Kingdom of Saudi Arabia
Ministry of Education
College of Computer
Department of Computer Engineering

Course Code and Name: Electronics COE213
Final Exam
472 Date: 11-6-2026 Duration:2hour

Student Name:	Student ID:

The exam starts here

Question 1 (10 marks) **:**
Choose the correct answer

1) Which semiconductor material has the highest electron mobility?
a) Germanium
b) Silicon
c) Gallium Arsenide
d) Cadmium Sulfide

2) Transition capacitance is most significant in the:
a) Forward bias region
b) Reverse bias region
c) Zero voltage region
d) Open circuit condition

3) An ideal diode in the "on" state is considered to have a resistance of:
a) Infinity
b) Zero
c) 1 kilo-ohm
d) 10 ohms

4) Which of the following equations correctly represents the current relationship in a BJT?
a) IC = IE + IB
b) IE = IC + IB
c) IB = IC + IE
d) IE = IC – IB

5) What is the main use of the active region in a BJT?
a) Switching only
b) Amplification
c) Power loss
d) Heating

6) Relationship Between Alpha (α) and Beta (β) in a BJT
a) $\alpha = \beta$
b) $\alpha = \beta/(\beta+1)$
c) $\alpha = \beta-1$
d) $\alpha = 1/\beta$

7) What is the main advantage of voltage-divider bias?
a) Highest gain
b) Smallest size
c) Lowest cost
1d) β-independent Q-point

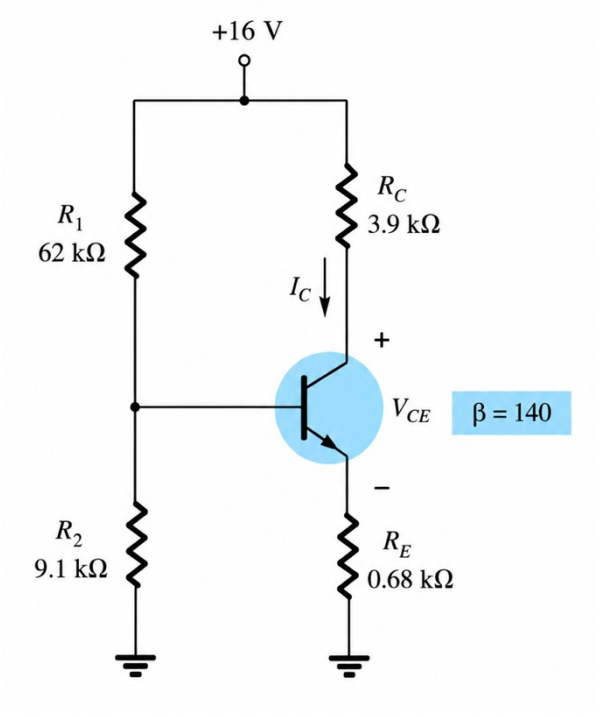
8) In approximate analysis, IB is considered:
a) Very large
b) Very small
c) Equal to IC
d) Equal to IE

9) What is the primary function of a differential amplifier in an op-amp?
a) To provide high output impedance
b) To amplify the difference between two input signals
c) To provide a constant output voltage
d) To act as a low-pass filter

10) For n-channel enhancement MOSFETs, drain current flows only when:
a) VGS = 0V
b) VGS < 0V
c) VGS > VGS(Th)
d) VGS < VGS(Th)

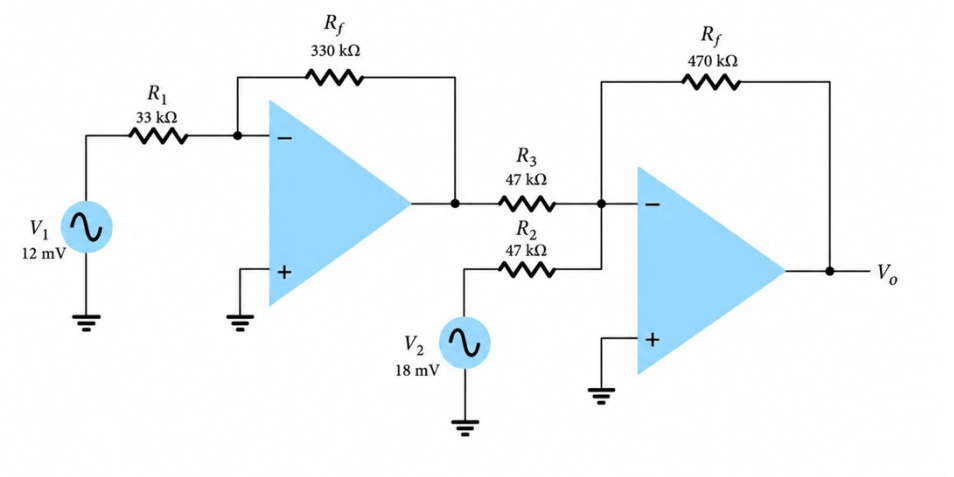
Question 2 (10 marks) **:**

For the given voltage-divider BJT biasing circuit, use the approximate analysis method to find I_{CQ} , V_{CEQ} , V_E and V_B

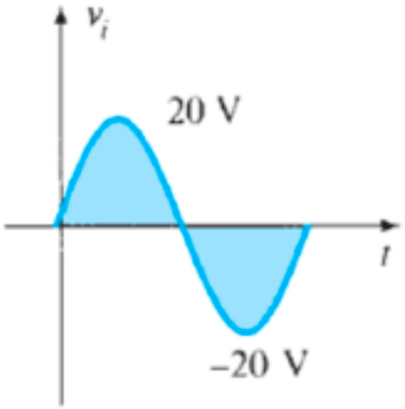


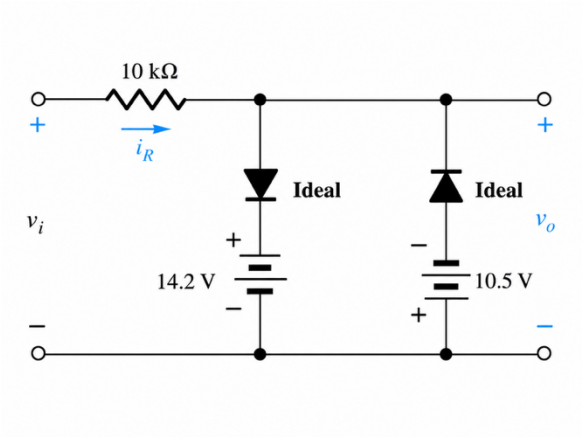
Question 3 (8 marks) **:**

For the given amplifier circuit, determine the V_O output voltage :



Question 4 (10 marks) **:**
For the given circuit ,sketch the V_O output voltage **:**





Question 5 (12 marks) **:**
For the network of Figure, V_D = 8 V. Determine:

a) I_D

b) V_S and V_{DS}

c) V_G **and** V_{GS}

d) V_P

