Test Booklet No. _____

This booklet consists of 100 questions and 12 printed pages.

RGUCET/2023/PG/20

Series NIL

RGUCET 2023

MASTER OF TECHNOLOGY IN ELECTRONICS AND COMMUNICATION ENGINEERING (M.TECH)

Full Marks: 100 **Time: 2 Hours**

Roll No. | | | | | | | | |

Day and Date of Examination :

Signature of Invigilator(s) :

Signature of Candidate :

General Instructions:

PLEASE READ ALL THE INSTRUCTIONS CAREFULLY BEFORE MAKING ANY ENTRY.

1. DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. Candidate must write his/her Roll Number on the space provided.
3. This Test Booklet contains 100 Multiple Choice Questions (MCQs). Each question carries 1 mark. There shall be negative marking of 0.25 against each wrong attempt.
4. Please check the Test Booklet to verify that the total pages and total number of questions contained in the test booklet are the same as those printed on the top of the first page. Also check whether the questions are in sequential order or not.
5. Candidates are not permitted to enter into the examination hall 15 minutes after the commencement of the entrance test or leave the examination hall before 30 minutes of end of examination.
6. Making any identification mark in the OMR Answer Sheet or writing Roll Number anywhere other than the specified places will lead to disqualification of the candidate.
7. Candidates shall maintain silence inside and outside the examination hall. If candidate(s) is/are found violating the instructions mentioned herein or announced in the examination hall, they will be summarily disqualified from the entrance test.
8. In case of any dispute, the decision of the Entrance Test Committee, RGU shall be final and binding.
9. The OMR Answer Sheet consists of two copies, the Original copy and the Student's copy.

1	A sum of Rs 1750 is divided into two parts such that the interests on the first part at 8% simple interest per annum and that on the other part at 6% simple interest per annum are equal. The interest on each part is(in Rs)					
	a)60	b)65	c)70	d)40	a	60
2	Radhe does 70% of some work in 15 days. Later, with Shyam's help, she completes the remaining work in 4 days. In how many days can Shyam alone complete the entire work?					
	a)33.3 days	b) 38.3 days	c)35.3 days	d) 45.3 days	c	35.3 days
3	A-clock gains five minutes every hour. What will be the angle traversed by the second hand in one minute?					
	a) 360°	b)360.5	c)390°	d) 380°	c	390°
4	There are 3 green, 4 orange and 5 white color bulbs in a bag. If a bulb is picked at random, what is the probability of having either a green or a white bulb?					
	a)(1/3)	b) (2/3)	c) (4/3)	d) (5/3)	b	(2/3)
5	If 5^a = 3125, then the value of 5^(a-3) = ?					
	a)25	b)125	c) 625	d)5	a	25
6	In a camp, there is a meal for 200 children or 120 men. If 150 children have taken the meal, how many men will be served with the remaining meal?					
	a)31	b)29	c)30	d) 35	c	30
7	Applied to a bill for Rs. 50000. Find the difference between a discount of 25 % to that of two successive discounts of 20 % and 10 %?					
	a)2250	b)1500	c)1750	d)1800	b	15

						00
8	If θ be acute angle and cosθ = 15/17, then the value of cot (90° - θ) is					
	a)2√8/15	b)8/15	c)√2/7	d)8√7/17	b	8/15
9	A man would gain 25% by selling a chair for Rs. 47.5 and would gain 15% by selling a table for Rs. 57.5. He sells the chair for Rs. 45; what is the least price for which he must sell the table to avoid any loss on the two together?					
	a) 41.2	b)42.2	C)43	d)45.2	c	43
10	In an arithmetic progression the first term is 10 and its common difference is 8. If the general term is an , find a19 - a11.					
	a) 65	b)64	c)66	d)61	b	64
11	The cost of Type 1 rice is Rs. 30 per kg and Type 2 rice is Rs. 40 per kg. if both Type 1 and Type 2 are mixed in the ratio of 1 : 4, then what will be the price per kg of the mixed variety of rice?					
	a)38 per kg	b)34 per kg	c)68 per kg	d) 48 per kg	a	38 per kg
12	Find the least number which when divided by 12, 27 and 35 leaves 6 as a remainder?					
	a)3586	b)3756	c)3786	d) 4786	c	3786
13	When was G20 established?					
	a) 1995	b) 1999	c) 1985	d) 2000	b	1999
14	What is the product of all the numbers in the dial of a telephone?					
	a) 158480	b)159480	c)159990	d)None of these	d	None of these
15	There are deer and peacocks in a zoo. By counting heads they are 80. The number of their legs is 200. How many peacocks are there?					

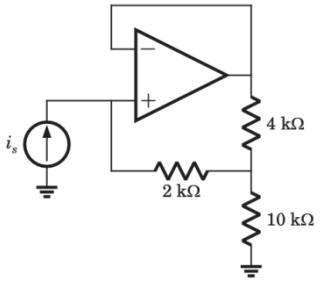
	a) 20	b) 30	c) 50	d) 60	d	60
16	In which state the Hornbill Festival is celebrated?					
	a) Assam	b) Nagaland	c) Tripura	d) Sikkim	b	Nagaland
17	The capital city of Ukraine					
	a) Kyiv	b)Kharkiv	c) Odessa	d) Dnipro	a	Kyiv
18	Select the wrongly spelt word in the following words.					
	a) expire	b) explicit	c) explode	d)exploite	d	exploite
19	In each of the following questions, choose the correctly spelt word.					
	a)Bouquete	b) Bouquet	c)) Boquet	d)Bouquette	b	Bouquet
20	one who is not easily pleased by anything					
	a) gullible	b) fastidious	c) innocent	d) amenable	b	fastidious
21	Museum is related to Curator in the same way as Prison is related to _____?					
	a)Warden	b)Jailor	c)Monitor	d)Manager	b	Jailor
22	One who damages public property					
	a) Cynosure	b) Demagogue	c) Epicure	d) Vandal	d	Vandal
23	Find the Error Section in the following sentence “Some of the richest (A) / business magnate (B) / live in Mumbai. (C) / No Error (D)”					
	a) A	b) B	c) C	d) D	b	businessmagnate

24	Find the Error Section in the following sentence “He has made a mistake (A)/ of which (B) / I am certain (C) / No error (D)”					
	a) A	b) B	c) C	d) D	d	No error
25	My sister's marriage passed _____ peacefully.					
	a) away	b) by	c) off	d) out	c	off

26	The trigonometric Fourier series of an even function of time does not have the					
	a) DC term	b) Cosine Term	c) Sine Term	d) odd harmonic term	c	Sine term
27	The Fourier Series of an odd periodic function, contains only					
	a) Even harmonic	b) Cosine Term	c) Sine Term	d)Odd Harmonic	c	Sine Term
28	To obtain very high input and output impedances in a feedback Amplifier, the mostly used is					
	a) Voltage Series	b) Current Series	c) Voltage Shunt	d) Current Shunt	b	Current Series
29	Crossover distortion behavior is characteristic of					
	a) class A output stage	b) class B output stage	c) class AB output stage	d) common base output stage	b	class B output stage
30	A class-A transformer coupled, transistor power Amplifier is required to deliver a power rating of the transistor should not be less than.					
	a) 5W	b) 10W	c) 20 W	d) 40W	b	10 W
31	The number of comparators required in a 3-bit comparator type ADC is					
	a) 2	b)3	c)7	d)8	c	7
32	The number of comparators in 4-bit flash ADC is					

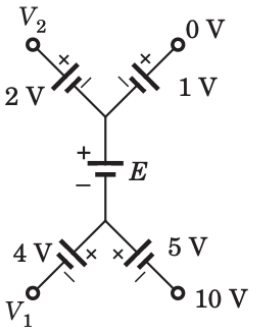
	a) 4	b) 5	c)15	d) 16	c	15
33	The resolution of a 4-bit counting ADC is 0.5 Volts. For an analog input of 6.6 Volts, the digital output of the ADC will be					
	a)1011	b)1101	c)1100	d)1110	d	1110
34	In a half-subtractor circuit with X and Y as inputs, the Borrow (M) and Difference (N = X - Y) are given by					
	a) $M = X \oplus Y, N$	b) $M = XY,\ N = X \oplus$	c) $M = \overline{X}Y,\ N = X$	d) $M = X\overline{Y},\ N = \overline{X \oplus Y}$	c	$M = \overline{X}Y,$
35	The output Y of a 2-bit comparator is logic 1 whenever the 2-bit input A is greater than the 2-bit input B. The number of combinations for which the output is logic 1, is					
	a) 4	b)6	c)8	d) 10	c	6
36	A region of negative differential resistance is observed in the current voltage characteristics of a silicon PN junction if					
	a) Both the P and N region are heavily doped	b) N region is heavily doped compared to the p region	c) P region is heavily doped compared to N region	d) An intrinsic silicon region is inserted between the P region and N region	a	Both the P and N region are heavily doped
37	Which one of the following processes is preferred to from the gate dielectric (SiO2) of MOSFETs?					
	a) Sputtering	b) Molecular Beam Epitaxy	c) Wet Oxidation	d) Dry Oxidation	d	Dry Oxidation
38	In MOSFET fabrication, the channel length is defined during the process of					
	a) Isolation Oxide Growth	b) Channel Stop implantation	c) Polysilicon gate patterning	d) Lithography step leading to the contact pads	c	Polysilicon gate patterning

39	Consider an angle modulated signal x(t) = 6cos[2πx10^6 t+2sin(8 t)] V. The average power of x(t) is.					
	a) 10 W	b) 14 W	c) 18 W	d) 22 W	c	18 W
40	Consider the amplitude modulated (AM) signal $A_c \cos \omega_c t$ + For demodulating the signal using envelope detector, the minimu be					
	a) 2	b) 1	c) 0.5	d) 0	a	2
41	An increase in the base recombination of a BJT will increase					
	a) the common emitter dc current gain β	b) the breakdown voltage BVceo	c)the unity gain cut off frequency fT	d)the trans-conductance gm	b	b) the breakdown voltage BVceo
42	A thin P-type silicon sample is uniformly illuminated with light which generates excess carriers. The recombination rate is directly proportional to					
	a)the minority carrier mobility	b)the minority carrier recombination lifetime	c)the minority carrier concentration	d)the excess minority carrier concentration	d	the excess minority carrier concentration
43	Drift current in the semiconductors depends upon					
	a) only the electric field	b)only the carrier concentration gradient	c)both the electric and carrier concentration	d) both the electric and carrier concentration gradient	c	both the electric and carrier concentration
44	The concentration of minority carriers in an extrinsic semiconductor under equilibrium is:					

	a) direct proportional to the doping concentration	b)inversely proportional to the doping concentration	c) directly proportional to the intrinsic concentration	d) inversely proportional to the intrinsic concentration.	b	inversely proportional to the doping concentration
45	If 120C of charge passes through an electric conductor in 60 sec, the current in the conductor is					
	a)0.5 A	b) 2 A	c) 3.33 mA	d) 0.3 mA	b	2 A
46	A silicon *pn*junction at T = 300 K has $N_d = 10^{14} cm^{-3}$ and $N_a = 10^{17} cm^{-3}$. The built-in voltage is					
	a) 0.63 V	b) 0.93 V	c) 0.026 V	d) 0.038 V	b	0.93 V
47	A silicon *pn*junction applied bias has doping concentrations of $N_d = 5 * 10^{16}$ cm^{-3} and $N_a = 5 * 10^{15}$ cm^{-3} The space charge width is					
	a)$3.2* 10^{-5}$ cm	b)$4.5* 10^{-5}$ cm	c)$4.5 * 10^{-4}$ cm	d)$3.2 * 10^{-4}$ cm	b	$4.5* 10^{-5}$ cm
48	For the circuit shown in fig. below the input resistance is 					
	a) 38 kW	b) 17 kW	c) 25 kW	d) 47 kW	b	17 kW
49	A Mealy system produces a 1 output if the input has been 0 for at least two consecutive clocks followed immediately by two or more consecutive 1's. The minimum state for this					

	system is					
	a) 4	b) 5	c) 8	d) 9	a	4
50	What is the rule h*(x*c) = (x*h)*c called?					
	a) Commutativity rule	b)Associativity rule	c)Distributive rule	d) Associativity and Commutativity rule	d	Associativity and Commutativity rule
51	In which regions a MOSFET works as a 'Switch"					
	a)Saturation, Linear	b) Cut off, linear	c) Saturation, Cut off	d) Cutoff, Cutoff	c	Saturation, Cut off
52	Find the convolution of x(t) = exp(2t)u(-t), and h(t) = u(t-3)					
	a)0.5exp(2t-6) u(-t+3) + 0.5u(t-3)	b)0.5exp(2t-3) u(-t+3) + 0.8u(t-3)	c)0.5exp(2t-6) u(-t+3) + 0.5u(t-6)	d)0.5exp(2t-6) u(-t+3) + 0.8u(t-3)	a	0.5exp(2t-6) u(-t+3) + 0.5u(t-3)
53	CMOS technology is used in developing					
	a)microprocessors	b)microcontrollers	c)digital logic circuits	d)all of the mentioned	d	all of the mentioned
54	P-well is created on					
	a)p subtrate	b)n substrate	c)p & n substrate	d) none of the mentioned	b	n substrate
55	The region where the electrons and holes diffused across the junction is called					
	a)Depletion	b)Depletion	c)Depletion	d)Depletion	b	Depletion

	Junction	region	space	boundary		region
56	_____ is a direct band gap material					
	a)Copper Indium Gallium Selenide	b)Copper Selenide	c)Copper Gallium Telluride	d)Copper Indium Gallium Diselenide	a	Copper Indium Gallium Selenide
57	Choose the correct statement(s) i) The gate circuit impedance of MOSFET is higher than that of a BJT ii) The gate circuit impedance of MOSFET is lower than that of a BJT iii) The MOSFET has higher switching losses than that of a BJT iv) The MOSFET has lower switching losses than that of a BJT					
	a)Both i& ii	b)Both ii & iv	c)Both i& iv	d)Only ii	c	Both i& iv
58	What is the duration of the unit sample response of a digital filter?					
	a)Finite	b)Infinite	c)Impulse	d)Zero	b	Infinite
59	s y[n] = n*cos(n*pi/4)u[n] a stable system?					
	a)Yes	b) No	C)Marginally stable	d)None of the mentioned	b	No
60	A signed integer has been stored in a byte using 2's complement format. We wish to store the same integer in 16-bit word. We should copy the original byte to the less significant byte of the word and fill the more significant byte with					
	a) 0	b) 1	c)equal to the MSB of the original byte	d)complement of the MSB of the original byte.	c	equal to the MSB of the original byte
61	An *pn*junction diode is operating in reverse bias region. The applied reverse voltage, at which the ideal reverse current reaches 90% of					

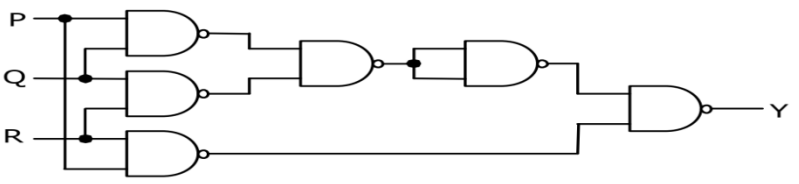
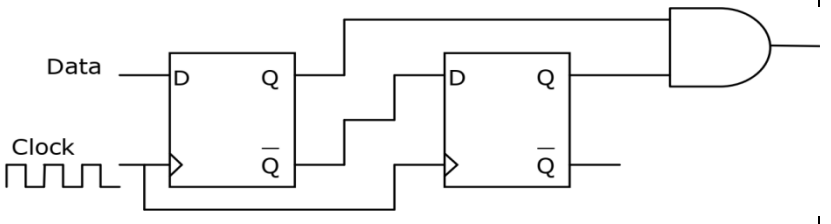
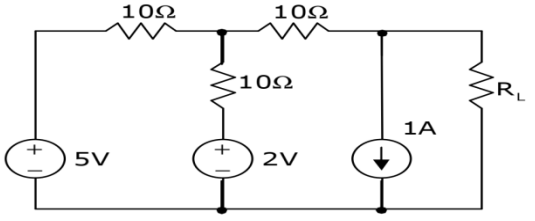
	its reverse saturation current, is					
	a)59.6 mV	b)4.8 mV	c)2.7 mV	d)42.3 mV	a	59.6 mV
62	The network function $(s + 1)(s + 4) / s(s + 2)(s + 5)$ is a					
	a)*RL* impedance function	b)*RC* impedance function	c)*LC* impedance function	d) Above all	b	*RC* impedance function
63	A branch has 6 node and 9 branch. The independent loops are					
	a)3	b)4	c)5	d)6	b	4
64	In the circuit of the fig below the value of the voltage source *E* is 					
	e) -16V	f) -6 V	g) 4 V	h) 16 V	a	-16V
65	Which of the following is an open loop control system?					
	a) Ward Leonard control	b) Metadyne	c) Stroboscope	d) Field controlled D.C. motor	d)	Field controlled D.C. motor
66	The output of the feedback control system must be a function of _____					
	a) Output	b) Input and	c) Reference	d) Reference output	b)	Input

	and feedback signal	feedback signal	input			and feedback signal
67	In closed loop control system, what is the sensitivity of the gain of the overall system, M to the variation in G?					
	a) G/1+GH	b)1/1+GH	c) G/1+G	d) 1/1+G	b)	1/1+GH
68	The input signals to control systems are not known fully ahead of time, the characteristics of control system which suddenly strain a control system are:					
	a) Constant velocity and acceleration	b) Sudden shock	c) Sudden change	d)All of the mentioned	d)	All of the mentioned
69	The open loop transfer function of a plant is given as, $G(s) = 1/s^2-1$. If the plant is operated in unity feedback configuration, then the lead compensator that can stabilize the control system is:					
	a) 10(s+4)/(s+2)	b) 10(s+2)/(s+10)	c) 10(s+2)/(s+10)	d)10(s-1)/(s+2)	d)	10(s-1)/(s+2)
70	The Cooley–Tukey algorithm of FFT is a					
	a) Divide and conquer algorithm	b) Divide and rule algorithm	c) Split and rule algorithm	d) Split and combine algorithm	a)	Divide and conquer algorithm
71	DIT algorithm divides the sequence into					
	a) Positive and negative values	b) Upper higher and lower spectrum	c) Even and odd samples	d) Small and large sample	c)	Even and odd samples

72	The computational procedure for Decimation in frequency algorithm takes				a)	Log_2 N stages
	a) Log_2 N stages	b) $2Log_2$ N stages	c) Log_2 N2 stages	d) Log_2 N/2 stages		
73	For a system function H(s) to be stable				c)	The poles lie in left half of the s plane
	a) The zeros lie in left half of the s plane	b) The zeros lie in right half of the s plane	c) The poles lie in left half of the s plane	d) The poles lie in right half of the s plane		
74	Which among the following represent/s the characteristic/s of an ideal filter?				d)	All of the above
	a) Constant gain in passband	b) Zero gain in stop band	c) Linear Phase Response	d) All of the above		
75	The process of converting the analog sample into discrete form is called				c)	Quantization
	a) Modulation	b) Multiplexing	c) Quantization	d) Sampling		
76	The modulation techniques used to convert analog signal into digital signal are				d)	All of the above
	a) Pulse code modulation	b) Delta modulation	c) Adaptive delta modulation	d) All of the above		
77	The sequence of operations in which PCM is done is				a)	Sampling, quantizing, encoding
	a) Sampling, quantizing, encoding	b) Quantizing, encoding, sampling	c) Quantizing, sampling, encoding	d) None of the above		
78	In PCM, the parameter varied in accordance with the amplitude of the modulating signal is					

	a) Amplitude	b) Frequency	c) Phase	d) None of the above	d)	None of the above
79	In digital transmission, the modulation technique that requires minimum bandwidth is					
	a) Delta modulation	b) PCM	c) DPCM	d)PAM	a)	Delta modulation
80	In Delta Modulation, the bit rate is					
	a) N times the sampling frequency	b) N times the modulating frequency	c) N times the nyquist criteria	d) None of the above	a)	N times the sampling frequency
81	The channel capacity according to Shannon's equation is					
	a) Maximum error free communication	b) Defined for optimum system	c)Information transmitted	d)All of the above	d)	All of the above
82	The steady-state error of a feedback control system with an acceleration input becomes finite in a					
	a) type 0 system.	b) type 1 system	c) type 2 system	d) type 3 system	c)	type 2 system
83	What is the value of steady state error in closed loop control systems					
	a) Zero	b) Unity	c) Infinity	d) Unpredictable	a)	Zero

84	Which of the following is a asynchoronous counter?					
	a) Ring Counter	b) Johnson counter	c) Ripple Counter	d) None	c)	Ripple Counter
85	In colour TV receiver, varactor diode is used for					tuning
	a)detection	b) rectification	c)tuning	d) both (a) and (b)	c	
86	A 400 W carrier is amplitude modulated with m = 0.75. The total power in AM is					512 W
	a) 400 W	b) 512 W	c)588 W	d)650 W	b	
87	Non-coherently detection is not possible for					PSK
	PSK	b)ASK	c)FSK	d)both (a) and (c)	a	
88	In radar systems PRF stands for					
	a)Power Return Factor	b)Pulse Return Factor	c)Pulse Repetition Frequency	d)Pulse Response Factor	c	Pulse Repetition Frequency
89	As the frequency increases, the absorption of ground wave by earth's surface					
	a) decreases	b) increases	c) remains the same	d) either (a) or (c)	b	increases
90	The rate at which information can be carried through a communication channel depends on					bandwidth
	a)carrier frequency	b)bandwidth	c)transmission loss	d)transmitted power	b	
91	If the bandwidth is increased by 2, the γFMγAM (where γ is the ratio of SNR of output to SNR at input, FM is frequency modulation and AM is amplitude modulation) is increased by a factor of				c	4

	a) 2	b) 3	c) 4	d) 6		
92	Frequency shift keying is used mostly in				a	telegraphy
	a) telegraphy	b) telephony	c)satellite communication	d)radio transmission		
93	The frequency range of 300 kHz to 3000 kHz is known as				b	medium frequency
	a) low frequency	b)medium frequency	c)high frequency	d)very high frequency		
94	The output Y in the circuit below is always '1' when 				b	two or more of the inputs P,Q,R are '1'
	a)two or more of the inputs P,Q,R are '0'	b)two or more of the inputs P,Q,R are '1'	c)any odd number of the inputs P,Q,R is '0'	d)any odd number of the inputs P,Q,R is '1'		
95	When the output Y in the circuit below is '1', it implies that data has 				a	changed from 0 to 1
	a)changed from 0 to 1	b)changed from 1 to 0	c)changed in either direction	d)not changed		
96	In the circuit shown below, the value of RL such that the power transferred to RL is maximum 				c	15Ω

	a)5Ω	b)10Ω	c) 15Ω	d)20Ω		
97	To increase Q factor of a coil, the wire should be				c	thick
	a)long	b)thin	c)thick	d)long and thin		
98	An ammeter of 0-25 A range has a guaranteed accuracy of 1% of full scale reading. The current measured is 5 A. The limiting error is				d	
	a)2%	b)2.5%	c)4%	d)5%		5%
99	In 3 phase power measurement by two wattmeter method, the reading of one wattmeter is zero. The power factor of load is				b	0.5
	a) 1	b)0.5	c) 0	d)0.8		
100	In a CRO which of the following is not a part of electron gun					
	a)cathode	b)grid	c)accelerating anode	d)X - Y plates	d	X - Y plates

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