International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Assignment Test Autumn-2020 Program: B.Sc. Engg. (EEE)
Course Code: **EEE-2301** Course Title: **Electronics-I**
Time: **5 hours** (Writing- **4 hours 30 minutes** + **30 minutes** submission time) Full Marks: **50** (**Written** 30 + **Viva/Viva-Quiz**-20)

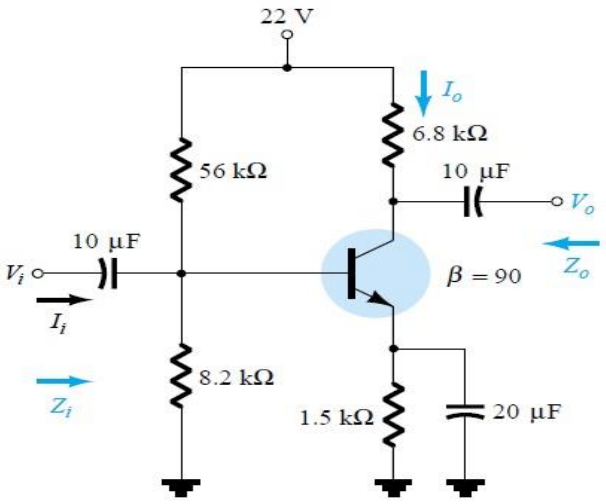
[Answer each of the questions **(1-5)** from the followings; Figures in the right margin indicate full marks.**]**

Don't blindly copy any answer from book/internet/friend. There is serious penalty for plagiarism. A straight zero will be given for the cause. Please write from your own understanding.

Question Distribution Procedure	
Last Two digits of Student ID	**SET Number**
Even , Even	**SET-A**
Even , Odd	**SET-B**
Odd , Even	**SET-C**
Odd , Odd	**SET-D**

SET-A

1(a).	The common-base amplifier is preferred for high-frequency signals when compared to the CE amplifier. Justify.	**CO1**	**Ev**	**01**
1(b).	Evaluate the equations for voltage gain, current gain, input impedance, and output impedance for a BJT using low-frequency h-parameter model for CE configuration.	**CO3**	**Ev**	**03**
1(c).	For the following network shown in **"Fig: 1"**, Determine the following parameters. (a) r_e (b) Z*i* & Z*o* (c) A*v* Consider r_0 is very large.	**CO2**	**Ev**	**02**

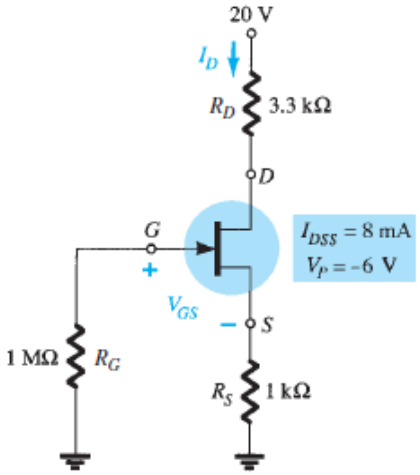


"Fig: 1" CE Amplifier circuit.

2(a).	Why R_E is replaced by a constant current bias in a differential amplifier. Justify.	**CO1**	**Ev**	**01**
2(b).	Examine the circuit diagram for a differential amplifier using BJT's. Describe common mode and differential modes of working.	**CO3**	**An**	**03**
2(c).	Determine CMRR of differential amplifier with differential gain 300 and common-mode gain of 0.2.	**CO2**	**Ev**	**02**

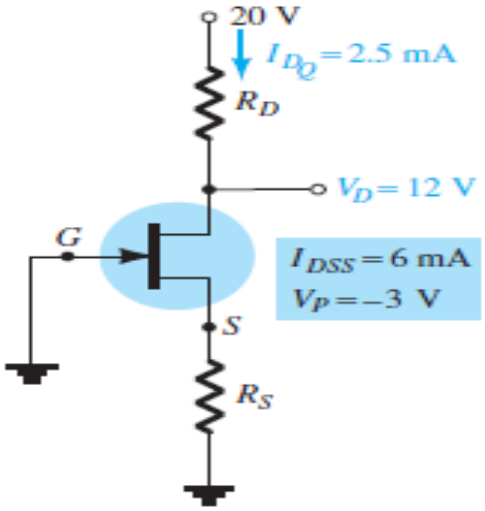
3(a).	Create a relation between the three JFET parameters, μ, r_d, and g_m.	**CO1**	**An**	**01**
3(b).	Determine the following for the network of **"Fig: 2"**,	**CO2**	**Ev**	**02**

a. V_{GSQ}.
b. I_{DQ}.
c. V_{DS} .
d. V_S .



"Fig: 2" n-channel JFET (Self-Biased) circuit.

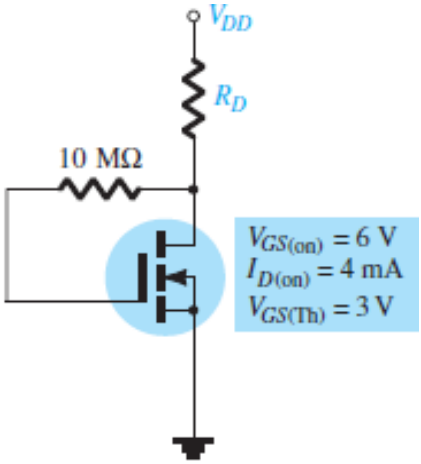
3(c).	For the network of **"Fig: 3"**, the levels of V_{DQ} and I_{DQ} are specified. Determine the required values of R_D and R_S. What are the closest standard commercial values?	**CO3**	**Ev**	**03**



"Fig: 3" n-channel JFET circuit.

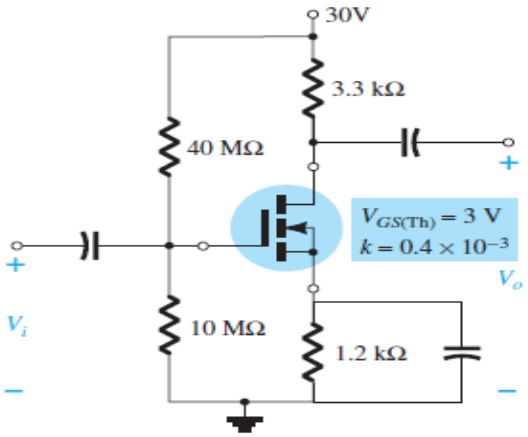
4(a).	Examine why Depletion MOSFET is commonly known as "Normally-ON" MOSFET?	**CO1**	**Ap**	**01**
4(b).	Compare enhancement and depletion modes of MOSFET with the help of its characteristics and construction.	**CO1**	**An**	**03**
4(c).	Derive the expression for transconductance of MOSFET.	**CO1**	**An**	**02**

5(a).	Explain the operation of CMOS as an inverter.	**CO1**	**U**	**02**
5(b).	The levels of V_{DS} and I_D are specified as V_{DS} = (½) V_{DD} and $I_D = I_{D\,(on)}$ for the network shown in **"Fig: 5",** Determine the levels of V_{DD} and R_D.	**CO2**	**Ev**	**02**



"Fig: 4" n-channel Depletion MOSFET

5(c).	Determine the output voltage (V_o) and Voltage gain (A_v) for an n-channel E-MOSFET is shown in **"Fig: 5",** if Vi = 0.8 mV and r_d = 40 kΩ	**CO2**	**Ev**	**02**



"Fig: 5" Voltage-divider biased n-channel E-MOSFET.

6.	Viva-Quiz: The time of viva-quiz will be declared in google classroom.	**CO1**		**20**

Prepared by,

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