

Reg.No. _____

**Karunya UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 15EI2002
Sub. Name : Medical Electronics

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

Q. No.	Questions	Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)			
1.	The minimum voltage required for a transistor to work is _____ a. 0v b. 0.7v c. 0.7mV d. undefined	CO2	(1)
2.	For a transistor to work the collector base junction and emitter base junction should be _____ biased. a. Forward, forward b. forward, reverse c. reverse, forward d. reverse, reverse	CO2	(1)
3.	Calculate the level of I_B if $I_C = 10 \text{ mA}$ and $I_E = 10.2 \text{ mA}$. a. 0.2mA b. 200mA c. 200 μA d. 20.2mA	CO1	(1)
4.	In a JFET I_D is controlled using a. V_{GS} b. V_{DS} c. I_G d. V_{DG}	CO2	(1)
5.	Which of the following transistor(s) has (have) depletion and enhancement types? a. BJT b. JFET c. MOSFET d. UJT	CO2	(1)
6.	A BJT is a _____-controlled device. The JFET is a _____ - controlled device. a. voltage, voltage b. voltage, current c. current, voltage d. current, current	CO1	(1)
7.	When $I_D = 0 \text{ mA}$ the resultant V_{GS} is referred as a. $V_{GS(off)}$ b. V_P c. V_{DS} d. V_v	CO1	(1)
8.	The region to the left of the pinch-off locus is referred to as the _____ region. a. saturation b. cutoff c. ohmic d. active	CO2	(1)
9.	UJT exhibits negative resistance region a. Before the peak point b. Between peak and valley points c. After the valley point d. Before cut off region	CO1	(1)
10.	You need to design a relaxation oscillator, the most likely device to use might be a. SCR b. UJT c. optocoupler d. 4 Terminal diode	CO3	(1)
11.	For an oscillator to have perfect oscillations, the phase shift should be a. 0 b. 180 c. 90 d. 270	CO3	(1)
12.	An optocoupler is used as _____ in medical equipments a. oscillator b. insulator c. Isolator d. amplifier	CO3	(1)
13.	Electrical activity of heart refers to a. EEG b. EMG c. ECG d. EGG	CO3	(1)
14.	What causes piezoelectric crystal to work as peizosensor a. heating effect b. dissimilar metals c. water running on ions d. pressure on crystal	CO3	(1)
15.	MRI stands for	CO3	

	a. Magnetic resonance Imaging	b. Medical research Instructions	c. Magnetic resolution imaging	d. Magnetic recording imaging		(1)
16.	_____ is an electrical pulse generator that starts or maintains normal heart rhythm				CO3	
	a. pacemaker	b. defibrillator	c. TENS	d. Thermometer		(1)
17.	EMG measures- Electrical activity of :-				CO3	
	a.heart	b. brain	c. muscle	d. visual cortex		(1)
18.	I am a radiologist, I need to setup a new radiology center. Your are a sales personal from some XYZ Medical Inst. co.Out of the following options which instrument you will advise me to purchase?				CO1	
	a.Patient Monitoring System	b. ECG Unit	c. X-Ray Unit	d. , PH meter		(1)
19.	Ventilators are mostly used in				CO3	
	a. ICU	b. home	c. Emergency medicine	d.clinics		(1)
20.	The study of electrical parameters of the body				CO1	
	a.Biomaterials	b. Bioimpedence	c. Biopotentials	d. Bioamplifirers		(1)
21.	An audiometer is a _____ instrument.				CO2	
	a. Diagnostic	b. therapeutic	c. analytical	d. supplementary		(1)
22.	The basic buiding block of an organism				CO3	
	a. tissues	b.genes	c.cells	d.organs		(1)
23.	For small signal ac operation, a practical forward biased diode can be modeled as				CO1	
	a. Resistance and capacitance in series	b. Ideal diode and resistance in parallel	c. Resistance and ideal diode in series	d. . Resistance		(1)
24.	Zener diode works as a				CO1	
	a.It is a rectifier diode.	b. It is a constant voltage device	c. It is a constant current device	d. It works in the forward region		(1)
25.	The primary application of a voltage regulator is to				CO1	
	a. Converts the ac voltage to dc voltage	b. Smoothen the ac variation in dc output voltage	c. Maintains a constant dc output voltage inspite of the fluctuations in ac input voltage or load current	d. None of the above		(1)
26.	The saturation region in BJT works when				CO2	
	a Both the junctions are reverse biased	b. Base emitter junction is in reverse biased, and base collector junction is forward biased	c. Base emitter junction is in forward biased, and base collector junction is reverse biased	d. Both the junctions are forward biased		(1)
27.	Which of the following approximation is often used in electronic circuit				CO2	
	a. $I_E = I_C$	b. $I_C = I_B$	c. $I_B = I_E$	d. $I_B = I_C + I_E$		(1)
28.	Input characteristics of CE amplifier is obtained by plotting				CO1	

	a. V_{CE} vs. I_C for constant value of I_E	b. V_{BE} vs. I_E for constant value of V_{CE}	c. V_{BE} vs. I_B for constant value of I_C	d. V_{BE} vs. I_B for constant value of V_{CB}		(1)
29.	In an NPN transistor the electrons move from emitter and				CO1	
	a. recombine with holes in the base	b. recombine in the emitter its self	c. pass through the base to the collector	d. are stopped by the junction barrier		(1)
30.	The leakage current I_{CBO} flows in				CO1	
	a. The emitter, base and collector leads	b. The emitter and base leads.	c. The emitter and collector leads.	d. The base and collector leads		(1)
31.	What does LED stands for?				CO1	
	a. Light emitting Display	b. Low energy display	c. Light emitting diode	d. Light emitting detector		(1)
32.	Which of the following works as charge transferring device				CO3	
	a. UJT	b. BJT	c. FET	d. MOSFET		(1)
33.	Which of these is the best description of a Zener diode?				CO3	
	a. its a rectifier diode	b. constant voltage device	c. constant current device	d. it works in forward region		(1)
34.	What is the current gain for a common-base configuration where $I_E = 4.2$ mA and $I_C = 4.0$ mA?				CO2	
	a. 0.95	b. 1	c. .99	d. 0.1		(1)
35.	I am a diode. Most often I am working as a capacitor. Who am I?				CO2	
	a. Varactor diode	b. photo diode	c. tunnel diode	d. zener diode		(1)
36.	Electrons on the outermost shell or orbit is called as				CO2	
	a. valance electrons	b. conduction band electrons	c. negative electrons	d. free electrons		(1)
37.	Why is heat produced in a diode				CO2	
	a. due to voltage across the diode	b. due to pn junction	c. due to current passing through the diode	d. due to valance electrons		(1)
38.	In power supply diagram which indicates a smooth dc output				CO3	
	a. rectifier	b. regulator	c. filter	d. transformer		(1)
39.	When matching polarity connections have been made and the potential difference (PD) is above 0.7 V, the diode is considered to be:				CO1	
	a. forward biased	b. reverse biased	c. open switch	d. not working		(1)
40.	A certain transistor has β_{DC} of 230. When the base current is $30\mu A$, Determine the emitter current				CO2	
	a. 6.93 mA	b. 8 mA	c. 10 mA	d. 6mA		(1)

PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)

41.	Analyze the PN junction formation	CO2	(5)
42.	Comment on avalanche and zener breakdown	CO1	(5)
43.	Describe a basic DC power supply with its significance	CO3	(5)
44.	Based on the three regions of operation, analyze how JFET are used in biomedical applications	CO2	(5)
45.	Determine the dc current gain β_{DC} and the emitter current I_E for a transistor where $I_B = 50\mu A$ and $I_C = 3.65$ mA.	CO3	(5)
46.	Briefly explain the operation and characteristics of photodiode and LED	CO3	(5)
47.	Comment on Power MOSFETs and MOSFETs as charge transferring device	CO2	(5)
48.	Write short notes on optocoupler used as isolator	CO3	(5)
49.	Compare the construction, operation and characteristics of CE amplifier	CO1	(5)

50.	Design an RC phase shift oscillator. Suggests the necessary conditions for oscillations	CO1	(5)
PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)			
51.	Discuss three regions of operation of UJT and analyze how UJT is working as a relaxation oscillator	CO2	(10)
52.	Differential amplifiers are widely used in practical situations. Comprehend the situation	CO3	(10)
53.	In detail Explain DC Load line and its significance in transistor working	CO1	(10)

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