

Test Booklet No. _____

This booklet consists of 100 questions and 12 printed pages.

RGUPET/____/____

Series

NIL

RGUPET 2023
Ph.D. in ELECTRONICS AND COMMUNICATION ENGINEERING

Full Marks: 100

Time: 3 Hours

Roll No.

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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) from the concerned subject. Each question carries 1 mark.
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	Which of the following is not a type of research question?					
	A hypothesis	Predicting an outcome	Evaluating a phenomenon	Developing good practice	a	A hypothesis
2	Which of the following is not a data-collection method?					
	Research questions	Unstructured interviewing	Postal survey questionnaires	d) Participant observation	a	Research questions
3	Nine years old children are taller than 7 years old ones. It is an example of					
	a) Vertical studies	b) Cross-sectional studies	c) Experimental studies	d) Case studies	b	Cross-sectional studies
4	Hypothesis cannot be stated in					
	a) Declarative terms	b) Null and question form terms	c) General terms	d) Directional terms	c	General terms
5	Who is regarded the father of scientific social surveys ?					
	a) Best	b) Booth	c) Darwin	d) None of these	b	Booth
6	If a researcher is studying the effect of using laptops in his classroom to ascertain their merit and worth, he is likely conducting which type of research?					
	a) Basic	b) Applied	c) Experimental	d) Evaluation	d	Evaluation
7	In Hindi language the term Anusandhan refers to					

	a) Become goal-oriented	b) Attain the aim	c) Preying of an aim	d) Follower of an aim	d	Follower of an aim
8	Research is based upon					
	a) Rating scale	b) Experiments	c) General principles	d) Scientific method	d	Scientific method
9	Reliability is the fundamental quality of a' research which also reflects					
	a) Superiority	b) Purity of data	c) Verifiability	d) Validity	d	Validity
10	Which of the following statement is correct?					
	a) Discoveries are researches	b) Researches lead to discovery	c) Invention and Research are related	d) None of the above	b	Researches lead to discovery
11	The depth of any research can be judged by:					
	a) Title of the research	b) Duration of the research	c) Objectives of the research	d) Total expenditure on the research	c	Objectives of the research
12	Research can be conducted by a person who:					
	a) Is a hard worker	b) Holds a postgraduate degree	c) Has knowledge about research methodology	d) Possesses thinking and reasoning ability	c	Has knowledge about research methodology
13	The first step of research is:					
	a) Finding a	b) Selecting a problem	c) Searching a problem	d) Identifying a	d	Identifying a

	problem			problem		problem
14	Bibliography given in a research report:					
	a) Has no relevance to research	b) Shows vast knowledge of the researcher	c) Helps those interested in further research	d) All of the above	c	Helps those interested in further research
15	Which one among the following variables cannot be expressed in quantitative terms?					
	a) Numerical Aptitude	b) Marital Status	c) Socio-economic Status	d) Professional Attitude	d	Professional Attitude
16	A research paper is a brief report of research work based on					
	Primary Data only	Secondary Data only	Both Primary and Secondary Data	None of the above	c	Both Primary and Secondary Data
17	One of the following is not an open source software:					
	DSpace	Windows	Green-stone	Linux	b	Windows
18	An appropriate source to find out descriptive information is.....					
	Bibliography	Directory	Encyclopaedia	Dictionary	c	Encyclopaedia
19	Questionnaire is a :					
	Research method	Measurement technique	Tool for data collection	Data analysis technique	c	Tool for data collection
20	Which of the following is not a "Graphic representation" ?					
	Pie Chart	Bar Chart	Table	Histogram	c	Table

21	When accessing the internet, which of these steps is the most essential?					
	Recording the full URL	Noting the access dates	Downloading material to be referenced	They are all equally important	d	They are all equally important
22	A researcher designs an experiment to test how variables interact to influence job-seeking behaviours. The main purpose of the study was:					
	Description	Prediction	Exploration	Explanation	d	Explanation
23	Which research method is a bottom-up approach to research?					
	Deductive method	Explanatory method	Inductive method	Exploratory method	c	Inductive method
24	One step that is not included in planning a research study is:					
	a) Identifying a researchable problem	b) A review of current research	c) Statement of the research question	d) Conducting a meta-analysis of the research	d)	Conducting a meta-analysis of the research
25	A formal statement of the research question or “purpose of research study” generally.					
	a) Is made prior to the literature review	b) Is made after the literature review	c) Will help guide the research process	d) b and c	d)	b and c
26	What is a good research? The following are correct except					

	a) Purpose clearly defined	b) Research process detailed	c) Research design thoroughly planned	d) Findings presented ambiguously	d)	Findings presented ambiguously
27	Every research proposal, regardless of length should include two basic sections. They are:				a)	Research question and research methodology
	a) Research question and research methodology	b) Research proposal and bibliography	c) Research method and schedule	d) Research question and bibliography		
28	Secondary data can almost always be obtained more quickly and at a lower cost than _____ data.				d)	Primary
	a) Tertiary	b) Collective	c) Research	d) Primary		
29	The following journal article would be an example of _____ research; "The benefits of florescent lightning on production in a factory setting."				a)	Applied
	a) Applied	b) Interviewed	c) Basic	d) Stupid		
30	If a researcher is studying the effect of using laptops in his classroom to ascertain their merit and worth, he is likely conducting which type of research?				c)	Evaluation
	a) Basic	b) Applied	c) Evaluation	d) Experimental		
31	The most difficult sources to locate are				b)	Policy Reports and Presented Papers
	a) Dissertations	b) Policy Reports and	c) Government	d) Scholarly		

		Presented Papers	Documents	Books		
32	Qualitative and Quantitative Research are the classifications of research on the basis of Select correct option:				c)	Techniques used
	a) Use of the research	b) Time dimension	c) Techniques used	d) Purpose of the research		
33	Which of the following is not a search engine					
	a) Google	b) Yahoo	c) Windows	d) Bing	c.	Windows
34	What is the shortcut in MS word to print the open window.				b	Ctrl+P
	a) Ctrl+R	b) Ctrl+P	c) Ctrl+C	d) Ctrl+V		
35	What is the shortcut in MS word to save the open window.				c	Ctrl+S
	a) Ctrl+R	b) Ctrl+P	c) Ctrl+S	d) Ctrl+V		
36	Which of the following is not a part of the research report writing				d	Gender
	a) Introduction	b) Objective	c) Conclusion	d) Gender		
37	Which one of the following is not used to measure the performance of a system					

	a) Accuracy	b) Error	c) Sensitivity	d) Expression	d	Expression
38	A bibliography may be a					
	a) Book	b) Article	c) Google.com	d) Thesis	c	Google.com
39	Which one of the following tool is used for managing bibliography					
	a. Mendeley	b. Origin	c. MATLAB	d. Multisim	a	Mendeley
40	Published information in a particular subject area is discussed in					
	a) Journal	b) Research Proposal	c) Literature Review	d) References	c	Literature Review
41	Who should write a literature review?					
	a) Scholar	b) Teacher	c) Supervisor	d) Co-super	a	Scholar

				p e r v i s o r		
42	Applied research is a type of research on the basis of					
	a) Information Sought	b) Objective	c) Application	d) None of these	c	Application
43	The Introduction section of research of research plan					
	a) Gives overview of prior relevant study	b) Contains a statement of popular study	c) Both A and B	d) None	c	Both A and B
44	A subset that is chosen from large population is					
	a) parameter	b) variable	c) sample	d) mean	c	sample
45	Step by Step and proper method is called					
	a) systematic approach	b) non-systematic	c) inference	d) logic	a	Systematic approach
46	A variable is changed and measured in a scientific experiment is					
	a. Dependent	b. Independent	c. Fixed	d.	b	Independent

47	A variable is tested and controlled in a scientific experiment is					
	a. Dependent	b. Independent	c. Fixed	d. a	Dependent	
48	Pick individual based descriptive research is					
	a. Cohort	b. Case report	c. Ecological	d. b	Case report	
49	When estimated value is subtracted from actual value, the difference is called					
	a. Absolute	b. Estimated error	c. Relative error	d. a	Absolute	

	error					error
50	Errors occurred due to accident or by Chance refers to					
	a. Constant error	b. Biased error	c. Unbiased error	d. c		Unbiased error

DOMAIN

51	The number of comparators in 4-bit flash ADC is					
	a) 4	b) 5	c) 15	d) 16	c	15
52	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
53	In a half-subtractor circuit with X and Y as inputs, the Borrow (M)					

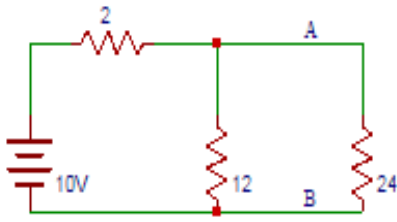
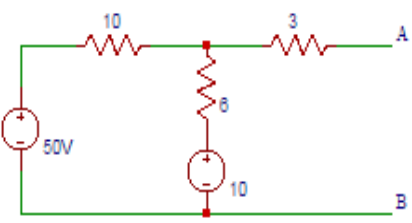
	and Difference ($N = X - Y$) are given by					
	a) $M = X \oplus Y, N = X \ominus Y$	b) $M = XY, N = X \oplus Y$	c) $M = \overline{XY}, N = X \oplus Y$	d) $M = X\overline{Y}, N = \overline{X \oplus Y}$	c	$M = \overline{XY}, N = X \oplus Y$
54	What is an activation value?					
	a) weighted sum of inputs	b) threshold value	c) main input to neuron	d) none of the mentioned	a	weighted sum of inputs
55	How is the brightness of a pixel on the screen increased?					
	a) Increasing the amount of light directed on the screen	b) Using mirrors	c) Using sound waves	d) None of the above	a	Increasing the amount of light directed on the screen
56	The different types of machine learning are?					
	a) Supervised	b) Unsupervised	c) Reinforcement	d) All of the above	d	All of the above
57	The "Father of Artificial Intelligence" is:					
	a) Alan Turing	b) Charles Babbage	c) John McCarthy	d) None of the above	c	John McCarthy
58	What is the value of discrete time signal $x(n)$ at $n=0$ whose Fourier transform is represented as below?					
	a) $\omega_c \pi$	b) $-\omega_c / \pi$	c) ω_c / π	d) none of the mentioned	c	ω_c / π
59	Which of the following relation is true if the signal $x(n)$ is real?					
	a) $X^*(\omega) = X(-\omega)$	b) $X^*(\omega) = X(-\omega)$	c) $X^*(\omega) = -X(-\omega)$	d) None of the	b	$X^*(\omega) = X(-\omega)$

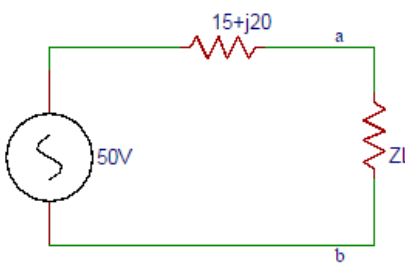
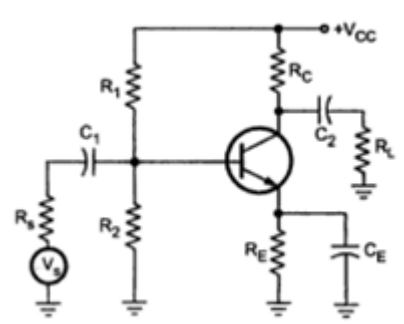
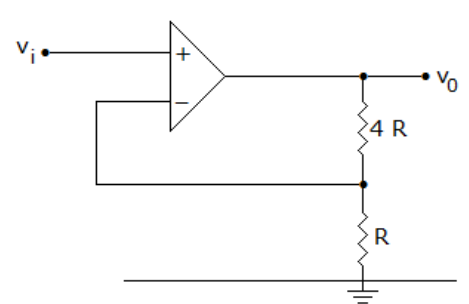
	$X^*(\omega)=X(\omega)$	ω	$X(\omega)$	mentioned		
60	Which one of the following processes is preferred to from the gate dielectric (SiO_2) of MOSFETs?					
	a) Sputtering	b) Molecular Beam Epitaxy	c) Wet Oxidation	d) Dry Oxidation	d	Dry Oxidation
61	In MOSFET fabrication, the channel length is defined 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
62	In a microprocessor, the register which holds the address of the next instruction to be fetched is					
	a. Accumulator	b. Program Counter	c. Stack Pointer	d. Instruction Register	b	Program Counter
63	In register index addressing mode the effective address is given by					
	a. the index register value	b. the sum of the register value and the operand	c. the operand	d. the difference of the index value and the operand	a	the index register value
64	The trigonometric Fourier series of an even function of time does not have the					
	a. DC term	b. Cosine Term	c. Sine Term	a. DC term	c	Sine Term
65	The Fourier Series of an odd periodic function, contains only					
	a. Even harmonic	b. Cosine Term	c. Sine Term	a. Even harmonic	c	Sine Term

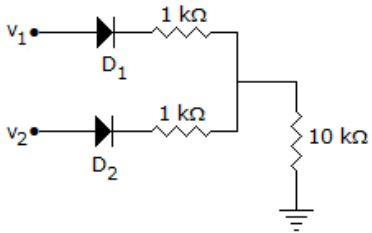
66	Consider an angle modulated signal $x(t) = 6\cos[2\pi \times 10^6 t + 2\sin t]$ V. The average power of $x(t)$ is.					
	a. 10 W	b. 14 W	c. 18 W	d. 22 W	c	18 W
67	What is the summation of the probability of all the events.					
	a) 0	b) 1	c) Not defined	d) Insufficient data	b	1
68	Which of the following cannot be the Fourier series expansion of a periodic signal?					
	a. $x(t) = 2\cos(t) + 3\cos(3t)$	b. $x(t) = 2\cos(\pi t) + 7\cos(t)$	c. $x(t) = 2\cos(t) + 0.5$	d. $x(t) = 2\cos(t) + 3\cos(3.5t)$	b	$x(t) = 2\cos(\pi t) + 7\cos(t)$
69	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
70	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
71	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
72	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
73	A network has 7 nodes and 5 independent loops. The number of					

	branches in the network is					
	a.13	b.12	c.11	d.10	c	11
74	Feedback control system is basically _____				d)	Low pass filter
	a) Band pass filter	b) Band stop filter	c) High pass filter	d) Low pass filter		
75	With negative feedback in a closed loop control system, the system sensitivity to parameter variation:				c)	Decreases
	a) Becomes infinite	b) Becomes zero	c) Decreases	d) Increases		
76	What is the relation between output response and input signal in closed loop system?				b)	Linear
	a) Nonlinear	b) Linear	c) Exponential	d) Parabolic		
77	The characteristic equation of a control system is given by $s(s+4)(s^2+2s+s) + k(s+1) = 0$. What are the angles of the asymptotes for the root loci?				c)	60°, 180°, 300°
	a) 0°, 180°, 300°	b) 0°, 120°, 240°	c) 60°, 180°, 300°	d) 120°, 180°, 240°		
78	Roots on the imaginary axis makes the system :				c)	Marginally stable
	a) Stable	b) Unstable	c) Marginally stable	d) Linear		
79	All causal systems must have the component of				a)	memory
	a) memory	b) time invariance	c) stability	d) linearity		
80	Which one of the following is an example of a bounded signal?				c)	$e^{-t} \cos \omega t$
	a) $e^t \cos \omega t$	b) $e^t \sin \omega(-t)$	c) $e^{-t} \cos \omega t$	d) $e^t \cos \omega(-t)$		
81	Determine the fundamental period of the following signal: $\sin 60t$				b)	1/30 sec
	a) 1/60 sec	b) 1/30 sec	c) 1/20 sec	d) 1/10 sec		

82	For an energy signal _____				d)	P=0
	a)E=0	b)P= ∞	c)E= ∞	d)P=0		
83	The convolution of a discrete time system with a delta function gives				b)	the system itself
	a)the square of the system	b)the system itself	c)the derivative of the system	d)the integral of the system		
84	Find the Fourier transform of $u(-t)$.				c)	$\pi\delta(\omega) - 1/j\omega$
	a) $\pi\delta(\omega) + 1/\omega$	b) $\pi\delta(\omega) + 1/j\omega$	c) $\pi\delta(\omega) - 1/j\omega$	d) $\delta(\omega) + 1/j\omega$		
85	When do DTFT and ZT are equal?				b)	When $r = 1$
	a)When $\sigma = 0$	b)When $r = 1$	c)When $\sigma = 1$	d)When $r = 0$		
86	Find the Z-transform of $\delta(n+3)$				d)	z^3
	a)z	b) z^2	c) 1	d) z^3		
87	The impulse response of a LTI system which is continuous is $H(t) = e^{- t }$. The system is _____				c)	Stable but not causal
	a)Causal and stable	b)Causal but not stable	c)Stable but not causal	d)Neither causal nor stable		
88	The resulting signal when a continuous time periodic signal $x(t)$ having period T, is convolved with itself is _____				c)	Periodic having period T
	a)Non-Periodic	b)Periodic having period 2T	c)Periodic having period T	d)Periodic having period T/2		
89	One of the types of signal is an Impulse train. The type of discontinuity in an impulse train is _____				a)	Infinite
	a)Infinite	b)Zero	c)One	d)Finite		
90	How many complex multiplications are performed in computing the N-point DFT of a sequence using divide-and-conquer method if $N=LM$?					

	a) $N(L+M+2)$	b) $N(L+M-2)$	c) $N(L+M-1)$	d) $N(L+M+1)$	d)	$N(L+M+1)$
91	What is the DFT of the four point sequence $x(n)=\{0,1,2,3\}$?				d)	$\{6, -2+2j, -2, -2-2j\}$
	a) $\{6, -2+2j, -2, -2-2j\}$	b) $\{6, -2-2j, 2, -2+2j\}$	c) $\{6, -2-2j, -2, -2+2j\}$	d) $\{6, -2+2j, -2, -2-2j\}$		
92	If $W_4^{100} = W_x^{200}$, then what is the value of x?				c)	8
	a) 2	b) 4	c) 8	d) 16		
93	With some initial charge at $t = 0+$, a capacitor will act as _____				c)	a voltage source
	a) open circuit	b) short circuit	c) a voltage source	d) a current source		
94	Consider the circuit shown below. Find the equivalent Thevenin's voltage between nodes A and B.				b)	8.5
						
	a) 8	b) 8.5	c) 9	d) 9.5		
95	Determine the equivalent thevenin's voltage between terminals A and B in the circuit shown below.				c)	25
						
	a) 5	b) 15	c) 25	d) 35		
96	If source impedance is complex, then maximum power transfer occurs when the load impedance is _____ the source impedance.				d)	complex conjugate
	a) equal to	b) negative of	c) negative of complex	d) complex conjugate		

			conjugate of	of		of
97	The maximum power delivered by the source in the below circuit shown?					
						
	a) 39.33	b) 40.33	c) 41.33	d) 42.33	c)	41.33
98	Which of the following resistor is not involving in biasing the circuit shown below?					
						
	e) R_1	f) R_2	g) R_C	d) R_L	d)	R_L
99	In the op-amp circuit of figure, $V_0 =$					
						
	a) V_i	b) $3 V_i$	c) $5 V_i$	d) $0.5 V_i$	c)	$3 V_i$

10 0	<p>In figure $v_1 = 8\text{ V}$ and $v_2 = 4\text{ V}$. Which diode will conduct?</p> 				
	a) D_2 only	b) D_1 only	c) Both D_1 and D_2	d) Neither D_1 nor D_2	b D_1 only

SPACE FOR ROUGH WORK

