

Total No. of Questions – [3]

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G.R. No.	
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PAPER CODE	U112-203B(BE)
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DEC-2022 (INSEM+ ENDSEM) EXAM

F.Y. B. TECH. (SEMESTER - II)

COURSE NAME: BASIC ELECTRONICS ENGINEERING

COURSE CODE: ET10203B

(PATTERN 2020)

Time: [2Hr]

[Max. Marks: 60]

(*) Instructions to candidates:

- 1) Figures to the right indicate full marks.
- 2) Use of scientific calculator is allowed
- 3) Use suitable data where ever required

Q.1

Solve the following

- i) In a semiconductor diode, as temperature increases _____ [2]
 - a) Majority charge carriers increases
 - b) Minority charge carriers increases
 - c) Both a and b
 - d) None of the above
- ii) A half-wave rectifier has an input voltage of 240 V r.m.s. If the step-down transformer has a turns ratio of 8:1, what is the peak load voltage? Ignore diode drop. [2]
 - a) 27.5 V
 - b) 86.5 V
 - c) 30 V
 - d) 42.4 V
- iii) A forward potential of 10V is applied to a Si diode. A resistance of 10 K Ω is also in series with the diode (Assume practical diode model). The current is----- [2]
 - a) 0.93 mA
 - b) 10 mA
 - c) 1 mA
 - d) 0.7 mA
- iv) The barrier potential of a semiconductor diode is 700 mV at 27 degree Celsius. Calculate its new value at 30 degree Celsius. [2]
 - a) 706mV
 - b) 694mV
 - c) 700mV
 - d) 709mV

- v) What is the minimum PIV rating of each diode in center tap full wave rectifier, if its $V_p(\text{out})$ is equal to 23 V? [2]
 a) 49.3 V
 b) 46.7 V
 c) 48.6 V
 d) 1.4 V
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- vi) Determine the peak output voltage for the full wave bridge rectifier. Assume silicon diode. The transformer is specified to have a 10 V rms secondary voltage and 120 V across the primary winding. [2]
 a) 8.6 V
 b) 12.74 V
 c) 14.14 V
 d) 13.44 V
- vii) Determine the PIV rating for the full wave bridge rectifier. Assume all four are silicon diodes. The transformer is specified to have a 12 V rms as secondary voltage for the standard 140 V across the primary. [2]
 a) 16.3 V
 b) 10 V
 c) 8.2 V
 d) 15 V
- viii) The average value of Half-Wave rectified Output Voltage is _____ if its peak output voltage is 60V. [2]
 a) 20.28 V
 b) 20.43V
 c) 19.09 V
 d) 59.3 V
- ix) In a transistor, $I_C = 100 \text{ mA}$ and $I_E = 100.5 \text{ mA}$. The value of β is [2]
 a) 50
 b) 500
 c) 100
 d) 200
- x) In a transistor if $\beta = 50$ and collector current I_C is 10 mA, then the emitter current I_E is [2]
 a) 100.1 mA
 b) 110 mA
 c) 10.2 mA
 d) 15 mA
- xi) The current gain (β) of a transistor in common emitter configuration is 40. If the collector current changes by 160 mA, then required change in the base current isfor constant V_{CE} . [2]
 a) 4 mA
 b) 0.4 mA
 c) 40 mA
 d) 4 A

xii) In RC phase shift oscillator producing output at $f = 500 \text{ Hz}$, $R = 7.5 \text{ K}\Omega$ then $C =$ [2]

- a) 0.01 micro F
b) 0.017 micro F
c) 0.012 nF
d) 0.001 micro F

xiii) If the collector supply is 12 V, then collector cut off voltage under d.c. conditions is [2]

- a) 24 V
b) 0 V
c) 6 V
d) 12 V

xiv) In NPN transistor, operating in saturated mode, the value of output voltage V_{CE} is [2]

- a) Less than V_{BE}
b) Greater than V_{BE}
c) Less than $2V_{BE}$ and greater than V_{BE}
d) Equal to V_{BE}

xv) For a BJT fixed bias circuit, determine base current I_B , if $V_{BB} = 5\text{V}$, $V_{BE} = 0.7\text{V}$ and $R_B = 10\text{K}\Omega$. [2]

- a) $650 \mu\text{A}$
b) $430 \mu\text{A}$
c) $340 \mu\text{A}$
d) $100 \mu\text{A}$

Q.2

Solve any three questions out of four

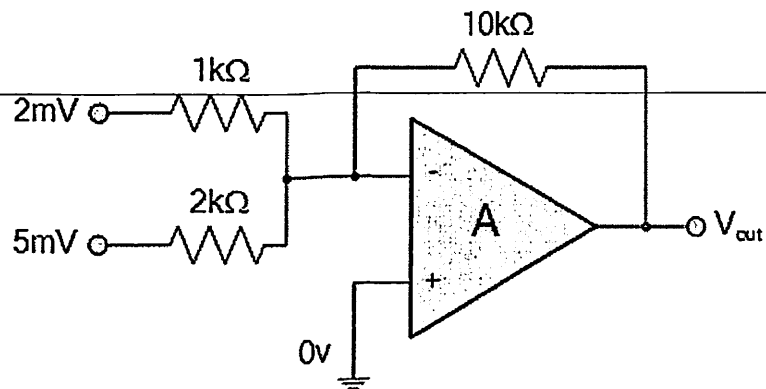
- a) Sketch the internal structure of p-channel Enhancement type MOSFET and explain its output drain characteristics? [5]
- b) Calculate V_{GS} and V_{DS} for the circuit, with $R_1 = 100 \text{ K}\Omega$, $R_2 = 15 \text{ K}\Omega$, $R_D = 200 \Omega$, $V_{DD} = 24 \text{ V}$. Assume this particular MOSFET has minimum values of $I_{D(on)} = 200 \text{ mA}$ at $V_{GS} = 4 \text{ V}$ and $V_{GS(th)} = 2 \text{ V}$. [5]
- c) Calculate drain current when $V_{GS} = 6\text{V}$ for an E-MOSFET with $I_{D(on)} = 600 \text{ mA}$ at $V_{GS} = 10\text{V}$ and $V_{GS(th)} = 5\text{V}$. [5]
- d) Explain Turning OFF process of SCR with circuit diagram. [5]

Q.3

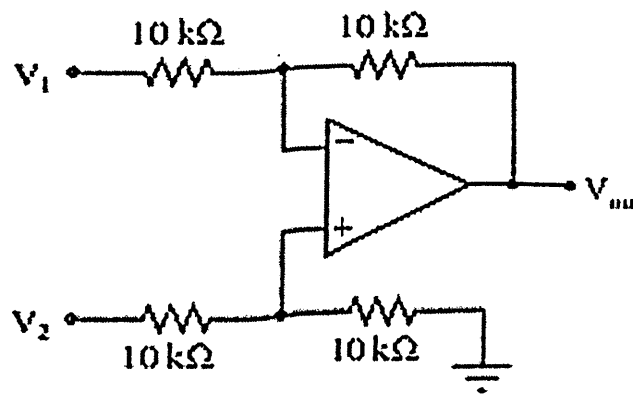
Solve any three questions out of four

- a) Compare inverting and non-inverting configuration of op amp with circuit diagram. [5]
- b) Define the following terms related to a differential amplifier. [5]
i) CMRR
ii) Slew Rate

- c) If two input voltages are applied at inverting terminal of given circuit. Find the output voltage V_{out} . [5]



- d) For a given circuit diagram, if $V_1 = 4V$ and $V_2 = 1.5V$, calculate the output voltage V_{out} . [5]
Also calculate output voltage V_{out} for the values if $V_1 = -1V$ and $V_2 = 3V$.



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