Total No. of Questions : 10]

SEAT No. :

PE-12175

[Total No. of Pages : 4

# [6581]-2406
## F.E.
## ESC-101-ETC : Basic Electronics Engineering
## (2024 Pattern) (Semester - I/II)

*Time : 2½ Hours]* *[Max. Marks : 60*

*Instructions to the candidates :*

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 and Q.9 or Q.10.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*
5) *Use of electronic pocket calculator is allowed.*

*Q1)* a) Recognize the Impact of Electronics on industry and society? **[6]**

b) Draw circuit diagram and explain operation of Bridge Rectifier with the help of neat waveforms? **[6]**

OR

*Q2)* a) Draw circuit diagram and explain operation of Half-Wave Rectifier with the help of neat waveforms? **[6]**

b) Draw V-I characteristics of P-N Junction Diode and define these parameters. **[6]**

i) Barrier Potential

ii) Reverse Breakdown Voltage

iii) Reverse saturation current

*Q3)* a) Draw the construction diagram and explain the operation of Enhancement type N-channel MOSFET in detail? **[6]**

b) Define Current Gain, $\alpha$, $\beta$ and $\gamma$. Determine the dc current gain $\beta$ (Beta) and the collector current IC for a transistor where $I_B = 20\mu A$ and IE= 2 mA. **[6]**

OR

*Q4)* a) Draw the construction diagram and explain the operation of Enhancement type P-channel MOSFET in detail? **[6]**

b) Draw the V-I Characteristics of BJT in common emitter configuration and explain in detail? **[6]**

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***Q5)*** a) Classify the different types of Logic Gates? Draw and explain any two Logic gates with its truth table & logic equation. **[6]**

b) Convert: $(1101.101)_2$ into $(--)_{10}$ and $(35.56)_{10}$ into $(--)_2$ **[6]**

State the binary addition rule and Perform the addition of$(110101)_2$ & $(0101)_2$

OR

***Q6)*** a) Draw & Explain Half adder and Full adder Circuit using basic logic gates with truth table. **[6]**

b) Draw the block diagram of Microprocessor and explain the functions of each block in detail. **[6]**

***Q7)*** a) Draw the block diagram of Digital Multimeter. Explain the function of each block. **[6]**

b) Summarize an Ideal characteristic of Op-Amp and mention the practical values of each one. **[6]**

OR

***Q8)*** a) Draw the block diagram of Function Generator. Explain the function of each block. **[6]**

b) Explain Non inverting amplifier using op-amp in detail. And If R1 = 1kΩ and Rf = 10kΩ with Vcc = ±12V applied, Vin = 200mV. Calculate Voltage gain and Output Voltage. **[6]**

***Q9)*** a) What are the different Selection criteria used while selecting the sensors for particular application? **[6]**

b) Provide a table of Electromagnetic Frequency Spectrum with their applications. **[6]**

OR

***Q10)*** a) Describe the Block diagram of IoT based Data Acquisition and Automation System. **[6]**

b) Describe the Basic block diagram of Communication System. **[6]**

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Total No. of Questions : 10]

**PE-12175**

# [6581]-2406
## F.E.
## ESC-101-ETC : Basic Electronics Engineering
## (2024 Pattern) (Semester - I/II)

*Time : 2½ Hours]* *[Max. Marks : 70*

*Instructions to the candidates :*

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8 and Q.9 or Q.10.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*
5) *Use of electronic pocket calculator is allowed.*

*Q1)* a) Draw V- I characteristics of P-N Junction Diode and define these parameters. **[5]**
   i) Cut-in Voltage
   ii) Reverse saturation current
   iii) Reverse Breakdown Voltage

b) Draw circuit diagram and explain operation of half Wave Rectifier with the help of neat waveforms? **[5]**

c) Compare P-N Junction Diode and LED in detail. **[4]**

OR

*Q2)* a) Draw circuit diagram and explain operation of Full-Wave Bridge Rectifier with the help of neat waveforms? **[5]**

b) Recognize the Impact of Electronics on industry and society? **[5]**

c) Compare Active and Passive Components in detail. **[4]**

*Q3)* a) What is N-Well method of VLSI CMOS manufacturing, Explain in detail. **[5]**

b) Draw the construction diagram and explain the operation of Enhancement type N-channel MOSFET in detail? **[5]**

c) Compare BJT and MOSFET in detail. **[4]**

OR

*Q4)* a) Draw the construction diagram and explain the operation of Enhancement type P-channel MOSFET in detail? **[5]**

b) Draw the V-I Characteristics of BJT in common emitter configuration and explain in detail? **[5]**

c) Define transistor. Determine the dc current gain β (Beta) and the emitter current IE for a transistor where $I_B$ 40 μA and $I_c$ 3.4 mA. **[4]**



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*Q5)* a) Classify the different types of Logic Gates? Draw and explain any two Logic gates with its truth table & logic equation. **[5]**

b) Draw the block diagram of Microprocessor and explain the functions of each block in detail. **[5]**

c) Convert : **[4]**

i) $(11101010)_2$ into $(\text{-----})_{10}$

ii) $(25.625)_{10}$ into $(\text{-----})_2$

iii) $(78.33)_{10}$ into $(\text{----})_2$

iv) $(1101.11)_2$ into $(\text{----})_{10}$

OR

*Q6)* a) State and Prove De-Morgan's Theorem. **[5]**

b) Draw & Explain Full adder Circuit using basic logic gates with truth table. **[5]**

c) Compare Microprocessor and Microcontroller in detail. **[4]**

*Q7)* a) Draw the Functional block diagram of operational amplifier and explain in detail. **[5]**

b) Draw the block diagram of Digital Multi-meter. Explain the function of each block. **[5]**

c) Summarize an Ideal characteristic of Op-Amp. **[4]**

OR

*Q8)* a) Draw the block diagram of Function Generator. Explain the function of each block. **[5]**

b) Draw the block diagram of Regulated DC power supply and explain in detail. **[5]**

c) For Non-inverting amplifier using op-amp, If R1 = 1kΩ and Rf = 10kΩ with Vec = $\pm$ 12 V applied, Calculate Close loop Gain and Output Voltage, if Vin = 100 mV. **[4]**

*Q9)* a) What is the different Selection criteria used while selecting the sensors for particular application? **[5]**

b) Provide a table of Electromagnetic Frequency spectrum with their applications. **[5]**

c) Give detail comparison of Active Sensors and Passive Sensors. **[4]**

OR

*Q10)* a) Describe the Basic block diagram of Communication System. **[5]**

b) Describe the Block diagram of GSM. **[5]**

c) Describe the Block diagram of IoT based Data Acquisition and Automation System. **[4]**

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