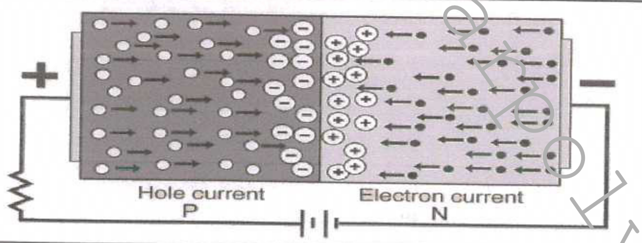
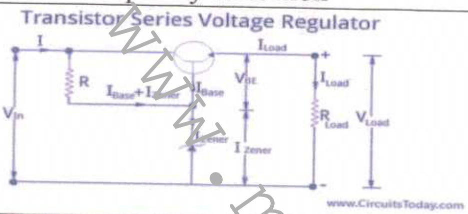
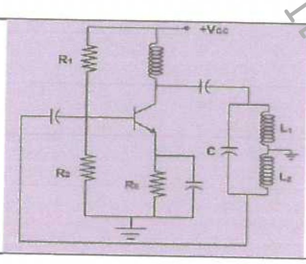
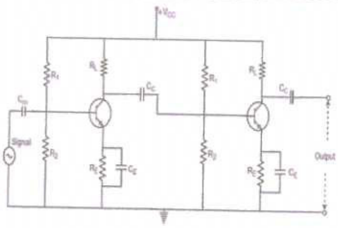
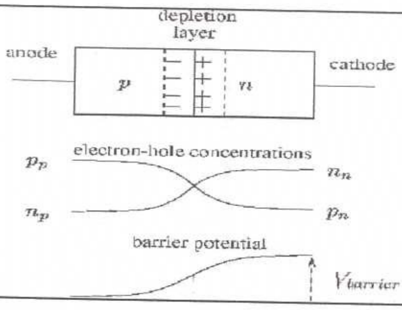
Scoring Indicators

Code: TED (10)-3053

Q No	Scoring Indicators	Split Score	Total Score
I.1	Drift current is the electric current, or movement of charge carriers, which is due to the applied electric field, often stated as the electromotive force over a given distance.	2	2
I.2	The variation of dc output voltage output as a function of dc load current is called regulation. Percentage regulation is given as % regulation = $V_{NL} - V_{FL} / V_{FL} * 100$	2	2
I.3	The gain of an amplifier is defined as measure of the ability to amplify a signal. Gain is a ratio it does have any unit. The ratio of output voltage to the input voltage is defined as voltage gain.	2	2
I.4	1. The first condition is that the magnitude of the loop gain ($A\beta$) must be unity. This means the product of gain of amplifier 'A' and the gain of feedback network 'β' has to be unity. 2. The second condition is that the phase shift around the loop must be 360° or 0°. This means, the phase shift through the amplifier and feedback network has to be 360° or 0°.	2	2
I.5	Analog to digital conversion, Level detection, Line reception	Any two-2	2
II.1		Fig-3 Exp-3	6
II. 2	Common base current gain,$\alpha = (I_c/I_e)$ Common emitter current gain,$\beta = (I_c/I_b)$ From transistor current relations, $I_e = I_c + I_b$, $\alpha = I_c/I_e$, $\alpha = I_c/(I_c+I_b)$ Dividing numerator and denominator by Ib $\alpha = (I_c/I_b)/((I_c/I_b)+(I_b/I_b))$ $\alpha = \beta/\beta+1$ $\beta = I_c/I_b$ $\alpha = I_c/(I_e-I_c)$ Dividing numerator and denominator by I_e $\beta = (I_c/I_e)/((I_e/I_e)-(I_c/I_e))$ $\beta = \alpha/1-\alpha$	6	6
II.3	The ratio of r. m. s. value of AC component to the DC. component in the rectifier output is known as ripple factor i.e. Ripple factor = r. m. s. value of AC component / value of DC. component=I_{AC}/I_{DC} In semiconductor diodes, peak reverse voltage or peak inverse voltage is the maximum voltage that a diode can withstand in the reverse direction without breaking down or avalanching.	6	6

	Rectifier efficiency is defined as the ratio of DC power to the applied input AC power. Therefore, maximum rectifier efficiency = 40.6%. This means only 40.6% of the input AC power is converted into DC power		
II.4	The negative feedback reduces noise. It has highly stabilized gain. It can control step response of amplifier. It has less harmonic distortion. It has less amplitude distortion. It has less phase distortion. Input and output impedances can be modified as desired. It can increase or decrease output impedances. It has higher fidelity i.e. more linear operation. It has less frequency distortion	Any six-6	6
II. 5		Fig-3 Exp-3	6
II. 6		Fig-3 Exp-3	6
II.7		Fig-3 Exp-3	6
III (a)		Fig-2 Exp-3 WF-2	7

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<tr><td>III (b)</td><td>

S. No.	Characteristics	CB Configuration	CE Configuration	CC Configuration
1	Input resistance	Very low (40Ω)	Low (50Ω)	Very high (750kΩ)
2	Output resistance	Very high (1MΩ)	High (10kΩ)	Low (50Ω)
3	Current gain	Less than unity	High (100)	High (100)
4	Voltage gain	Small (150)	High (500)	Less than unity
5	Leakage current	Very small	Very large	Very large
6	Applications	For high frequency application	For audio frequency application	For impedance matching
7	Phase shift between input and output	0°	180°	0°

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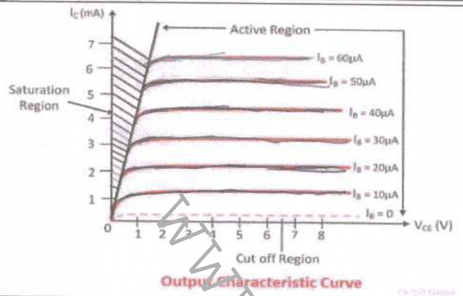
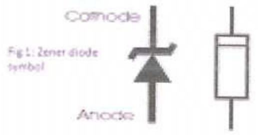
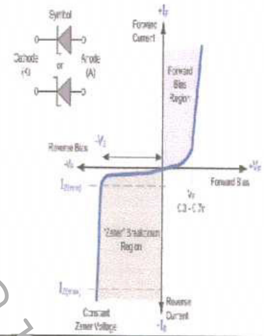
<tr><td>IV (a)</td><td>


</td><td>Fig-4
Exp-4</td><td>8</td></tr>
<tr><td>IV (b)</td><td>

ZENER DIODE / BREAKDOWN DIODE

- Zener diode permits the current to flow in forward direction as well as in reverse direction when the voltage exceeds breakdown voltage i.e. zener voltage (V_Z)
- Operates in breakdown region in reverse bias condition.
- Zener diode may use avalanche breakdown or zener breakdown mechanism.





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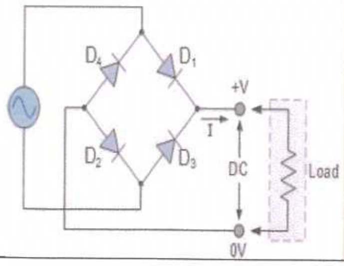
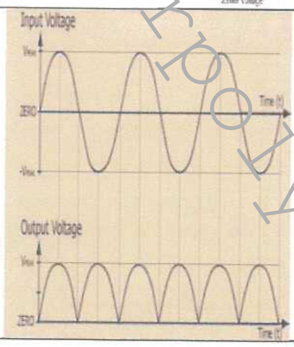
Exp-3</td><td>7</td></tr>
<tr><td>V (a)</td><td>




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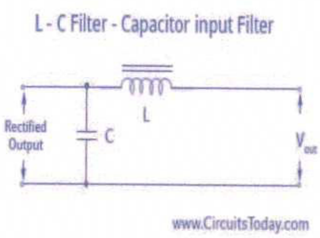
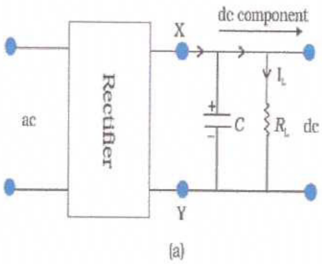
GRAPH-2
EXP-2</td><td>7</td></tr>
<tr><td>V (b)</td><td>




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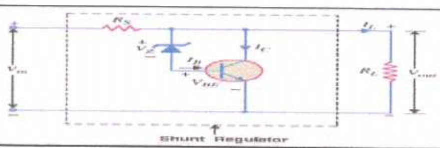

</td><td>Fig-3
Exp-4</td><td></td></tr>
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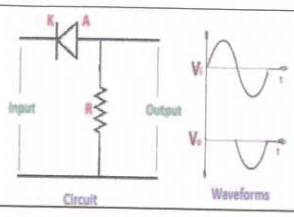
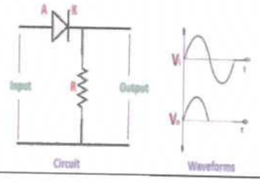
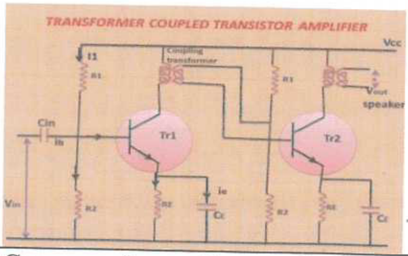
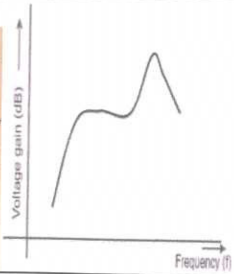
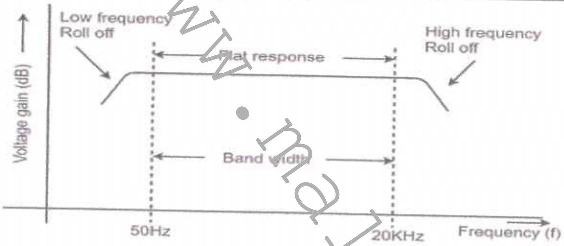
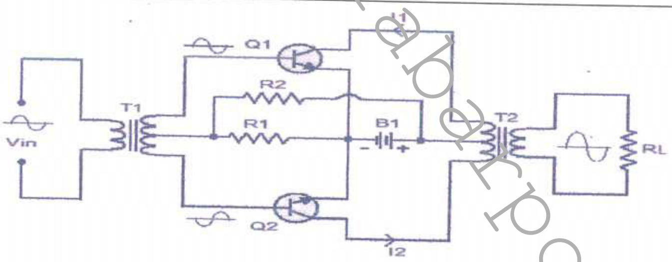
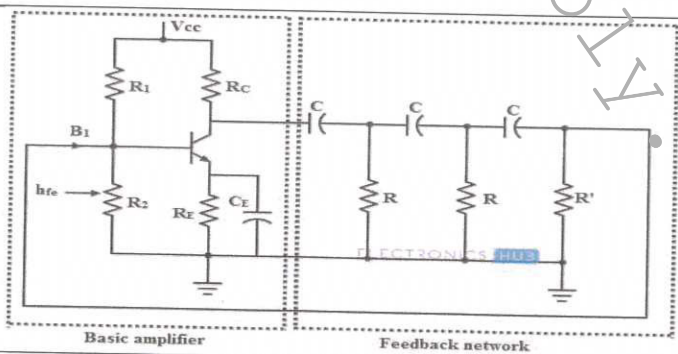
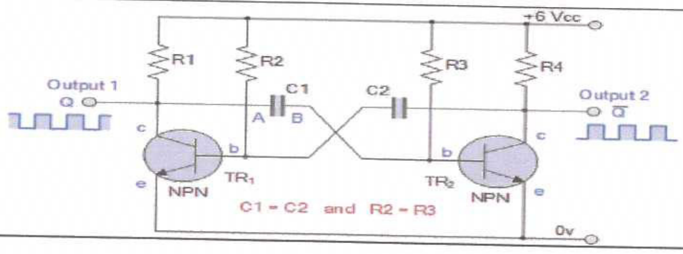
VI (b)	 	4+4	8
VII (a)	 	Fig-3 Curve-2 Exp-2	7
VII (b)	Compare 3 coupling methods	8	8
VIII (a)		Fig-3 Exp-4	7
VIII (b)		CKT-3 Graph-2 Exp-3	8
IX (a)		CKT-3 Exp-4	7
IX (b)		CKT-4 Exp-4	8

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<tr>
<td>X
(a)</td>
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<tr><th>Sr. No.</th><th>RC oscillator</th><th>LC oscillator</th></tr>
<tr><td>1.</td><td>Frequency of oscillations is dependent of values of R and C.</td><td>Frequency of oscillations is dependent on values of L and C.</td></tr>
<tr><td>2.</td><td>These are used at low and medium frequencies.</td><td>These are preferred at high frequencies.</td></tr>
<tr><td>3.</td><td>Example of RC oscillators: Phase shift and wein bridge oscillators</td><td>Examples of LC oscillators: Hartley, Colpitt's and clapp oscillators.</td></tr>
<tr><td>4.</td><td>Poor frequency stability.</td><td>Poor frequency stability except for the clapp oscillator</td></tr>
<tr><td>5.</td><td>Used as low and medium frequency signal generators.</td><td>Used in radio, TV as high frequency sources, frequency synthesizers.</td></tr>
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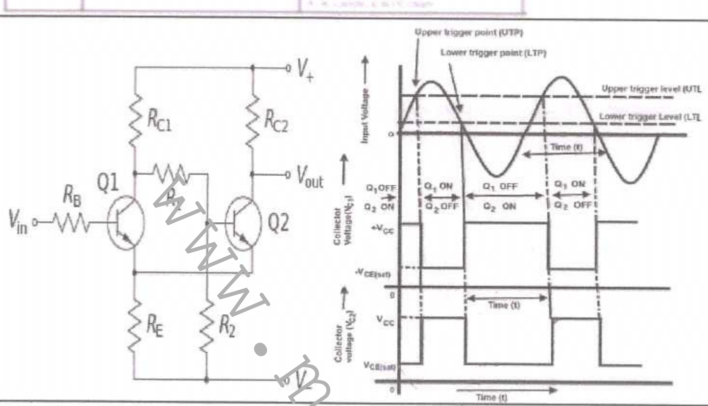
<tr>
<td>X
(b)</td>
<td>


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<td>Fig-2
WF-3
Exp-3</td>
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