

**University of Mumbai**  
**Examinations Summer 2022**

Time: 2hour 30 minutes

Max. Marks: 80

<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
<b>20 Marks</b>	
1.	Which of the following is a common application of UJT?
Option A:	Amplifier
Option B:	Rectifier
Option C:	Multivibrator
Option D:	Sawtooth generator
2.	Which of the following is a characteristics of an ideal Op-Amp?
Option A:	Finite voltage gain
Option B:	Finite Bandwidth
Option C:	Infinite output resistance
Option D:	Infinite input resistance
3.	In inverters, to make the supply voltage constant
Option A:	an inductor is placed in series with the load
Option B:	capacitor is connected in parallel to the load side
Option C:	an inductor is placed in parallel with the load
Option D:	capacitor is connected in parallel to the supply side
4.	NAND gate means
Option A:	Inversion followed by AND gates
Option B:	AND gate followed by an inverter
Option C:	AND gate followed by OR gate
Option D:	OR gate followed by AND gate
5.	MSP 430 microcontroller has a dual _____ D/A converters with synchronization
Option A:	8-bit
Option B:	16-bit
Option C:	12-bit
Option D:	32-bit
6.	What happens when the speed of a DC motor increases ?
Option A:	Back emf falls and line current increase.
Option B:	Both back emf as well as line current increase.
Option C:	Both back emf as well as line current fall.
Option D:	Back emf increase but line current falls.
7.	Typical brushless motor doesn't have
Option A:	Commutator
Option B:	Permanent magnet
Option C:	Electronic controller
Option D:	Fixed armature
8.	Zener diodes allow a current to flow in the reverse direction, when the
Option A:	voltage reaches above a certain value
Option B:	temperature reaches above a certain value
Option C:	current always flows in the reverse direction only

Option D:	current cannot flow in the reverse direction
9.	Which of the following instructions means "Jump if carry = 0"?
Option A:	JNC label
Option B:	JNE label
Option C:	JNZ label
Option D:	JC label
10.	To turn off the SCR, which of the following is done?
Option A:	Reduce gate voltage to zero
Option B:	Reverse bias the gate
Option C:	Reduce anode voltage to zero
Option D:	Reduce cathode voltage to zero

<b>Q2.</b> <b>(20 Marks)</b>	
A	<b>Solve any Two</b> <span style="float: right;"><b>5 marks each</b></span>
i.	Compare DIAC and TRIAC.
ii.	Draw and explain astable mode of operation of IC 555
iii.	Draw functional block diagram of microcontroller and explain it..
B	<b>Solve any One</b> <span style="float: right;"><b>10 marks each</b></span>
i.	Explain UJT triggering method of SCR in brief with circuit diagram.
ii.	Draw circuit diagram and waveforms of three phase bridge inverter with 180° conduction mode and explain the working of the same.

<b>Q3.</b> <b>(20 Marks)</b>	
A	<b>Solve any Two</b> <span style="float: right;"><b>5 marks each</b></span>
i.	State and prove De-Morgan's theorem.
ii.	Draw and explain equivalent circuit of an OP-AMP.
iii.	List the feature of MSP 430.
B	<b>Solve any One</b> <span style="float: right;"><b>10 marks each</b></span>
i.	Explain the functional block diagram of IC-555 Timer.
ii.	What is a flip flop? Explain different types of flip flops.

<b>Q4.</b> <b>(20 Marks)</b>	
A	<b>Solve any Two</b> <span style="float: right;"><b>5 marks each</b></span>
i.	Explain the operation of JK flip-flop.
ii.	Draw and explain first order low pass filter.
iii.	Draw the characteristics of power BJT, power MOSFET and IGBT.
B	<b>Solve any One</b> <span style="float: right;"><b>10 marks each</b></span>
i.	Draw and Explain characteristics of DC shunt motor.
ii.	Explain speed control method of induction motor using microcontroller.