G.R. No.	

PAPER CODE	U111-203B

DECEMBER 2021 (INSEM+ ENDSEM) EXAM
F.Y. B. TECH. (SEMESTER - I)
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)   If the a.c. input to a half-wave rectifier is an r.m.s value of $400/\sqrt{2}$ volts, then diode PIV rating is-------   [2]
a) $400/\sqrt{2}$ V
b) 400 V
c) $400 \sqrt{2}$ V
d) 200 V

ii)   Two LED's are connected in series along with limiting resistance. It is supplied with 10 V DC supply and drop across each LED is 2V, the value of limiting resistance for 20 mA current is-----   [2]
a) 200 Ω
b) 250 Ω
c) 300 Ω
d) 400 Ω

iii)   The internal quantum efficiency of LEDs decreasing _____with _____ temperature.   [2]

a) Exponentially, decreasing
b) Exponentially, increasing
c) Linearly, increasing
d) Linearly, decreasing

iv)   For single phase supply frequency of 50 Hz, ripple frequency in full wave rectifier is ----   [2]
a) 25 Hz
b) 50 Hz
c) 100 Hz
d) 200 Hz

v)   Each diode in a center-tapped full-wave rectifier is _____-biased and conducts for _____ of the input cycle.   [2]
a) forward, 90 degrees
b) forward, 180 degrees
c) reverse, 90 degrees
d) reverse, 360 degrees

vi) What is the average value of half wave rectifier, for the Vp(out)= 50V [2]
a) 21.2 V b) 15 V
c) 15.9 V d) 19.9 V

vii) In Center tapped FWR, if the peak value of secondary voltage is 25 V then the peak value of the output voltage is _____ [2]
a) 24.3 V b) 11.8 V
c) 25.7 V d) 12.5 V

viii) The current flowing through the Photo diode without illumination of light in reverse bias mode is called as ---------------- [2]
a) reverse current b) dark current
c) forward current d) pinch off current

ix) Determine value of collector current I_C, for β=150 and base current I_B= 430 μA. [2]
a) 100 mA b) 46.8 mA
c) 64.5 mA d) 80.3 mA

x) For voltage divider biasing circuit, if R_1=18 KΩ, R_2= 4.7 KΩ, V_{CC}=10V. What is the value of V_B (voltage at Base terminal)? [2]
a) 2.07 V b) 3.23 V
c) 10 V d) 5.1 V

xi) In Common Emitter amplifier, if base current is 10 mA and beta is 100. What is the value of collector current? [2]
a) 1 mA b) 1000 micro A
c) 1 A d) 10 nano A

xii) In voltage divider biasing circuit using BJT, if V_E=2.42 V and R_E=240Ω. What is the value of emitter current I_E? [2]
a) 10 mA b) 25 mA
c) 20 mA d) 100 mA

xiii) What is the total phase shift requirement, around the feedback loop, for a phase-shift oscillator? [2]
a) 90° b) 180°
c) 270° d) 360°

xiv) The biasing circuit has a stability factor of 24. If due to temperature change, I_{CBO} changes by 3 μA, then I_C will change by .... [2]
a) 8 μA b) 7.2 μA
c) 0.72 μA d) 72 μA

xv) In transistor amplifier circuit, V_{CC} applied as 12 V. For maximum amplification of input signal at its output, what will be the value of V_{CE} required? [2]
a) 12 V b) 0.7 V
c) 6 V d) 1.2 V

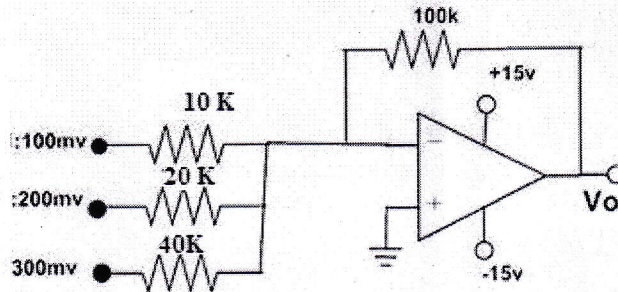**Q2** **Solve any three out of four**

a) Sketch the internal construction of an n-channel Enhancement type MOSFET and explain the pinch off process? [5]

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b) List the MOSFET amplifier configurations, and state two applications for each configuration. [5]

c) Calculate V_{GS} and V_{DS} for the MOSFET with voltage divider bias circuit, given parameters are $R_1 = 150\ K\Omega$, $R_2 = 20\ K\Omega$, $R_D = 200\ \Omega$, $V_{DD} = 24$ V. Assume this particular MOSFET has minimum values of $I_{D(on)} = 200$ mA at $V_{GS} = 4$ V and $V_{GS(th)} = 2$ V. [5]

d) Sketch the internal structure for TRIAC and draw its complete characteristics. [5]

Q.3 **Solve any three out of four**

a) Write a short note on CMRR and Slew rate of an op-amp. [5]

b) Compare between Inverting and noninverting amplifier configurations of an op-amp [5]

c) Draw the diagram of non-inverting amplifier configuration using an op-amp and derive the expression of its gain. [5]

d) For the given circuit diagram, if 3 input voltages 100mv; 200mv and 300mv are applied at inverting terminal. Find the output voltage Vo. [5]

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