Bách Khoa University (BKU), HCM City
Faculty of Computer Science and Engineering

Full Name:.....
Student ID: .....

Final Term Exam – BK192 / 2019-2020

Course: Electronics Devices
Lecture: Lê Trọng Nhân
Exam Code: 1921

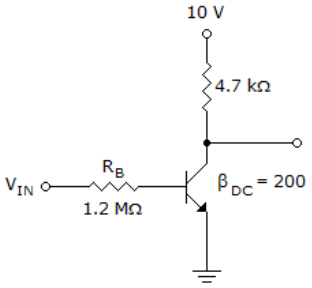
Duration: 90 minutes
Date: 26-07-2020

Refferences are not allowed. There are **110 points** in the exam.

I. Multiple choice (30 points): Pick **ONLY ONE** correct answer into the table bellow.

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15

1. Refer to the figure bellow, it is assumed that the transistor is in saturation mode. If $V_{CE} = 0.2V$ in this state, what is the value of $I_{C(sat)}$?



   (a) 0mA
   (b) 2.08mA
   (c) 2.12mA
   (d) Cannot determine due to a null value of V_{IN}

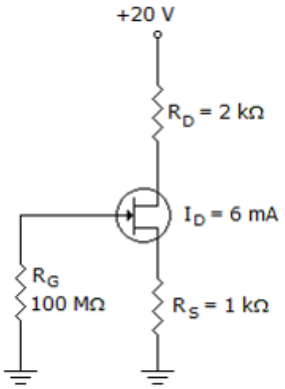
2. A JFET can be operated with .....

   (a) negative gate voltage only
   (b) positive gate voltage only
   (c) positive as well as negative gate voltage
   (d) none of the above

3. The value of the current passing through a diode in the diode bridge (used to rectify the DC current) is:

   (a) A half of the current going through the load
   (b) Double the current passing through load
   (c) By the exact current passing through the load
   (d) A quarter of the current passing through the load

4. Refer to the figure using FET bellow, determine V_S



   (a) 12V
   (b) 6V
   (c) 9V
   (d) 2V

5. If the reverse bias on the gate of a JFET is increased, then width of the conducting channel (or the resistance of the JFET) .....

(a) is decreased
(b) is increased
(c) remains the same
(d) none of the above

6. At cut-off, the JFET channel is .....

(a) at its widest point
(b) completely closed by the depletion region
(c) extremely narrow
(d) reverse baised

7. In a JFET, when drain voltage is equal to pinch-off voltage, the depletion layers .....

(a) almost touch each other
(b) have large gap
(c) have moderate gap
(d) none of the above

8. When there is a current passing through a diode, its voltage is

(a) Proportional to the current
(b) Invert proportional to the current
(c) Almost a constant value
(d) Proportional to the voltage supply

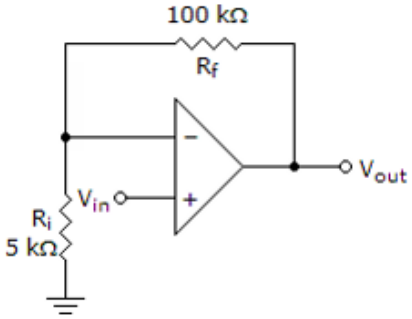
9. The forward voltage drop across a silicon diode is about .....

(a) 2.5 V
(b) 3 V
(c) 10 V
(d) 0.7 V

10. When a transistor is used as a switch having two different states ON and OFF, it is stable in which two distinct modes bellow?

(a) Saturation and Amplifier modes
(b) Amplifier and Cut-off modes
(c) Saturation and Cut-off modes
(d) All are not correct

11. Refer to the given figure. A dc input signal of $V_{IN} = -50mV$ is applied. Determine the inverting input voltage (V-) (to ground).



(a) 50mV
(b) 1.05V
(c) -1.05V
(d) -50mV

12. A zener diode is always ..... connected.

(a) reverse
(b) forward
(c) either reverse or forward
(d) none of the above

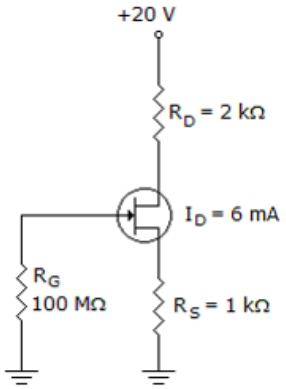
13. Midpoint bias for a D-MOSFET is ID = —, obtained by setting VGS = 0

(a) IDSS/2
(b) IDSS/4
(c) IDSS
(d) None of above

14. A transistor has .....

(a) one PN junction
(b) two PN junctions
(c) three PN junctions
(d) four PN junctions

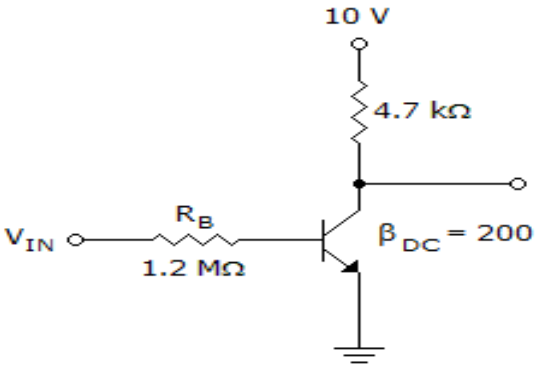
15. Refer to the figure using FET bellow, determine V_{GS}



(a) 0V
(b) 6V
(c) -6V
(d) Cannot determine

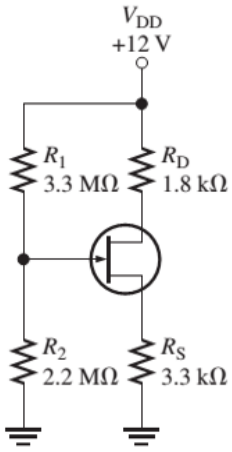
II. Essay (80 points): Student presents your answers in **Examination Paper**

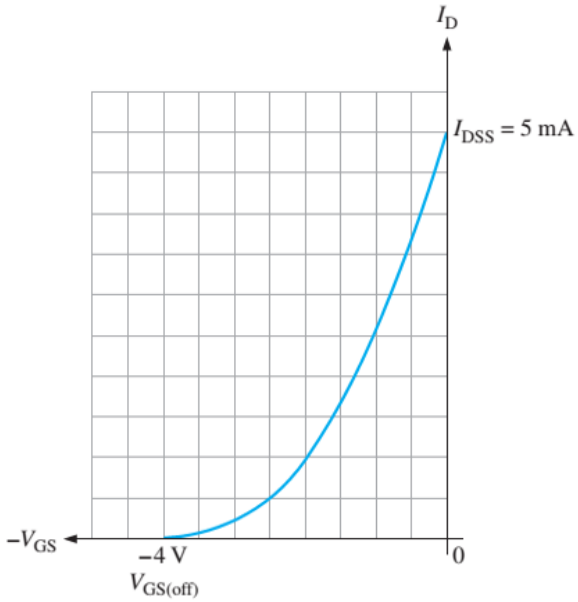
1. (20 points) Refer to the circuit using BJT NPN as following:



Determine the minimum value of I_B to put this transistor operating in saturation mode. It is assumed that in saturation mode, $V_{CE} = 0.2V$.

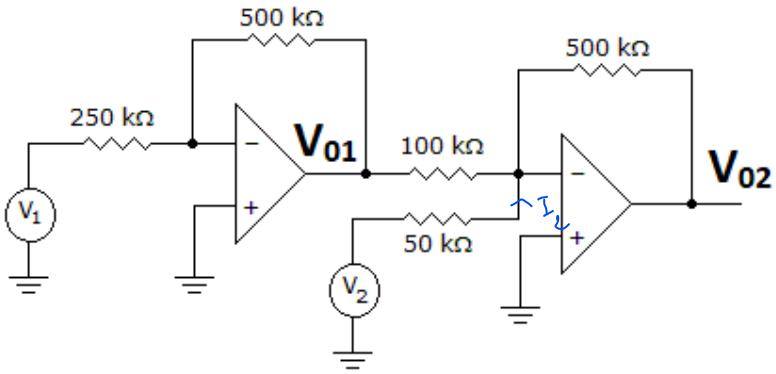
(25đ) Refer to the following circuit with $I_{DSS} = 5mA$ and $V_{GS(off)} = -4V$:





- Determine V_G in volt (5 points)
- Determine V_{GS} in volt (10 points)
- Determine I_D in ampere (10 points)

(35đ) Reffer to the OPAM circuit bellow



- Determine V_{O1} (15đ)
- Determine V_{O2} (20đ)

END.

Head of Department

Lecturer

Lê Trọng Nhân

Answer 1921

I. Multiple choice (30 points): Pick **ONLY ONE** correct answer into the table bellow.

1. (b)
2. (c)
3. (c)
4. (b)
5. (a)
6. (b)
7.
8. (c)
9. (d)
10. (c)
11. (d)
12. (a)
13. (c)
14.
15. (c)

II. Essay (80 points): Student presents your answers in **Examination Paper**

1.
2.
3.