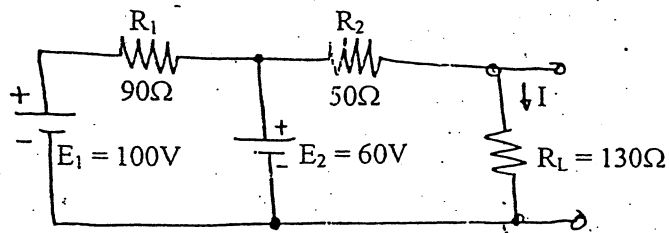


Exam.	New Back (2066 Batch Only)		
Level	BE	Full Marks	80
Programme	All (Except B.Arch.)	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

Subject: - Basic Electronics Engineering

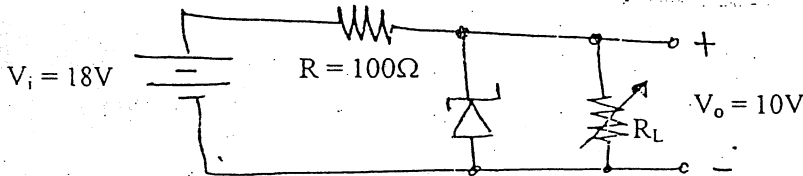
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Describe the principle of superposition theorem by solving following problem. [5]



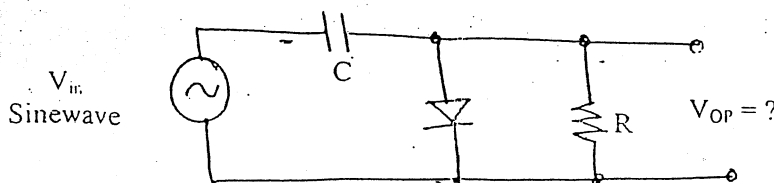
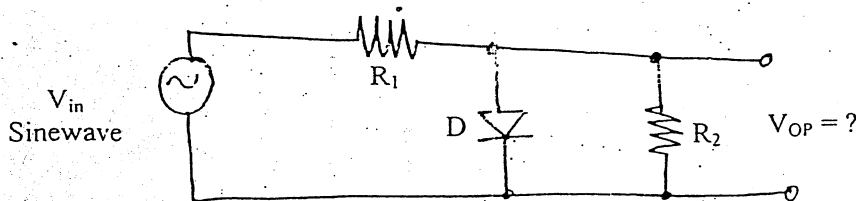
Find current I through R_L .

- b) Explain the concept of voltage gain and transconductance using block diagram. [3]
2. a) Describe the working principle of PN junction diode with the help of circuit diagram and its IV characteristics graph. [3]
- b) Find zero current in the given circuit when $R_L = 1.2k\Omega$. [3]

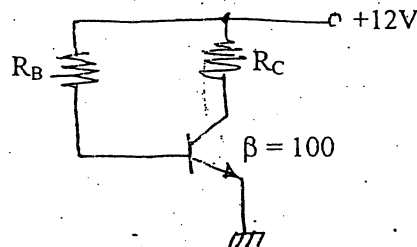


Assume $V_Z = 10V$.

3. a) Draw bridge rectifier circuit and its output waveform with output load resistor (R_L) connected. Express the ripple factor if smoothing capacitor, C is connected to the circuit. [3]
- b) Draw output waveforms of the following circuits and indicate the peak output voltage. Assume diode is ideal. [3]



4. a) Draw basic differential amplifier circuit and indicate its input and output voltage waveforms. [2]
 b) Describe the operation of CMOS NOT-gate circuit. [4]
 c) Find R_B and R_C in the given circuit. Given data are: $I_C = 1.2\text{mA}$, $V_{CE} = 6\text{V}$ and $\beta = 100$. [4]



5. a) State six important properties of ideal opamp. [3]
 b) Derive voltage gain for noninverting amplifier using ideal opamp. [3]
 c) Describe the operation of square wave generator using opamp. [4]
 6. a) Define antenna and electro magnetic wave (EMW) propagation. [4]
 b) Explain and enlist wired and wireless communication systems. [4]
 c) Draw a block diagram of AM super heterodyne radio receiver. [2]
 7. a) Why NOR and NAND gates are called universal gates? Explain with examples. [3]
 b) Draw a block diagram of edge triggered, with preset and clear facilities, D-flip flop and its truth table. State one important advantage over RS flip flop. [3]
 8. a) State and prove De Morgan's Theorems. [3]
 b) Convert the followings: [3]
 i) 33_{10} to binary
 ii) $(1100\ 0011)_2$ to decimal
 iii) Add $(1001)_2$ and $(0111)_2$
 9. a) Draw the block diagram of (CRO) oscilloscope. And explain its working function. [4]
 b) Draw the block diagram of DMM (Digital Multimeter). And explain how it measures DC voltage, DC current and resistance. [6]
 10. Write short notes on: (any two) [2x4]
 a) Graphical analysis of diode circuit
 b) Shift register and counter
 c) E-MOSFET
