Basic Electronics

Time: 3 Hrs.] Prelim Question Paper Solution [Marks : 70

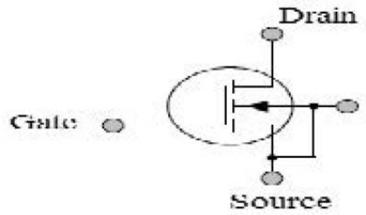
Q.1 Attempt any FIVE of the following : [10]

Q.1(a) State the need of filters in a regulated DC power supply. [2]

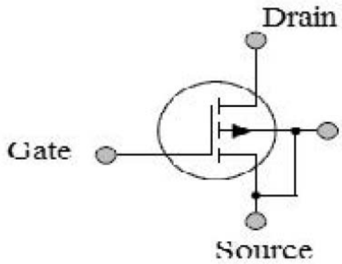
Ans.: The output of a rectifier contains dc component as well as ac component. The presence of the ac component is undesirable and must be removed so that pure dc can be obtained. Filter circuits are used to remove or minimize this unwanted ac component of the rectifier output and allows only the dc component to reach the load.

Q.1(b) Draw the symbol of N–channel and P–channel enhancement type MOSFET. [2]

Ans.: **Symbol of N- Channel Enhancement MOSFET:**

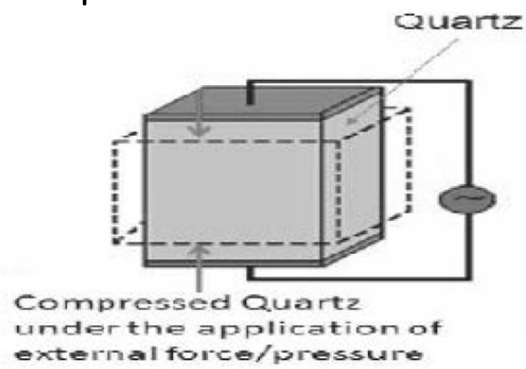


Symbol of P- Channel Enhancement MOSFET:



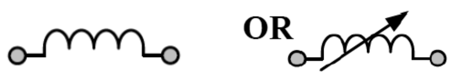
Q.1(c) Draw constructional diagram of piezoelectric transducer. [2]

Ans.: **Constructional diagram of piezoelectric transducer:**

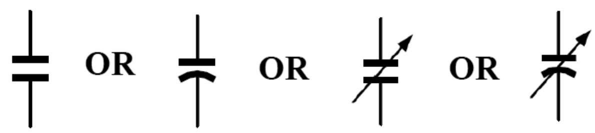


Q.1(d) Draw the symbol of inductor and capacitor. State the unit of inductor and capacitor. [2]

Ans.: **Symbol of Inductor:**



Symbol of Capacitor:



Unit of Inductance : Henry OR H
Unit of capacitance : farad OR F

Q.1(e) Define α and β of transistor. **[2]**

Ans.: α **(Alpha):** This is the Common Base dc current gain. It defined as the ratio of collector current (I_C) to emitter current (I_E).

$$\alpha = \frac{I_C}{I_E}$$

β **(Beta):** This is the Common Emitter dc current gain. It is defined as the ratio of collector current (I_C) to the base current (I_B).

$$\beta = \frac{I_C}{I_E}$$

Q.1(f) State the two advantages and disadvantages of integrated circuits. **[2]**

Ans.: **Advantages of Integrated circuits:**

- Small in size due to the reduced device dimension.
- Low weight due to very small size.
- Low power requirement due to lower dimension and lower threshold power requirement.
- Low cost due to large-scale production.
- High reliability due to the absence of a solder joint.
- Increased speed.
- Easy replacement instead of repairing as it is economical.
- Higher yield, because of the batch fabrication.

Disadvantages of Integrated circuits:

- IC resistors have a limited range.
- Generally inductors (L) cannot be formed using IC.
- ICs are delicate and cannot withstand rough handling
- Limited amount of power handling.
- Lack of flexibility.
- Higher value capacitors cannot be fabricated.

Q.1(g) State seebeck and Peltier effect **[2]**

Ans.: **Seebeck effect:** This states that whenever two dissimilar metals are connected together to form two junctions out of which, one junction is subjected to high temperature and another is subjected to low temperature then e.m.f is induced and it is proportional to the temperature difference between two junctions.

Peltier effect: This states that for two dissimilar metals in a closed loop, if current is forced to flow through, then one junction will be heated and other will become cool.

OR

It is the presence of heating of one junction and cooling of the other when electric current is maintained in a circuit of material consisting of two dissimilar conductors.

Q.2 Attempt any THREE of the following : **[12]**

Q.2(a) Define the following terms with respect to rectifier : **[4]**

(i) Ripple factor **(ii) Rectification efficiency (η)**

(iii) Transformer Utilization Factor (TUF) **(iv) Peak Inverse Voltage (PIV)**

Ans.: **(i) Ripple factor:** The factor which represents ac component present in the rectifier output, with respect to dc component is called Ripple Factor.

OR

The ratio of r.m.s. value of a.c. component to the d.c. component in the rectifier output is known as ripple factor.

Mathematically,

$$\gamma = \frac{\text{rms value of an component}}{\text{dc component}}$$

$$\gamma = \frac{V_{rms}}{V_{dc}} = \frac{I_{rms}}{I_{dc}}$$

(ii) Rectification efficiency (η): This is defined as the ratio of dc power delivered to the load to the ac input power from the secondary winding of the transformer. Mathematically,

$$\eta = \frac{\text{dc power delivered to the load}}{\text{an input power from the transformer secondary}} = \frac{P_{dc}}{P_{ac}}$$

(iii) Transformer Utilization Factor (TUF): It is the ratio of dc power delivered to the load and the ac rating of the transformer secondary.

$$TUF = \frac{\text{dc power delivered to the load}}{\text{ac rating of the transformer secondary}} = \frac{P_{dc}}{P_{ac\,(rated)}}$$

(iv) Peak Inverse Voltage (PIV): The maximum value of reverse voltage (for the diode in a rectifier) occurring at the peak of the negative cycle of the input cycle is called Peak Inverse Voltage.

Q.2(b) Compare CB, CE and CC configuration on the basis of : **[4]**
(i) Input impedance **(ii) Output impedance**
(iii) Current gain **(iv) Application**

Ans.:

Factor	CB	CE	CC
Input Impedance	Low OR 50Ω	Medium OR 600 Ωto 4K Ω	High OR 1M Ω
Output Impedance	High OR 50 K Ω	Medium OR 10K Ω to 50K Ω	Low OR 50 Ω
Current Gain	Less than or equal to 1 OR $\alpha = \frac{I_C}{I_E}$	High (100) OR $\beta = \frac{I_C}{I_B}$	High (100) OR $\gamma = \frac{I_E}{I_B}$
Application	High frequency Circuits	Audio frequency circuits (Amplifiers)	Impedance Matching

Q.2(c) Determine the value of capacitance with the following colour code. **[4]**
(i) Orange, Orange, Blue **(ii) Yellow, Violet, Yellow**

Ans.: **(i) Orange, Orange, Blue**

Colour coding:

Orange	Orange	Blue
$\downarrow$	$\downarrow$	$\downarrow$
3	3	6

Value of capacitor: 33×10^6 pF $= 33 \times 10^6 \times 10^{-12}$F $= 33 \times 10^{-6}$ F $= 33\mu$F

(ii) Yellow, Violet, Yellow

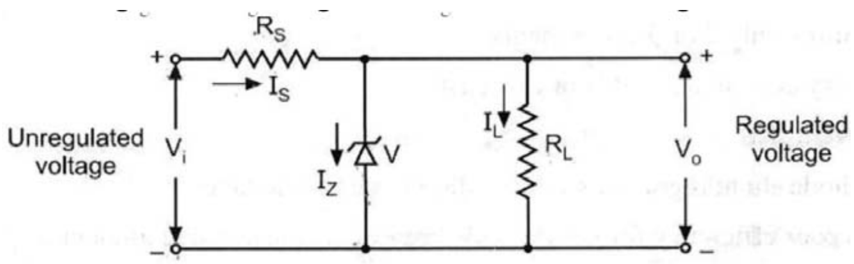
Yellow	Violet	Yellow
$\downarrow$	$\downarrow$	$\downarrow$
4	7	4

Value of capacitor: 47×10^4 pF = 470KpF
OR
$= 47 \times 10^4 \times 10^{-12}$F $= 47 \times 10^{-8}$F $= 0\ .47\mu$F

Q.2(d) Draw and explain zener diode as a voltage regulator. **[4]**

Ans.: **Zener diode as voltage regulator**

A reverse biased Zener diode is used to provide a constant voltage across the load resister R_L. The voltage regulator circuit diagram showing the Zener diode is as given below.



For proper operation, the input voltage Vi must be greater than the Zener voltage Vz. This ensures that the Zener diode operates in the reverse breakdown condition. The unregulated input voltage Vi is applied to the Zener diode.

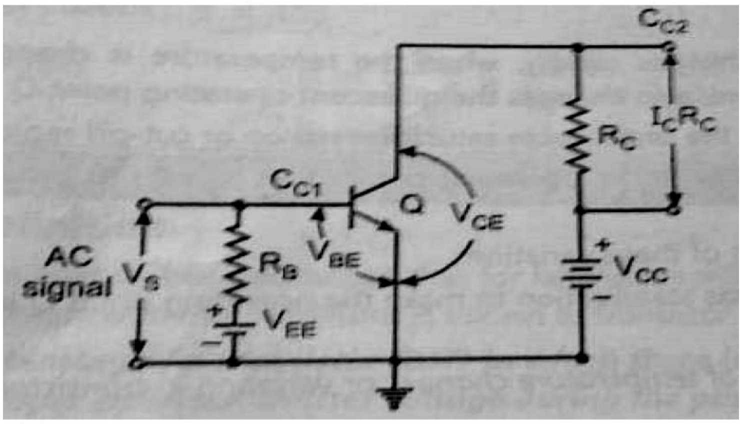
Regulation with varying input voltage: (Line Regulation)
As the input voltage increases, the input current (I_S) increases. This increases the current through Zener Diode, without affecting the load current (I_L). The increase in input current will also increase the voltage drop across R_S and keeps V_L as constant. If the input voltage is deceased, the input current also decreases. As a result, the current through zener will also decrease. Hence voltage drop across series resistance will be reduced. Thus V_L and I_L remains constant.

Regulation with varying load resistance: (Load Regulation)
The variation in the load resistance R_L changes I_L, thereby changing V_L. When load resistance decreases, the load current increases. This causes zener current to decrease. As a result, the input current and voltage drop across R_S remains constant. Thus, the load voltage V_L is also kept constant. On the other hand, When load resistance increases, the load current decreases. This causes zener current to increase. This again keeps the input current and voltage drop across R_S constant. Thus, the load voltage V_L is also kept constant.
Thus, a Zener diode acts as a voltage regulator and the fixed voltage is maintained across the load resistor R_L.

Q.3 Attempt any THREE of the following : [12]

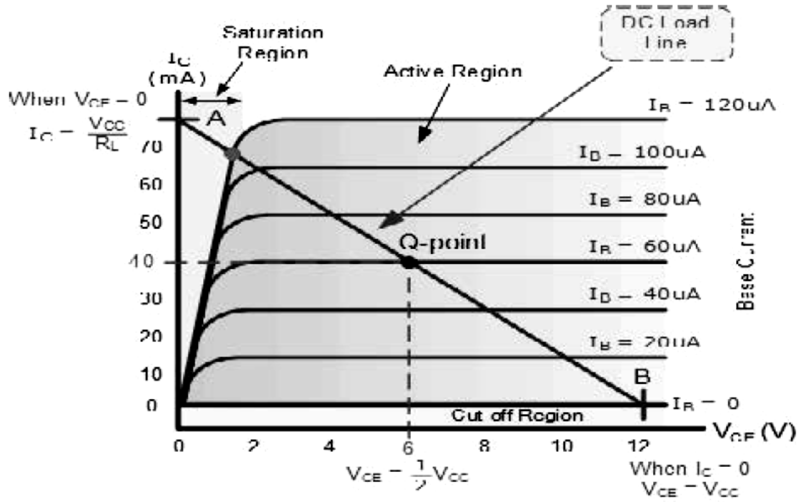
Q.3(a) Explain the concept of DC load line and operating point for biasing circuit. [4]

Ans.: **DC load line:** The straight line drawn on the characteristics of a BJT amplifier which give the DC values of collector current I_C and collector to emitter voltage V_{CE} corresponding to zero signal i.e. DC conditions is called DC load line.



To plot $I_{C(MAX)}$, $V_{CE(MAX)}$ on output characteristics:
Get $V_{CE\,(MAX)}$ by putting $I_{C\,=\,0}$
$V_{CE} = V_{CC} - I_C R_C$
$V_{CE\,(MAX)} = V_{CC}$ since $I_C = 0$
Get $I_{C(MAX)}$ by putting $V_{CE\,=\,0}$

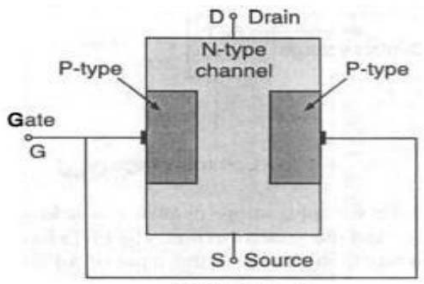
$$I_{C(MAX)} = \frac{V_{CC}}{R_C}$$



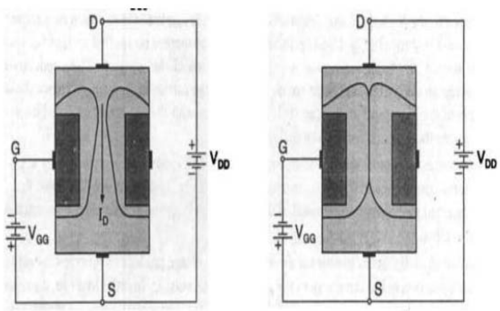
Operating point or Q-point: The fixed levels of certain currents and voltages in a transistor in active region defines the operating point on the DC load line.
For normal operation of the transistor, the Q- point is to be selected at the center of the load line.

Q.3(b) Sketch the construction of n–channel JFET and explain its working principle. [4]

Ans.: Construction of N-channel JFET



Working of N channel FET



When a voltage is applied between the drain and source with a DC supply (V_{DD}), the electrons flows from source to drain through narrow channel existing between the depletion regions. This constitutes drain current, I_D. The value of drain current is maximum when the external voltage applied between gate and source 0V.

When the gate to source voltage (applied by V_{GG}) is increased above zero, the reverse bias voltage across gate source junction is increased. The depletion region is widened. This reduces the width of the channel and thus controls the flow of current. The gate source voltage reaches a point where the channel gets completely blocked and the drain current becomes zero is called pinch- off voltage

Q.3(c) Differentiate active and passive transducer on the basis of any four points. [4]

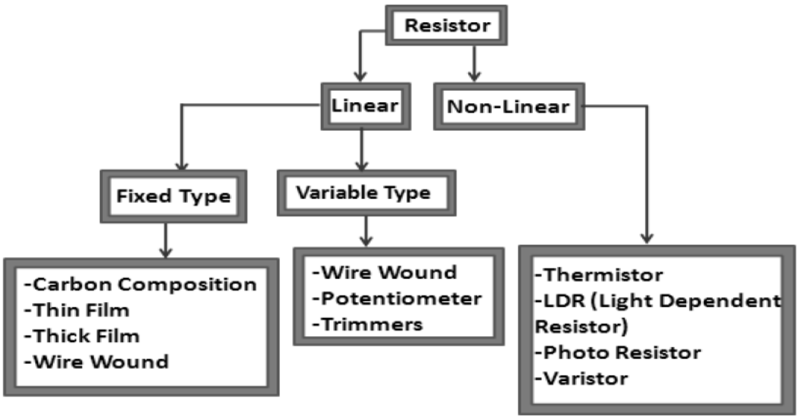
Ans.:

Parameters	Active Transducer	Passive Transducer
Working Principle	Operate under energy conversion principle	Operate under energy controlling principle

Example	Thermocouple, Piezoelectric Transducer etc.	Thermistors, Strain Gauges etc.
Advantage	Do not require external power supply for its operation	Require external power supply for its operation
Application	Used for measurement of Surface roughness in accelerometers and vibration pick ups	Used for measurement of power at high frequency

Q.3(d) State the different types of resistors. State any four specifications of resistors [4]

Ans.: Different types of Resistors:



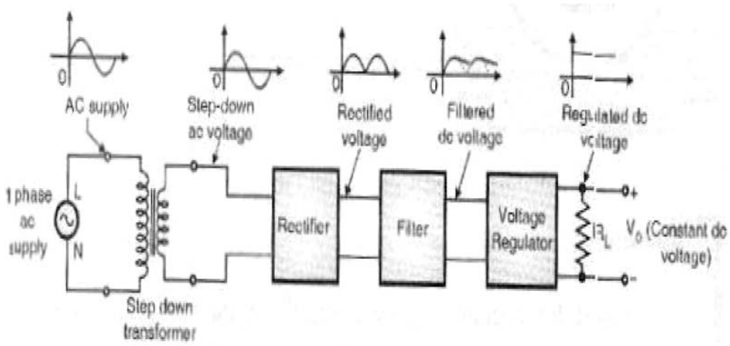
Specifications of Resistor:

- Temperature Coefficient.
- Size or value of a resistor
- Power Dissipation / wattage
- Tolerance
- Thermal Stability
- Frequency Response.
- Power De-rating.
- Maximum Temperature.
- Maximum Voltage.

Q.4 Attempt any THREE of the following : [12]

Q.4(a) Draw the basic block diagram of regulated DC power supply. Explain the function of each block. [4]

Ans.:



Block diagram of regulated power supply

1. **TRANSFORMER:** Transformer works on the basis of ELECTROMAGNETIC INDUCTION and they are mainly classified into two:
   (i) STEP UP TRANSFORMER
   (ii) STEPDOWN TRANSFORMER

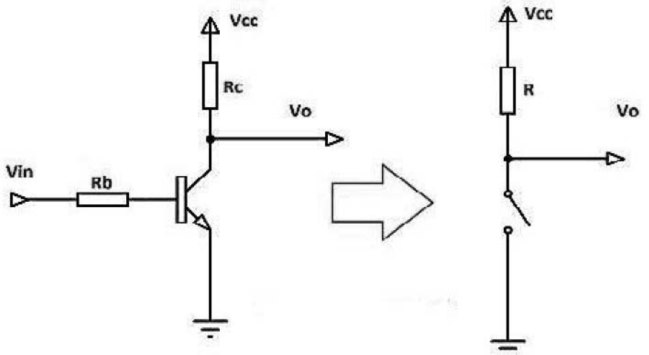
Step up transformer up convert the input voltage where step down transformer down converts. For a DC Power Source we have to use step down transformers, to covert the high voltage AC supply to low voltage DC.

2. **RECTIFIER:** Rectifiers are used to convert the sinusoidal AC voltage to non-sinusoidal pulsating DC. The main component used in Rectifiers are diodes due to its switching action. They will conduct Current only in one direction, hence the voltage. So we can use them as rectifiers to make the alternating Current unidirectional.
   Rectifiers are classified into Three :-
   (i) HALF WAVE RECTIFIERS
   (ii) FULL WAVE RECTIFIERS
   (iii) BRIDGE RECTIFIERS

3. **FILTERS:** Filters are used to eliminate or filter-out the unwanted ripples from the rectified output. Filters play an important role in dc Power supplies, they make the pulsating dc steady.

4. **VOLTAGE REGULATOR:** Voltage Regulators are used to regulate the output Voltage over load. They make the Voltage unvaried with load connected to it. This will eliminates the remaining ripples from the filter output. The output from Voltage Regulator may be the required DC. Voltage Regulators includes some safety measures such as Current Limiting, short circuit etc.

Q.4(b) Describe the working of transistor as a switch with circuit diagram. [4]
Ans.:

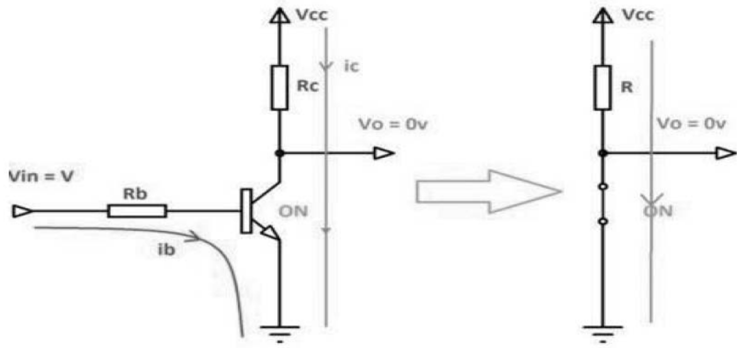


Transistor as a Switch Circuit Diagram

From the above circuit we can see that the control input Vin is given to base through a current limiting resistor Rb and Rc is the collector resistor which limits the current through the transistor. In most cases output is taken from collector but in some cases load is connected in the place of Rc.

- ON = Saturation
- OFF = Cutoff

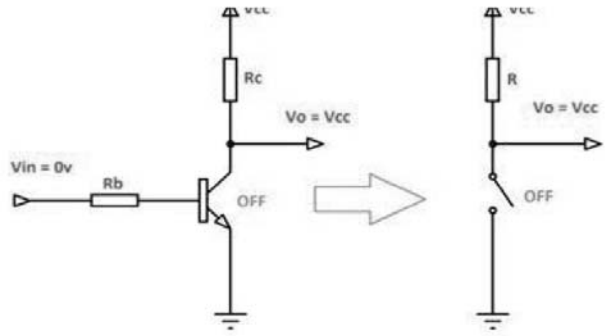
Transistor as a Switch – ON:



Transistor as a Switch ON

Transistor will become ON (saturation) when a sufficient voltage V is given to input. During this condition the Collector Emitter voltage V_{ce} will be approximately equal to zero, ie the transistor acts as a short circuit. For a silicon transistor it is equal to 0.3v. Thus collector current $I_c = V_{cc}/R_c$ will flows.

Transistor as a Switch – OFF:



Transistor as a Switch OFF

Transistor will be in OFF (cutoff) when the input Vin equal to zero. During this state transistor acts as an open circuit and thus the entire voltage Vcc will be available at collector.

Q.4(c) A JFET has a drain current of 5 mA. If I_{DSS} = 10 mA and $V_{GS\ (OFF)}$ = –6V. Find the value of (i) V_{GS} (ii) V_P **[4]**

Ans.: Given:

I_D = 5mA

I_{DSS} = 10mA

$V_{GS(OFF)}$ = -6V

V_{GS} = ?

V_P = ?

$$I_D = I_{DSS} \cdot \left(1 - \frac{V_{GS}}{V_{GS(OFF)}}\right)^2$$

$$V_{GS} = \left(1 - \frac{\sqrt{I_D}}{\sqrt{I_{DSS}}} \times V_{GSS(OFF)}\right)$$

$$V_{GS} = \left(1 - \frac{\sqrt{5mA}}{\sqrt{10mA}} \times -6\right)$$

V_{GS} = -1.756V

$V_P = V_{GS(OFF)}$

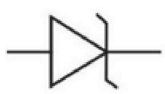
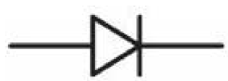
$\therefore V_P$ = -6V

Q.4(d) Compare P–N junction diode and zener diode on the basis of **[4]**

(i) Symbol **(ii) Direction of conduction**

(iii) Reverse breakdown **(iv) Application**

Ans.:

Parameter	Zener Diode	PN Diode
Symbol		
Direction of conduction	It conducts in both directions.	It conducts only in one direction.
Reverse breakdown	It has quite sharp reverse breakdown.	It has no sharp reverse breakdown.
Application	Commonly used for voltage regulation	commonly used for rectification

Q.4(e) Explain any four selection criteria of transducers for temperature measurement. **[4]**

Ans.: (i) **Ambient temperature range:** It will impact on sensor accuracy as we can easily predict the ambient temperature effect on measurement taken from the sensor.

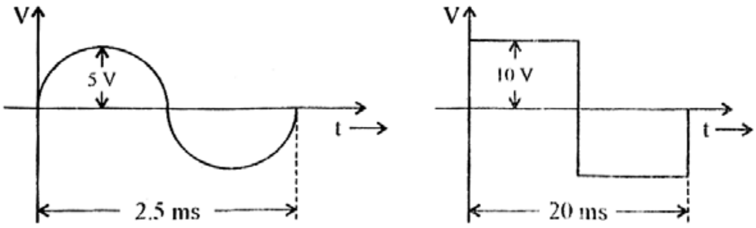
(ii) **Stability & control precision requirement:** If accuracy requirement is far better than 20F, use an RTD and if long term stability is required an RTD is better choice than Thermocouple.

(iii) Speed of response to temperature change requirement. Spring loaded temperature sensor and stepped thermo wells provide good speed of response.

(iv) **Cost:** Measurement failure most often results in production down time costs.

Q.5 Attempt any TWO of the following : **[12]**

Q.5(a) Calculate peak–to–peak amplitude, frequency and wavelength of waveforms shown in Figure. **[6]**



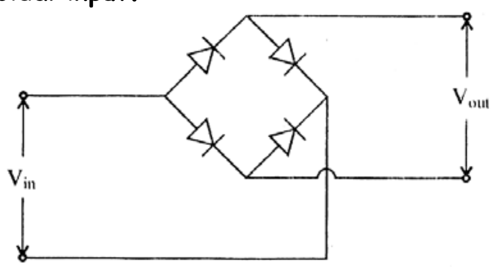
Ans.: **For sine waveform:**

1. Peak to peak amplitude = 10 V
2. Frequency = 1/T = 1/(2.5ms) = 400 Hz
3. Wavelength λ = Vc/f = $(3*10^8)/400$ = 750000 m

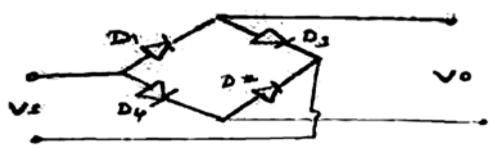
For square waveform:

1. Peak to peak amplitude = 20 V
2. Frequency = 1/T = 1/(20 ms) = 50 Hz
3. Wavelength λ = Vc/f =$(3*10^8)/50$ = 6000000 m

Q.5(b) Identify the circuit shown in Figure and explain working with input–output waveforms for a sinusoidal input. **[6]**



Ans.: **The given circuit is Bridge rectifier** – (with diodes numbered)



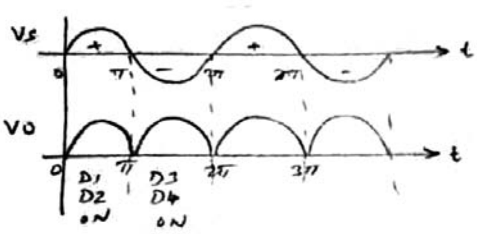
Working:

The four diodes labelled D1 to D4 are arranged in "series pairs" with only two diodes conducting current during each half cycle.

During the positive half cycle of the supply: Diodes D1 and D2 conduct in series while diodes D3 and D4 are reverse biased and the current flows through the load for the period o to π

During the negative half cycle of the supply: Diodes D3 and D4 conduct in series, but diodes D1 and D2 switch "OFF" as they are now reverse biased. The current flowing through the load is the same direction as before for the period π to 2π.

Waveforms:



Q.5(c) (i) In circuit shown in figure, a silicon transistor with β = 50 is used. Take V_{BE} = 0.7 V. Find Q point value. **[6]**

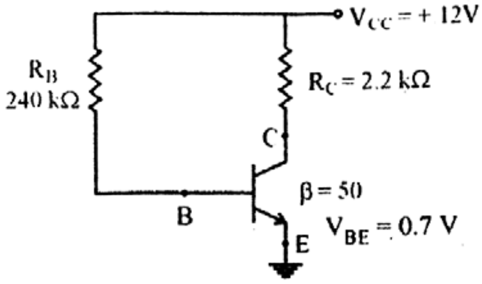


Fig.

(ii) Define operating point of the transistor.

Ans.: Collector current at saturation:

$I_{C(SAT)} = \frac{Vcc}{Rc}$

$I_{C(SAT)}$ = 5.45 mA

Value of cut-off voltage:

$V_{CE(cutoff)} = V_{CC}$

Therefore,

$V_{CE(cutoff)}$ = 12V

Base current, $I_B = \frac{Vcc}{RB}$

$I_B = \frac{12}{240 \times 10^3}$

I_B = 50 μ A

Collector current,

$I_C = \beta * I_B$

I_C = 50 * 50 * 10^-6

I_C = 2.5 mA

Collector to emitter voltage,

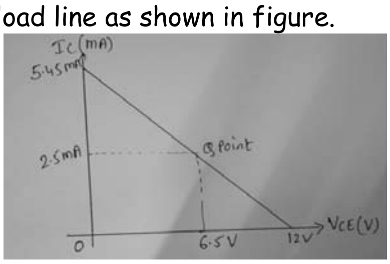
$V_{CE} = V_{CC}$ - (IC * RC)

V_{CE} = 12- ($2.5 * 10^{-3} * 2.2*10^3$)

V_{CE} = 6.5 V

Q-points are I_{CEQ} = 2.5 mA V_{CEQ} = 6.5 V

Q-point is located on the D.C. load line as shown in figure.



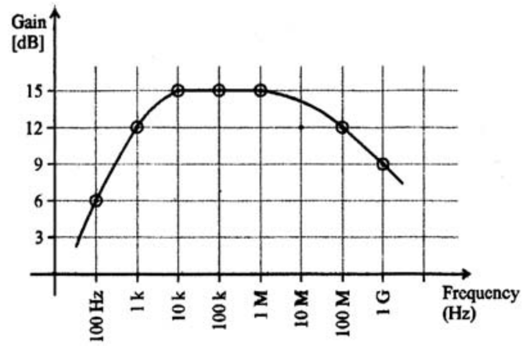
Q.6 Attempt any TWO of the following : **[12]**

Q.6(a) Observe the given frequency response of RC coupled amplifier in Figure. Calculate : **[6]**

(i) Lower cut–off frequency (F_L)

(ii) Higher cut–off frequency (F_H)

(iii) Bandwidth (BW)



Ans.: As maximum gain is 15 dB, 3 dB down gain is 12 dB.

So,

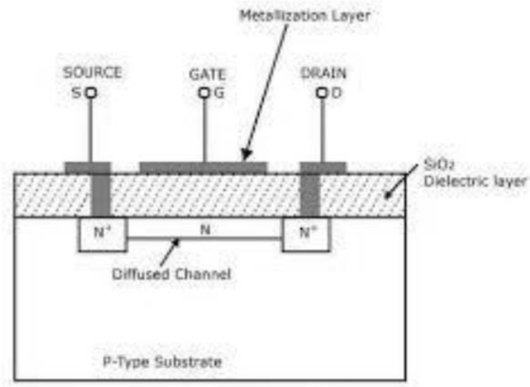
(i) The lower cut-off frequency F_L = 1KHz

(ii) Higher cut-off frequency F_H = 100 MHz

(iii) Bandwidth (BW) = F_H - F_L = (100000 -1)KHz = 99999 KHz

Q.6(b) Explain working principle of N–Channel depletion type MOSFET with construction diagram. Compare depletion type MOSFET and enhancement type MOSFET. **[6]**

Ans.: MOSFET

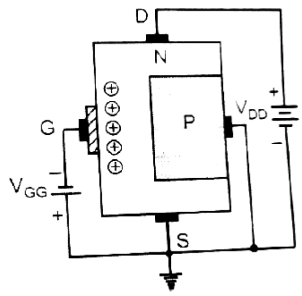


N-Channel DE-MOSFET Structure

Working principle:

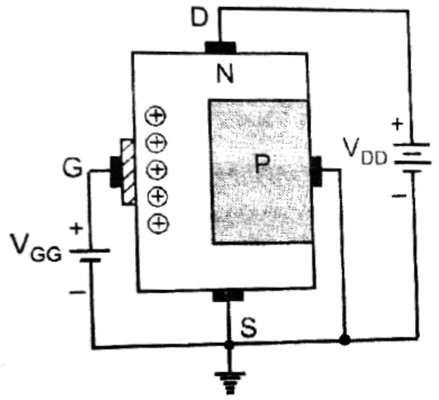
The depletion type MOSFET can be operated in the following two ways:

1. Depletion mode:



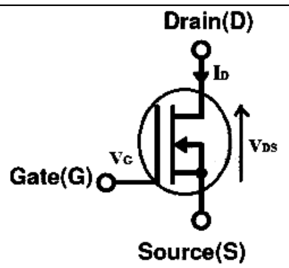
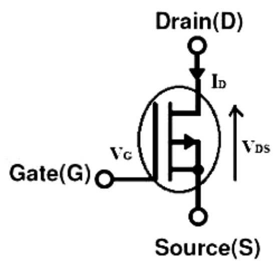
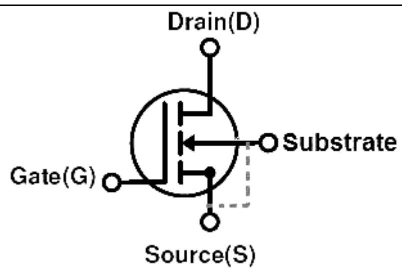
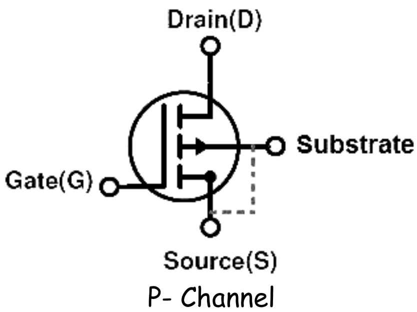
A depletion type N channel MOSFET with negative gate to source voltage is shown in figure. The negative gate voltage induces positive charges in N type channel through the insulating layer SiO2. Since, conduction of current through the N type channel is by means of majority carriers (i.e. electrons), the free electrons in the vicinity of positive charges are repelled away in the N type channel. This reduces the number of free electrons passing through the N type channel. As a result of this, the N type channel is depleted of free electrons (i.e. majority carriers). Thus, it reduces the drain current flowing through the N type channel as the gate to source voltage is made more negative. As large negative gate to source voltage, the N type channel region near the drain end is totally depleted of free electrons and therefore the drain current reduces to zero.

2. Enhancement mode:



An enhancement type N channel MOSFET with positive gate to source voltage is shown in figure. The positive gate voltage induces negative charges in N type channel through the insulating layer SiO2. Since, conduction of current through the N type channel is by means of majority carriers (i.e. electrons), the free electrons in the vicinity of positive charges are added together in the N type channel. Thus, the positive gate voltage increases the number of free electrons passing through the N type channel. This increases the drain current flowing through the N type channel as a result, it enhances the conductivity of the N channel. Thus, it increases the drain current flowing through the N type channel as the gate to source voltage become more positive. Because of the fact, the positive gate operation is called an enhancement mode.

Comparison of Depletion type MOSFET & Enhancement type MOSFET

Sr. No.	Depletion type MOSFET	Enhancement type MOSFET
1	 N-Channel  Channel	 N- Channel  P- Channel
2	An insulating oxide layer is present between gate and channel.	An insulating oxide layer is present between gate and substrate.
3	N or P type channel is present.	N or P type channel is not present. At a time of operation, induced channel is created.
4	For N channel V_{GS} = negative (for depletion mode) V_{GS} = positive (for enhancement mode)	For N channel V_{GS} = only positive
5	For N-channel, If V_{GS} is more negative, drain current decreases more.	For N-channel, If V_{GS} is more positive, drain current increases more.

Q.6(c) List four types of electrical pressure transducers and describe one application of each one. **[6]**

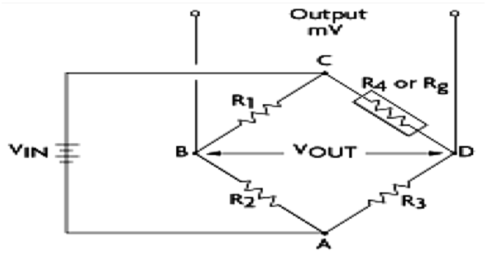
Ans.: Types of electrical pressure transducers:

1. Strain gauge pressure transducers
2. Potentiometer pressure transducers
3. Piezoelectric pressure transducers
4. Reluctance pressure transducers
5. Capacitive pressure transducers

Applications:

1. Strain gauge pressure transducers

In measurement of strain

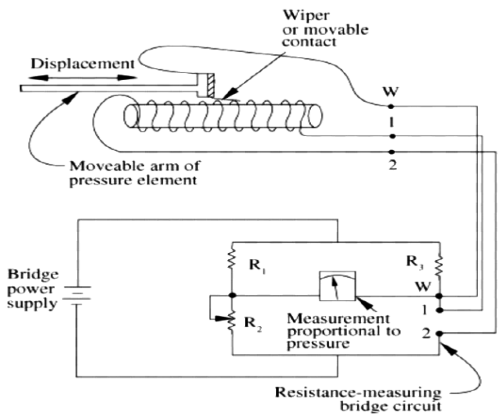


$$V_{OUT} = V_{IN}\left[\frac{R_3}{R_3 + R_g} - \frac{R_2}{R_1 + R_2}\right]$$

In order to measure strain with a bonded resistance strain gauge, it must be connected to an electric circuit that is capable of measuring the minute changes in resistance corresponding to strain. Strain gauge transducers usually employ four strain gauge elements that are electrically connected to form a Wheatstone bridge circuit. The Figure shows a typical strain gauge diagram. A Wheatstone bridge is a divided bridge circuit used for the measurement of static or dynamic electrical resistance. The output voltage of the Wheatstone bridge is expressed in millivolts output per volt input. The Wheatstone circuit is also well suited for temperature compensation. The number of active strain gauges that should be connected to the bridge depends on the application. For example, it may be useful to connect gauges that are on opposite sides of a beam, one in compression and the other in tension. In this arrangement, one can effectively double the bridge output for the same strain. In installations where all of the arms are connected to strain gauges, temperature compensation is automatic as resistance change (due to temperature variations) will be the same for all arms of the bridge.

2. Potentiometer pressure transducers

In pressure measurement:



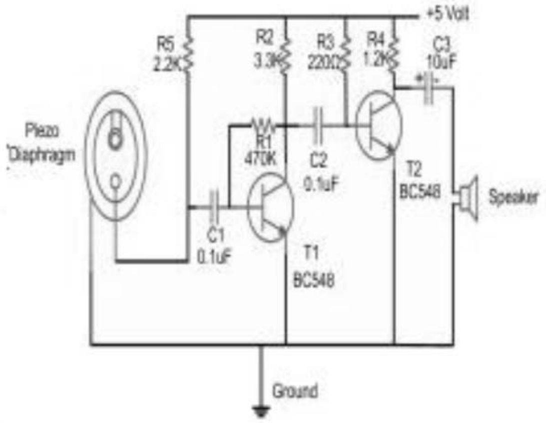
A potentiometric consists of a wire wound resistor with removable slide attached to it. Moving the slide will change the amount of resistance of the potentiometer. When the potentiometer is connected in an electronic circuit any movement of the slide on the potentiometer will change the resistance in the circuit. The circuit configuration most often used to make accurate measurement is the Wheatstone bridge.

In a Wheatstone bridge, the bridge has two parallel legs. Each leg has two resistors in series. A voltage source has connected to the bridge so that current will follow through each leg. In a typical bridge, there is another circuit installed here. When the resistance of all four resistor is exactly equal the current flow through each leg is equal. In this condition, the bridge is balanced. However, if one of these resistors is changed, current flow through each leg is no longer equal.

3. Piezoelectric pressure transducers

In detection of audio signal

The following circuit shows the piezoelectric sensor circuit diagram. The components required for this circuit are four resistors, speaker, two NPN transistor, capacitor, and piezo diaphragm. The generation of the electrical signal in the piezo diaphragm is when it is subjected to the pressure variation due to the sound in the vicinity. The output of the piezo-diaphragm is supplied to the two transistors of T1 & T2 (BC548) and the two transistors are known as a Darlington pair, it has a very high current.



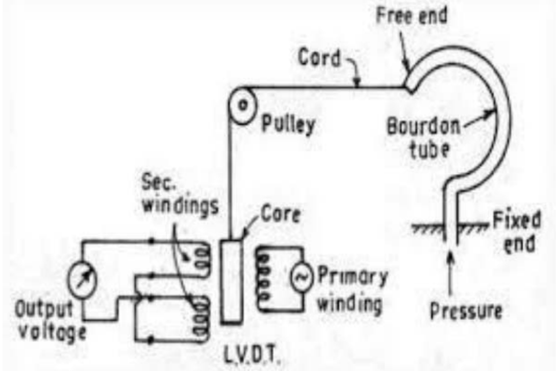
Circuit Diagram of Piezoelectric Sensor

If piezo diaphragm receives any audio signals, in the opposite faces it produces the voltage difference. By using the capacitors C1 of 0.1µF the signal is filtered or a DC component. The first transistor T1 of the Darlington pair amplifiers of the input signal and the output appears at the resistor R2. For the transistor T1, base-collector bias is given by the resistor R1 of 470k. The output of the first transistor T1 is given to the base of the T2 transistor after it is filtered by another capacitor C2.

In further the output of the transistor T1 is amplified by the transistor T2 and at the resistor R4, the amplified signal is produced. The R3 resistor is used for the necessary bias for the transistor T2. The output of the second transistor T2 is filtered with the capacitor C3 and it is connected to the speakers.

4. Reluctance pressure transducers

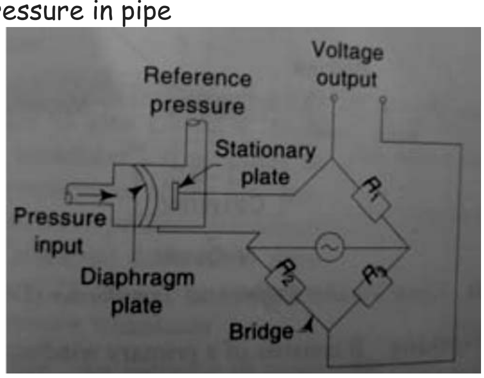
Measurement of fluid pressure in bourdon tube:



In this the, the bourdon tube act as primary transducer and LVDT which follows the output of bourdon tube act as a secondary transducer. The bourdon tube senses the pressure when liquid enters into it, it will bend depending upon the pressure of the fluid and converts it into a displacement. This set up is used for measurement of pressure which is converted into electrical signal by LVDT.

5. Capacitive pressure transducers

Measurement of pressure in pipe



In this arrangement, in place of movable plate, diaphragm is used, which expands and contracts due to change in pressure. The diaphragm plate acts as a movable plate of a capacitor. A fixed plate is placed near the diaphragm. These plates form a parallel plate capacitor which is connected as one of the arms of a bridge. Any change in pressure causes a change in distance between the diaphragm and fixed plate, which is unbalanes the bridge. The voltage output of the bridge corresponds to the pressure applied to the diaphragm plate.

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