COMMON P. G. ENTRANCE TEST - 2024 (CPET-2024)

Test Booklet No. :

00278

Subject Code : 09

Hall Ticket No. :

Subject : ELECTRONIC SCIENCE

TEST BOOKLET

Time Allowed: 60 Minutes

Full Marks: 80

: INSTRUCTIONS TO CANDIDATES :

- The Test Booklet contains 15 pages including the cover page and 80 (Question Nos. 1 to 80) multiple choice questions.
- DO NOT break open the seal of the Test Booklet until the invigilator instructs to do so.
- The candidates must check discrepancy, if any (like up-printed or torn or missing pages or missing questions) in the Test Booklet immediately after breaking the seal of the Test Booklet. If detected, the invigilator may be requested to replace the same.
- 4. Candidates are required to fill up and darken the Hall Ticket No., Test Booklet Serial No. and OMR Answer Sheet Serial No. in attendance sheet carefully. Wrongly filled in OMR Answer Sheet is liable for rejection.
- Each question has four choices / answers marked (A), (B), (C), (D). Candidate has to select the
 most appropriate choice / answer to each question and darken the oval completely against the
 question number provided in the OMR Answer Sheet.
- Indicate only one choice / answer from the options provided by darkening the appropriate oval in the OMR Answer Sheet. More than one response to a question shall be treated as a wrong answer.
- Use only Black Ball Point Pen for darkening the oval for answering.
- All the questions are compulsory and they carry equal marks. The total marks scored by a candidate depends on the number of correct choices / answers darkened in the OMR Answer Sheet. There will be no negative marking for wrong answers.
- No candidate shall be allowed to leave the Examination Hall / Room till all OMR Answer Sheets have been collected by the invigilator.
- 10. On completion of the entrance test, the original OMR Answer Sheet be handed over to the invigilator. Candidates are allowed to take the second copy of the OMR Answer Sheet along with the used Test Booklet for reference.
- Candidates are not allowed to carry any personal belongings including electronic devices such as scientific calculator, cell phones, headphones, earbuds, or any other type of devices that allow communication of any kind inside the Examination Room / Hall.
- 12. The candidates are advised not to scribble or make any mark on the OMR Answer Sheet except marking the answers at the appropriate places and filling up the details required. Rough work, if any, may be done in the blank sheet(s) provided at the end of the Test Booklet.
- 13. Any malpractice / use of unfair means will lead to your disqualification from the entrance test / admission process and may also lead to appropriate legal action as deemed fit.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

GO-41/10

(Turn over)

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Subject Code: 09

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(Continued)

GO-41/10

1.	Wh	nite light exhibits dispersion due to di	fferent	wavelengths of light having differen
	refr	ractive indices. Cauchy's formula for	the refr	ractive index of a material for light of
		velength λ is given by:		Page 12 Cria
	(A)	$\mu = a + \frac{b}{\lambda} + \frac{c}{\lambda^2}$	(B)	$\mu = a - \frac{b}{\lambda} + \frac{c}{\lambda^2}$
	(C)	$\mu = a + \frac{b}{\lambda^2} + \frac{c}{\lambda^4}$	(D)	$\mu = a - \frac{b}{\lambda^2} + \frac{c}{\lambda^4}$
2.	Ele	ctromagnetic radiation consists of:		
	(A)	Nothing	(B)	Phonos
	(C)	Electrons	(D)	Photons
3.	The	maximum kinetic energy of electrons	emitted	in the photoelectric effect increases
	(A)	Intensity of light is increased		
	(B)	Light source is brought near the me	etal	Profesional Programme Confly Con-
	(C)	Frequency of light is decreased		
	(D)	Wavelength of light is decreased		CONTRACTOR OF THE CONTRACTOR O
4.	The V is	de Broglie wavelength of an electron	n inside	a region with a potential difference
i lo	(A)	$\frac{0.1225}{\sqrt{(V)}}$ Å	(B)	$\frac{1.225}{\sqrt{(V)}}$ Å
e no	(C)	$\frac{12.25}{\sqrt{(V)}}$ Å	(D)	$\frac{122.5}{\sqrt{(V)}}$ Å
i.	Whic	ch of the following oscillators uses back?	а сара	acitive voltage divider to provide
NA) E	(A)	Hartley	(B)	RC phase shift
	(C)	Colpitts	(D)	Wien Bridge
. 1	Durin	ng population inversion, which of the	followin	1000 TERROR E HIBERT HOLD TO THE
	(A)	Stimulated absorption	(B)	Stimulated emission
((C)	Spontaneous emission		
	41/10		(D)	Spontaneous absorption
		(3)		(Turn over)

7.	If the	error in the measurement of the r	adius of a s	sphere is 1%, then the error in the
	meas	urement of volume is:		gradus Dienskrijsvicaniles
	(A)	1%	(B)	3%
	(C)	$\frac{4\pi}{3}\%$	(D)	13%
8.	Whic	h of the following is not a fundame	ental quanti	ty?
	(A)	Charge	(B)	Current
	(C)	Time	(D)	Mass
9.	Plane	ck's constant has the dimension of	of:	(O) Electron.
	(A)	Force	(B)	Energy
	(C)	Linear momentum	(D)	Angular momentum
10.	Whe	n a wave passes from air to wate	r, which of	the following doesn't change?
	(A)	Amplitude	(B)	Wavelength
	(C)	Frequency	(D)	Speed
11.	Red	(R), Green (G), and Blue (B) LED	s were fab	ricated using p-n junctions of three
				gaps. The built-in voltages of red,
				spectively. Assume the donor and
	acce	eptor doping to be the same on th	e p and n s	sides of all three diodes. Which one
	of th	ne following relationships about th	e build-in v	voltages is true?
	(A)	$V_R > V_G > V_B$	(B)	$V_R < V_G < V_B$
31314	(C)	$V_R = V_G = V_B$	(D)	$V_R > V_G < V_B$
12	Toi	ncrease the capacity of a parallel	plate capa	citor, one should introduce between
	the	plates a sheet of:		· afficie (2)
	(A)	Mica	(B)	Tin vot nondragg provid a vide
	(C)	Copper	(D)) Stainless steel
G	0-41	/10	(4)	(Continued)

GO-41/10

	is independent of :	ulai mollor	in a magnetic field. The time perio
	(A) Speed	(B)	Mass
	(C) Charge	(D)	eloida muiteo le laineaa pe i en e-
14	I a bond ucilouphop stat bag brane should	i sitooo	utarter a comment and the
14		ield, the fie	eld strength:
	(A) Decreases	(B)	Increases
	(C) Remains the same	(D)	Reduces to zero
15.	A region around a time-varying electr	ic charge h	nas:
	(A) Electric field	(B)	Magnetic field
	(C) Both electric and magnetic field	(D)	Neither electric nor magnetic field
16.	The smallest change in the input sign output is called:	nal to an in	strument that produces detectable
	(A) Resolution	(B)	Threshold
	(C) Both (A) and (B)	(D)	Sensitivity
17.	LVDT is a:		
	(A) Capacitive transducer	(B)	Resistive transducer
	(C) Inductive transducer	(D)	Optical transducer
18.	Hall effect devices can be used to:		(A) DO level into an AC sky
	(A) Divide one signal by another	(B)	Add two signals
	(C) Multiply two signals	(D)	Subtract one signal from another
19.	Lissajous patterns on CRO can be use	ed to deter	mine:
	(A) Phase	(B)	Voltage
	(C) Current	(D)	Power (0)
20.	The electron relaxation time of metal A	A is 2.7 × 1	0 ⁻⁴ s and that of B is 1 35 x 10 ⁻⁴ s
	The ratio of the resistivity of B to the re		
	(A) 4	(B)	2 Chart JAY
	(C) 0.5	(D)	0.25 nam sept. (a)
GO-	-41/10	5)	•
			(Turn over)

21.	Thes	tructure of a silicon crystal is:	tunio pak	A charged particles undergo
	(A)	Like that of a diamond	(B)	Like that of NaCl
	(C)	Like that of cesium chloride	(D)	Simple cubic
22.	The f	orbidden energy gap between the v	alence ba	and and the conduction band is the
	least	in the case of :		assest sil (A)
	(A)	Mica	(B)	Pure silicon
	(C)	Pure germanium	(D)	Impure silicon
23.	The	movement of charge carriers from	an area	of high carrier concentration to an
	area	of low carrier concentration is called	ed:	order based set alerted (0)
	(A)	Drift	(B)	Diffusion
	(C)	Recombination	(D)	Gradient Faugus at motion
24.	Ina	silicon diode, the reverse saturation	n current	is of the order of:
	(A)	1pA violence (G)	(B)	1nA (a) color of the color of t
	(C)	1μΑ	(D)	1mA
25.	Clar	mping is the process of introducing	a/an:	regulation evidences (A)
	(A)	DC level into an AC signal	(B)	AC level into an AC signal
	(C)	AC level into a DC signal	(D)	DC level into a DC signal
26.	In a	JFET, beyond the pinch-off voltage	ge, as the	e drain voltage increases, the drain
	curr	rent:	d and day	so casta no en salla i eucate e la Rica
	(A)	Remains almost constant	(B)	
	(C)	Increases	(D)	May increase or decrease
27	The	e AC component in the output of	a full wa	ave rectifier is the DC
		경영 기업이 발생 경영진 경영 경영지 않는 경영 경영 경영 등 경영		1 The rand of the carefully of B
	(A)	Equal to (8)		
	(C)	Less than 650 (0)	(D) Greater than or equal to
-	0 41	/10	(6)	(Continued)

28.	The	e voltage gain of the BJT amplifier is hi	ighest	in:			
	(A)	CB configuration	(B)	CE configuration			
	(C)	CC configuration	(D)	Same in all configurations			
29.	A tr	ansistor is said to be in a quiescent sta	ate wh	nen:			
	(A)	It is unbiased		(A) Danays oudsharily			
	(B)	No signal is applied to it		y Kamp avened 10)			
	(C)	No current is flowing in it	7 34				
	(D)	Emitter junction bias is equal to colle	ector ju	unction bias			
30.	The	effect of cascading several amplifier	stages	s is to:			
	(A)						
	(B)	Reduce the overall frequency response					
	(C)	Increase the overall gain and reduce the frequency response					
	(D)	Decrease the overall gain and increa	se the	e frequency response			
31.	The	The adverse effect of noise in a communication system is maximum in :					
	(A)	Encoder	(B)	Channel			
	(C)	Receiver	(D)	Source Source			
32.	The	modulation index in a frequency-mod	lulate	d signal with a carrier frequency of			
	100 kHz, modulating frequency of 4 kHz, and frequency deviation of 50 kHz is :						
	(A)	2	(B)	12.5			
	(C)	25	(D)	0.5			
33.	A pre-emphasis circuit is placed :						
	(A)	After the modulation circuit	(B)	Before the modulation circuit			
	(C)	Before the detection circuit	(D)	After the detection circuit			
34.	Whic	ch of the following modulation systems	is dig	ital?			
	(A)	PPM (A) (A)	(B)	PCM			
	(C)	PWM	(D)	PFM			
GO-	41/1	0 (7)		(Turn over			

35. A balanced modulator produces :	MINORIE ALGERIA IO MED BOMIOV PIETE POR POR
(A) DSB-SC signal	(B) FM signal
(C) PM signal	(D) PAM signal
36. With a feedback system, transient respon	nse:
(A) Decays constantly	(B) Decays slowly
(C) Decays quickly	(D) Raises fast
37. The system generally preferred is:	as in animal a manua on 40) is a
(A) Underdamped	(B) Critically damped
(C) Overdamped	(D) Oscillatory
38. The transient response of a system is ba	asically because of:
(A) Coupling	(B) Forces
(C) Friction	(D) Stored energy
39. Electrical resistance is analogous to :	The second of th
(A) Inertia	(B) Dampers
(C) Spring	(D) Fluid capacity
40. The dominant mode in a rectangular wa	aveguide is:
(A) TE ₁₁	(B) TEM
(C) TE ₀₁	(D) TE ₁₀
41. The cut-off frequency of the TEM wave	is:
(A) Zero	(B) Infinity
(C) Negative	(D) Finite
42. The input impedance of a lossless tra	nsmission line is 100Ω when terminated in a ated in an open-circuit. The characteristic
impedance of the line is:	ya nobisuben grayolio septio dagay = 22 - 3
(A) 80Ω	(B) 164Ω
(C) 36Ω	(D) 64Ω
	(8) (Continued)

43.	The	e equation $\nabla \cdot \mathbf{J} = 0$ is:	HW Ho	a A network N is a dual of new			
	(A)	Poisson's equation	(B)	Laplace equation			
	(C)	Continuity equation	(D)	Maxwell equation			
44.	The	e capacitance per unit length ar	nd the chara	acteristic impedance of a lossles			
	trar	nsmission line are 'C' and 'Z ₀ ', resp	pectively. Th	e velocity of a traveling wave on th			
	trar	nsmission line is :					
	(A)	Z ₀ C	(B)	1/(Z _o C)			
	(C)	Z ₀ /C	(D)	C/Z ₀			
45.	Wh	en a charge is given to a conduct	tor:				
	(A)	It distributes uniformly all over the	he surface	502 vinte en instruction is excel			
	(B)	It distributes uniformly all over the	ne volume	le acestra ".			
	(C)	It goes to the center		noto manimento si FE (A)			
	(D)	It stays where it was placed		(C) The operand			
46.	The	The vector H in the far field of an antenna satisfies:					
	(A)	$\nabla \cdot \mathbf{H} = 0$ and $\nabla \times \mathbf{H} = 0$	(B)	$\nabla \cdot \mathbf{H} \neq 0 \text{ and } \nabla \times \mathbf{H} \neq 0$			
	(C)	$\nabla \cdot \mathbf{H} = 0$ and $\nabla \times \mathbf{H} \neq 0$	(D)	$\nabla \cdot \mathbf{H} \neq 0$ and $\nabla \times \mathbf{H} = 0$			
47.	Give	en h(n) = {1, 2, <u>1</u> , 0, 2}, then the s	ystem is:	(C) Needs rates in a to re			
	(A)	Causal and stable	(B)	Non-causal and stable			
	(C)	Causal and unstable	(D)	Non-causal and unstable			
48.	The	Hilbert transform introduces a ph	nase shift of	A an action complete the state of the			
	(A)	±0°	(B)	±45°			
	(C)	±90°	(D)	±180°			
49.	Ape	eriodic signal that can be expand	ed in Fourie	r series :			
	(A)	Is a power signal		0.5/1 The addition of (A)			
	(B)	Is a energy signal		the our entailed of the			
	(C)	Is neither a power nor an energy	ysignal	The address office to			
	(D)	Can be either a power or an ene	ergy signal	identification address for store			
GO	-41/1	10	(9)	(Turn over			
			the state of the s	1			

	(A)	Both of them have the same mesh equ	O PASSED			
	(B)	Both of them have the same node equ				
unia	(C)	Mesh equations of one are the node e	quatio	ons o	f the other	
	(D)	KCL and KVL equations are the same	9		Y ongoin noiseman	161)
51.	The	number of address lines required to ad	ldress	8k b	ytes of memory is	IA)
	(A) .		(B)	14	2,10	
	(C)	8	(D)	16	iewo el erredo 6.00	NAV P1
52.	Whi	le an instruction is executed, the Progr	ramme			
					ofinu e Sudhishbill	(8)
	(A)	The current instruction	(B)	The	e next sequential ins	struction
	(C)	The operand	(D)	The	e previous instruction	on .
53.	Stat	ic RAM : amiana annakre			Sterthell whov	
	(A)	Is a volatile memory			· V pre 0 - H. 9	
	(B)	Is a non-volatile memory			x 7 bns 6 e H . 7	
	(C)					
	(D)	Contains static information that can'	t be m	odifi	ed to bus in 180	()
54.	Ho	w many dual-purpose ports are there in	the 8	8051	microcontroller?	
	(A)	A STATE OF THE PROPERTY.			i molansii walihi	
	(C)	3	(D)	4		
55	. Th	e stack pointer in a microprocessor is	a regi	ster o	containing:	
	(A)	file and prorand	5.1X 3.6			
	(B) The current size of the stack				
	(C				is subject a nower	
	(D			rithm	etic operation	
G	0-4	(10				(Continued)
0						

50. A network N is a dual of network N if:

	(A)	It gives a high output voltage		afro	
	(B)	It works at high efficiency			
	(C)	The frequency of oscillations remain	ns subs	stantially constant.	
	(D)	It requires a very low Dc supply volt	age.	require node tego all similar requestions of the electric	isibeliA
57.	(11)	$0_2 + (11)_3 = (11)_2$		0010 120	
	(A)		(B)		
	(C)		(D)		
58.	Avo	oltage source can be converted into a	consta	ant current source by add	dina:
	(A)	High resistance in series with the vo			
	(B)	Low resistance in series with the vo			
	(C)	Low resistance in parallel with the v	oltage	source	oi ēdT - (ð)
	(D)	High resistance in parallel with the v	oltage	source	
59.	The	minimum gain of an amplifier, when it is	s used i	n a 3-stage RC phase sh	ift oscillator
	is:		er golali	tied alogonement to tale	oan The o
	(A)	44.5	(B)	29 wolley	
	(C)	3 SldsneV ((1)	(D)	1 1009	(0)
60.	Nega	ative feedback in an amplifier :		lol stanta lo	BAG AR
	(A)	Increase gain	(B)	Decreases gain	
	(C)	Decreases bandwidth	(D)	Increases noise level	
61.	Knov	wledge of binary number systems is re	equired	for the designers of com	puters and
		r digital systems because:		Seplogical Postgyning.	(C)
ella.	(A)	It is easy to learn the binary number s	system	e di technology the de	
	(B)	It is easy to learn Boolean algebra		oreinduorne a mont bates	
	(C)	It is easy to use binary codes		Machine Leaning	A)
	(D)	The devices used in these systems of	operate	in binary	(0)
GO-	-41/1	0 (11)		C	Turn over)
)

56. We use a crystal oscillator because :

62.	Wher	two n-bit numbers are added, the	sum will o	contain at most:	
	(A)	n bits	(B)	(n + 1) bits	(A) :
	(C)	(n + 2) bits	(D)	(n + n) bits	
63.	An ar	ithmetic operation in the 8085 mid	croproces	sor sets the sign and	parity flags.
	The	contents of the accumulator after th	ne executi	on of the operation ca	n be:
	(A)	1011 0100	(B)	0010 1101	
	(C)	1010 1101	(D)	0110 0111	
64.	The	mass of an electron in kg equals:			
	(A)	9.1 × 10 ⁻¹⁹	(B)	9.1 × 10 ⁻³¹	
	(C)	9.1 × 10 ⁻¹⁹	(D)	1.6 × 10 ⁻³¹	ar (A)
65.	The	ionization energy of a hydrogen at	om in eV	serie ell serie el vi is:	
	(A)	1.36	(B)	13.6	ar Mir
	(C)	1.61	(D)	16.1	
66.	The	color of the nanogold particles is:			2 Hill (24)
	(A)	Yellow	(B)	Orange	
	(C)	Red	(D)	Variable	
67.	GPF	RS stands for :		lome de la la salveel	nuise de la litte
	(A)	General Packet Radio Service		UB (17.20)	OW IAT
	(B)	Global Positioning Radio Service	е	chipmed and account	e0 (0)
	(C)	Geological Packet Radio Service	æ	Jeronalia vienutio at	
	(D)	Geological Positioning Radio Se	ervice		
68	68. A field of technology that deals with a combination of the real world and the data				
	ger	nerated from computers is:		east in learn Braneau	
	(A)	Machine Learning	(B)		е
	(C)	Augmented Reality	(D) Internet of Things	
G	0-41	/10	12)		(Continued)

69.	Hov	v many degrees of freedom does an o	bjecti	n 2D space have ?
	(A)	1	(B)	2
	(C)	3	(D)	6
70.	Qua	antum computers are very good at deal	ing wi	th:
	(A)	Clarity	(B)	Certainty
	(C)	Uncertainty	(D)	Reliability
71.	The	Fourier transform of the exponential e	jωot is	
	(A)	A constant	(B)	An impulse
	(C)	A rectangular gate	(D)	A series of impulses
72.	The	value of the integral $\int_{0}^{\infty} \frac{\sin x}{x} dx $ is:		Tell the Leylor's selling exponen
	(A)	0	(B)	$-\frac{\pi}{2}$
	(C)	$\frac{\pi}{2}$	(D)	1
73.	The	response of an LTI system is given I	by the	of input and impulse
	resp	onse.		HT (A
	(A)	Convolution	(B)	Correlation
	(C)	Superposition	(D)	Multiplication
74.	And	perational amplifier possesses:		
	(A)	Very large input resistance and very la	arge o	output resistance
	(B)	Very small input resistance and very s	small o	output resistance
	(C)	Very large input resistance and very s	mall o	output resistance
	(D)	Very small input resistance and very l	arge o	output resistance
75.	How	many bytes are in 4kB of memory?		
	(A)	4024	(B)	4048
	(C)	4182	(D)	4096
GO-	-41/1	0 (13)		(Turn over)

76	Which of the following	hexadecimal numbers represents an even decimal numb	er?
10.	A ALLICH OF THE TOHOMING	nexadecima numbers represents an even desima name	· ·

(A) DB

(B) D5

(C) BF

(D) AC

77. The output of a logic gate is '1' when all its inputs are at logic '0'. The gate is either:

(A) AND or XOR

(B) NAND or XNOR

(C) NOR or XNOR

(D) AND or XNOR

78. ex is periodic, with a period of:

(A) 2π

(B) 2iπ

(C) n

(D) iπ

79. The Taylor's series expansion of sinx is:

(A) $x - \frac{x^3}{3} + \frac{x^5}{5} - \dots$

(B) $x - \frac{x^2}{2} + \frac{x^4}{4} - \dots$

(C) $1-\frac{x^3}{3}+\frac{x^5}{5}-\dots$

(D) $1-\frac{x^2}{2}+\frac{x^4}{4}-...$

80. Frequency of the wave $y(x, t) = 0.5 \sin \frac{2\pi}{3.2}$ (64t - x) is:

(A) 1 Hz

(B) 20 Hz

(C) $\frac{64}{2\pi}$ Hz

(D) 64 Hz

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