PAPER ID-421107

Roll No: | | | | | | | | | | | | | |

**BTECH**
**(SEM II) THEORY EXAMINATION 2021-22**
**EMERGING DOMAIN IN ELECTRONICS ENGINEERING**

***Time: 3 Hours*** ***Total Marks: 100***

**Note:** Attempt all Sections. If you require any missing data, then choose suitably.

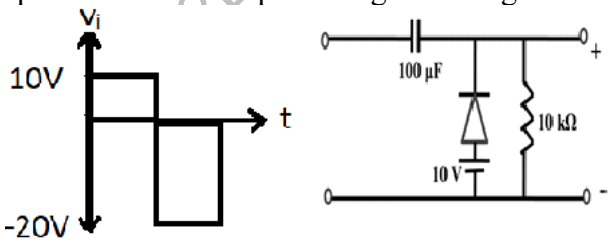
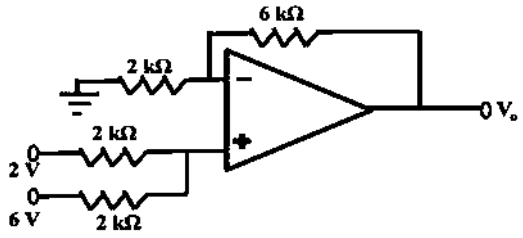
**SECTION A**

**1. Attempt *all* questions in brief. 2*10 = 20**

| Qno | Questions | CO |
|---|---|---|
| (a) | Discuss the formation of depletion layer in diode. | 1 |
| (b) | Explain the effect of temperature on diode. | 1 |
| (c) | What is difference between BJT and JFET. | 2 |
| (d) | Determine $\beta_{dc}$ and $I_{CBO}$ , If $I_E$ = 6mA, $I_C$ = 5.92mA and $I_{CEO}$=200mA. | 2 |
| (e) | What do you mean by CMRR in OP-AMP. | 3 |
| (f) | Which is better among microprocessor or microcontroller? Justify your answer with valid reason. | 3 |
| (g) | Determine base of the following: (i) $(345)_{10}=(531)_x$ (ii) $(2374)_{16}= (9076)_x$ | 4 |
| (h) | Write the truth table of two input X-OR gate and two input X-NOR gate. | 4 |
| (i) | Calculate the transmission efficiency if the modulation factor is 0.5. | 5 |
| (j) | Enlist the merits of satellite communication. | 5 |

**SECTION B**

**2. Attempt any *three* of the following: 10*3 = 30**

| Qno | Questions | CO |
|---|---|---|
| (a) | Define Clamper. Determine output voltage for the given network.   | 1 |
| (b) | Draw and explain common base N-P-N Transistor with its input and output characteristic graph. Also write an expression for output current. | 2 |
| (c) | Explain the concept of virtual ground in OP-AMP. Determine output Voltage for given network.   | 3 |
| (d) | Perform following operation as indicated.<br>(i) Determine2's complement of $(1010.110)_2$ .<br>(ii) Convert $(25.125)_{10}$ into Hexadecimal number.<br>(iii) Add binary number $(1011)_2$ and $(1111)_2$.<br>(iv) State De Morgan's Law.<br>(v) Define minterm and maxterm. | 4 |
| (e) | Explain Amplitude modulation. Derive the expression for the total power radiated by the modulated signal. Also calculate modulation efficiency. | 5 |

QP22EP2_056 | 01-08-2022 08:54:59 | 14.99.37.242

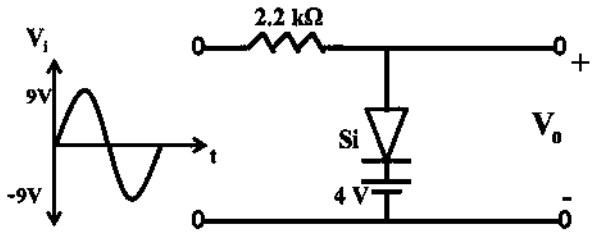
PAPER ID-421107

Roll No: | | | | | | | | | | | | | |

**BTECH**
**(SEM II) THEORY EXAMINATION 2021-22**
**EMERGING DOMAIN IN ELECTRONICS ENGINEERING**

## SECTION C

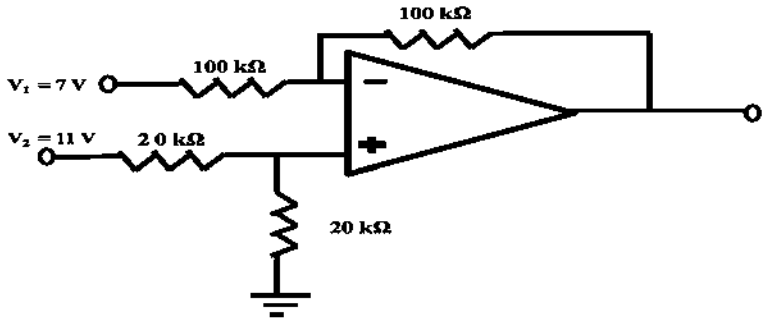
**3. Attempt any *one* part of the following: 10*1 = 10**

| Qno | Questions | CO |
|---|---|---|
| (a) | In the bridge rectifier circuit, the secondary voltage Vs= 100 sin50t and load resistance is 1kΩ. Calculate:(i) DC current(ii) RMS value of current (iii) Efficiency (iv) Ripple factor. | 1 |
| (b) | Determine and draw output voltage for given network.   | 1 |

**4. Attempt any *one* part of the following: 10 *1 = 10**

| Qno | Questions | CO |
|---|---|---|
| (a) | Explain the working of enhancement type MOSFET along with their transfer characteristics. | 2 |
| (b) | Describe the construction and working of P-Channel Depletion MOSFET, with characteristic graph. Also Justify that it is a voltage controlled device. | 2 |

**5. Attempt any *one* part of the following: 10*1 = 10**

| Qno | Questions | CO |
|---|---|---|
| (a) | Briefly explain:<br>(i) OP-Amp as Non-Inverting Amplifier.<br>(ii) Inverting summer.<br>(iii) Blue Tooth and Wi-Fi Technology. | 3 |
| (b) | Enlist the characteristics of ideal OP-Amp. Also determine the output voltage of following circuit.   | 3 |

QP22EP2_056 | 01-08-2022 08:54:59 | 14.99.37.242

PAPER ID-421107

Roll No: | | | | | | | | | | | | | |

**BTECH**
**(SEM II) THEORY EXAMINATION 2021-22**
**EMERGING DOMAIN IN ELECTRONICS ENGINEERING**

**6. Attempt any *one* part of the following: 10*1 = 10**

| Qno | Questions | CO |
|---|---|---|
| (a) | Define universal logic Gates. Realize basic logic gates using NAND and NOR gates. | 4 |
| (b) | Simplify the function F(A, B,C,D) =Σm(0,2,5,6,7,13,14,15) + d(8,10) using K-map and implement the simplified function using NAND gates only. | 4 |

**7. Attempt any *one* part of the following: 10*1 = 10**

| Qno | Questions | CO |
|---|---|---|
| (a) | Why do we need modulation? The antenna current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.93 A, when the carrier is modulated by a single sine wave. Find percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8. | 5 |
| (b) | An Audio frequency signa10 Sin $6\pi \times 400t$ is used to amplitude modulate a carrier of 25 sin $4\pi \times 10^5 t$. Calculate<br>(i) Modulation Index<br>(ii) Amplitude of each side band<br>(iii) Total power delivered to the load of 2KΩ<br>(iv) Bandwidth<br>(v) Transmission efficiency | 5 |

QP22EP2_056 | 01-08-2022 08:54:59 | 14.99.37.242

QP22EP2_056 | 01-08-2022 08:54:59 | 14.99.37.242