SE mechanical Sem IV (R 2019) (O...) Mechanical Industrial Electronics

University of Mumbai
Examinations Summer 2022

May 2022
30/5/2022

Time: 2hour 30 minutes

Max. Marks: 80

Q1. 20 Marks	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which of the following is a common application of UJT?
Option A:	Amplifier
Option B:	Rectifier
Option C:	Mulitivibrator
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

Q2. (20 Marks)	
	5 marks each
A	Solve any Two
i.	Compare DIAC and TRAIC.
ii.	Draw and explain astable mode of operation of IC 555.
iii.	Draw functional block diagram of microcontroller and explain it..
	10 marks each
B	Solve any One
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.

Q3. (20 Marks)	
	5 marks each
A	Solve any Two
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.
	10 marks each
B	Solve any One
i.	Explain the functional block diagram of IC-555 Timer.
ii.	What is a flip flop? Explain different types of flip flops.

Q4. (20 Marks)	
	5 marks each
A	Solve any Two
i.	Explain the operation of JK flip-flop.
ii.	Draw and explain first order low pars filter.
iii.	Draw the characteristics of power BJT, power MOSFET and IGBT.
	10 marks each
B	Solve any One
i.	Draw and Explain characteristics of DC shunt motor.
ii.	Explain speed control method of induction motor using microcontroller.