UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018
SET-1

Course: Electronics Devices & Circuits-II
Semester: IV
Program: B.Tech EE, EL-BCT
Time: 03 hrs. **Max. Marks: 100**

SECTION A

S. No.		Marks	CO
Q 1	What is the expected amplification of a BJT transistor amplifier if the DC supply is set to zero volts?	**4**	**CO1**
Q 2	What will happen to the output AC signal if the DC level is insufficient? Sketch the effect on the waveform.	**4**	**CO1**
Q 3	Draw the circuit diagram of a class B *npn* push-pull power amplifier using transformer- coupled input.	**4**	**CO3**
Q 4	Draw the circuit diagram of (a) a RC phase shift oscillator and (b) Wien bridge oscillator	**4**	**CO3**
Q 5	For a voltage divider configuration of common emitter transistor explain the effect of R_s (Series Resistor) and R_L (Load Resistor).	**4**	**CO2**

SECTION B

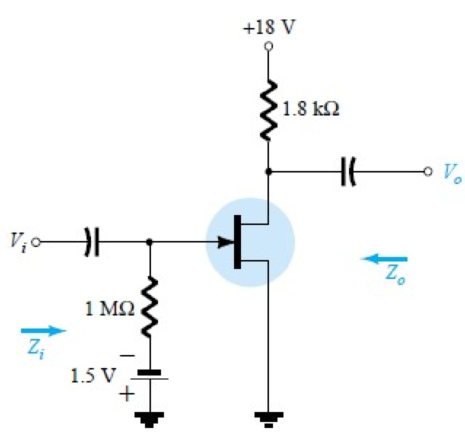
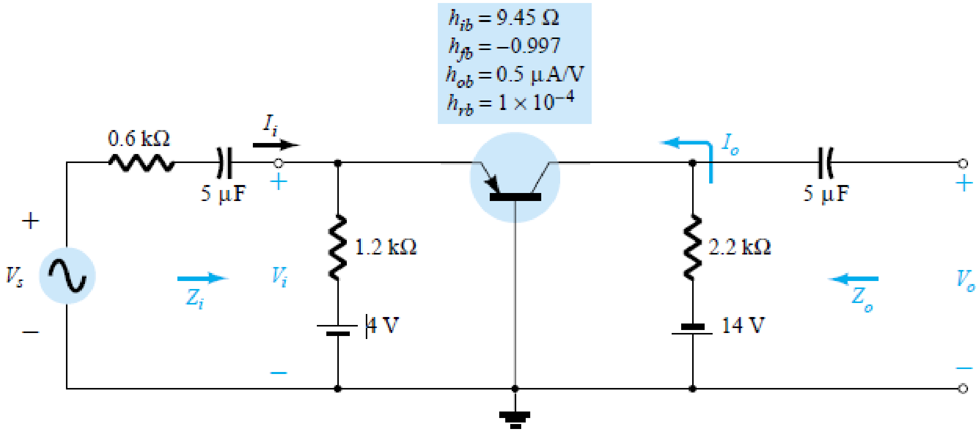
Q 6	Derive the parameters of Fixed biasing network using small signal analysis. Determine *Zi*, *Zo*, and *Av* for the network of Fig. 1 if I_{DSS} = 12 mA, V_P = 6 V, and y_{os} =40 µS. 	**10**	**CO2**

	Fig 1		
Q 7	For the common-base amplifier of Fig. 2, determine: (a) Zi. (b) Ai. (c) Av (d) Zo 	**10**	**CO1**
Q 8	With the help of circuit diagram design, the following circuits and also explain in brief. (a) Voltage series feedback amplifier (b) Voltage shunt feedback amplifier (c) Current series feedback amplifier (d) Current shunt feedback amplifier	**10**	**CO5**
Q 9	Calculate the percentage efficiency of CLASS A amplifier and compare it with other power amplifier. **OR**	**10**	**CO4**
Q 10	For the network of Fig. 3: (a) Determine Zi and Zo. (b) Find Av and Ai.	**10**	**CO2**

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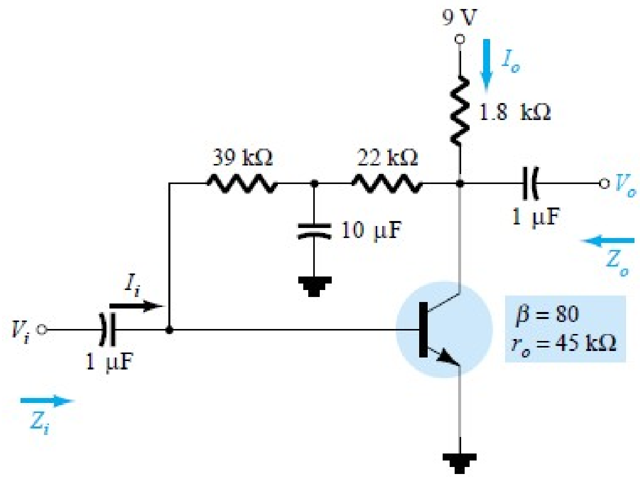

Fig. 3
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<td colspan="4">SECTION-C</td>
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<td>Q 11</td>
<td>
For the cascaded system of Fig. 4 with two identical stages, determine:
(a) The loaded voltage gain of each stage.
(b) The total gain of the system, A_v and A_{vs}.
(c) The loaded current gain of each stage.
(d) The total current gain of the system.
(e) How Z_i is affected by the second stage and R_L.
(f) How Z_o is affected by the first stage and R_s.
(g) The phase relationship between V_o and V_i.

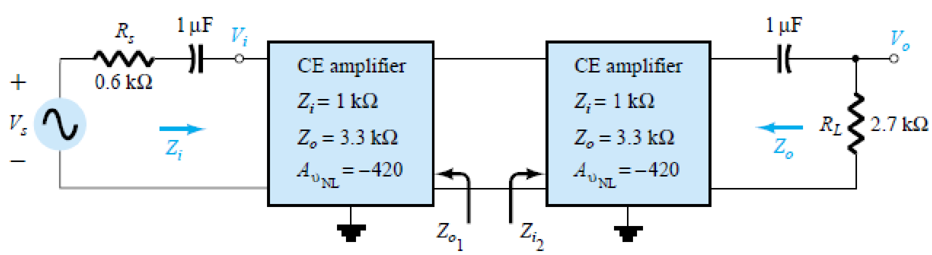

Fig.4
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<td>20</td>
<td>CO3</td>
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<td>Q 12</td>
<td>Consider a system, in which the input and output waveform is 180° out of phase. Design a positive feedback oscillator circuit using RC series circuit It is desired to design a phase-shift oscillator (as in Fig. 18.21a) using an FET having gm = 5000 µS, r_d=40 kΩ, and feedback circuit value of R = 10 kΩ. Select the value of C for oscillator operation at 1 kHz and RD for A> 29 to ensure oscillator action.</td>
<td>20</td>
<td>CO5</td>
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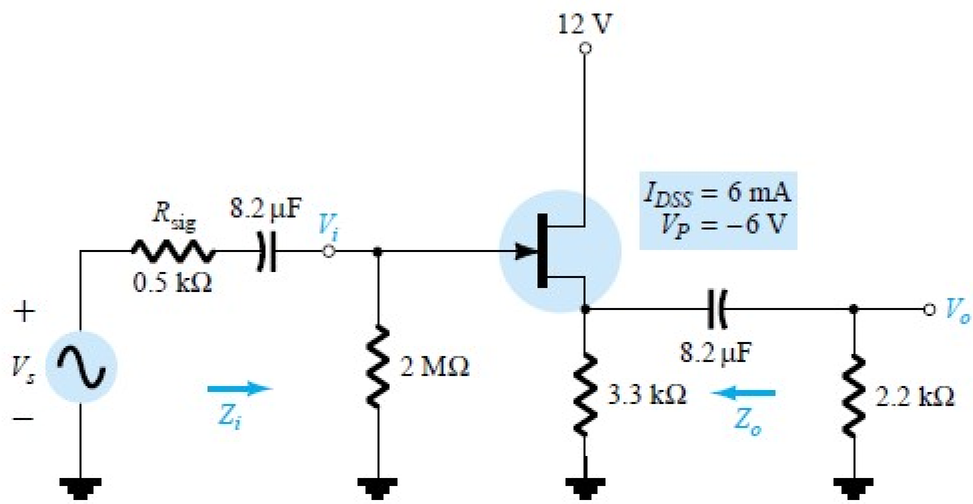
	OR		
Q 13	For the source-follower network of Fig. 5: (a) Determine A_{vNL}, Zi, and Zo. (b) Determine Av and Avs. (c) Change R_L to 4.7 kΩ and calculate Av and Avs. What was the effect of increasing levels of RL on both voltage gains? (d) Change Rsig to 1 kΩ (with R_L at 2.2 kΩ) and calculate Av and Avs. What was the effect of increasing levels of Rsig on both voltage gains? (e) Change R_L to 4.7 kΩ and Rsig to 1 kΩ and calculate Zi and Zo. What was the effect on both parameters?  Fig.5	**20**	**CO2**

Name: **Enrolment No:**	UPES

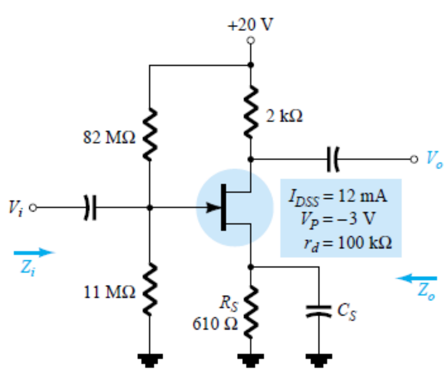
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018
SET-2

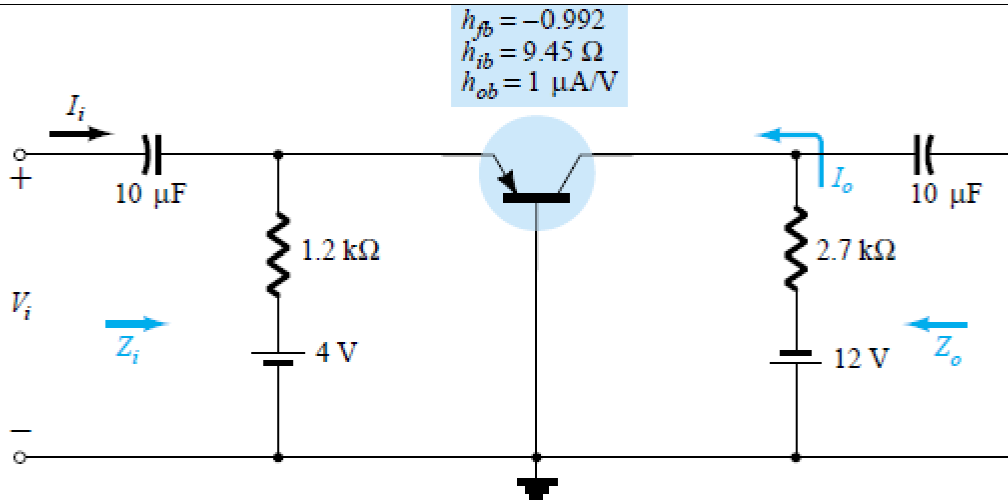
Course: Electronics Devices & Circuits-II
Semester: IV
Program: B.Tech EE, EL-BCT
Time: 03 hrs. **Max. Marks: 100**

SECTION A

S. No.		Marks	CO
Q 1	Can you think of the analogy that would explain the importance of the DC level on the resulting AC gain?	4	CO1
Q 2	What will happen to the output AC signal if the DC level is insufficient? Sketch the effect on the waveform.	4	CO2
Q 3	With the help of small signal transistor model define the phase relationship of input and output waveform. Define the above statement with the valid equations.	4	CO1
Q 4	Draw the circuit diagram of (a) a Hartley oscillator and (b) Colpitts oscillator	4	CO5
Q 5	Calculate the efficiency of class B push pull amplifier and compare it with other power amplifiers.	4	CO4

SECTION B

S. No.		Marks	CO
Q 6	Determine Z_i, Z_o, and V_o for the network of Fig. 1 if $V_i = 20$ mV.  Fig 1	10	CO2
Q 7	For the common-base network of Fig. 2: (a) Determine Zi and Zo. (b) Calculate Av and Ai. (c) Determine α, β, r_e, and r_o.	10	CO4

	 Fig.2		
Q 8	Explain in detail the essential conditions of Barkhausen criteria and how the conditions are validated for following circuits: a. Voltage series feedback amplifier b. Voltage shunt feedback amplifier c. Current series feedback amplifier d. Current shunt feedback amplifier	**10**	**CO5**
Q 9	Calculate the percentage efficiency of CLASS A amplifier and compare it with other power amplifier. **OR**	**10**	**CO4**
Q 10	For the network of Fig. 3: (a) Determine Zi and Zo. (b) Find Av and Ai.	**10**	**CO1**

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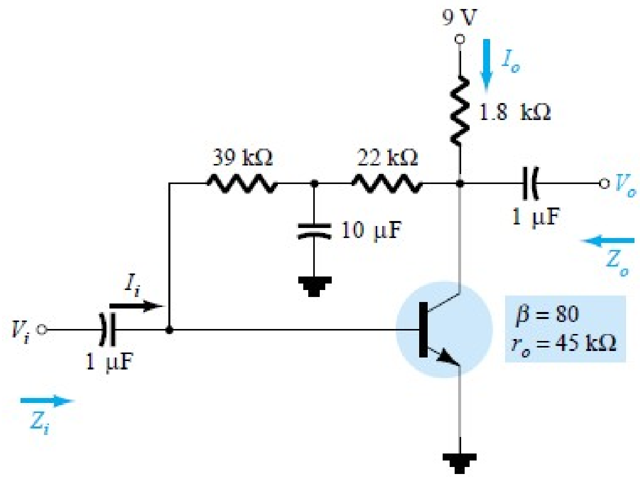
<tr><td></td><td>

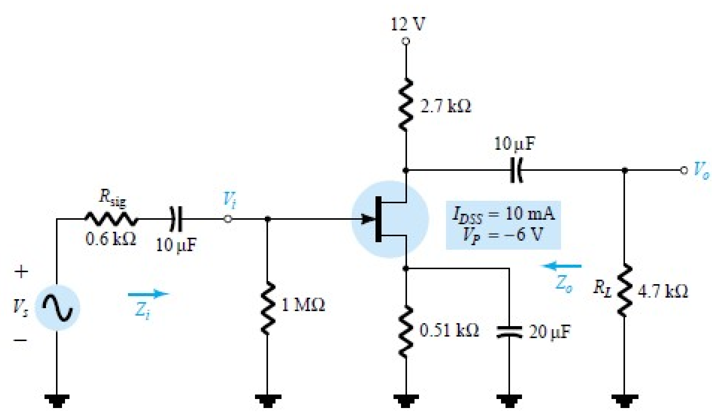
Fig. 3</td><td></td><td></td></tr>
<tr><td colspan="4">Section C</td></tr>
<tr><td>Q 11</td><td>1. For the self-bias JFET network of Fig.4:
(a) Determine A_{vNL}, Z_i, and Z_o.
(b) Sketch the two-port model with the parameters determined in part (a) in place.
(c) Determine A_v and A_{vs}.
(d) Change RL to 6.8 kΩ and R_{sig} to 1 kΩ and calculate the new levels of Av and Avs. How are the voltage gains affected by changes in R_{sig} and R_L?
(e) For the same changes as part (d), determine Z_i and Z_o. What was the impact on both impedances?


Fig.4</td><td>20</td><td>CO2</td></tr>
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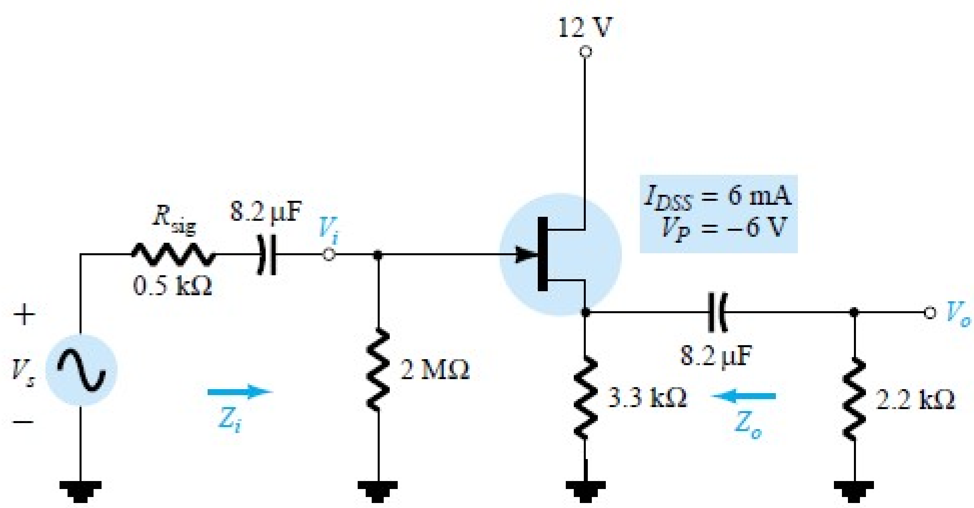
	OR		
Q 12	For the source-follower network of Fig. 5: (a) Determine A_{vNL}, Zi, and Zo. (b) Determine Av and Avs. (c) Change R_L to 4.7 kΩ and calculate Av and Avs. What was the effect of increasing levels of RL on both voltage gains? (d) Change Rsig to 1 kΩ (with R_L at 2.2 kΩ) and calculate Av and Avs. What was the effect of increasing levels of Rsig on both voltage gains? (e) Change R_L to 4.7 kΩ and Rsig to 1 kΩ and calculate Zi and Zo. What was the effect on both parameters?  Fig.5	**20**	**CO2**
Q 13	Consider a system, in which the input and output waveform is 180˚ out of phase. It is desired to design a phase-shift oscillator using an FET having gm = 5000 μS, r_d=40 kΩ, and feedback circuit value of R = 10 kΩ. Select the value of C for oscillator operation at 1 kHz and R_D for A> 29 to ensure oscillator action.	**20**	**CO4**