## COMMON P.G. ENTRANCE TEST - 2021 (CPET-2021)

Test Booklet No.:

204101

## HIGHER EDUCATION DEPARTMENT, GOVT. OF ODISHA TEST BOOKLET

Subject Code: 55 Entrance Subject: MATERIAL SCIENCE

Time Allowed: 90 Minutes

Full Marks : 70

## INSTRUCTIONS TO CANDIDATES

- 1. Please do not open this Question Booklet until asked to do so.
- 2. Check the completeness of the Question Booklet immediately after opening.
- 3. Enter your Hall Ticket No. on the Test Booklet in the box provided alongside. Do not write anything else on the Test Booklet.
- 4. Fill up & darken Hall Ticket No. & Test Booklet No. in the Answer Sheet as well as fill up Test Booklet Serial No. & Answer Sheet Serial No. in the Attendance Sheet carefully. Wrongly filled up Answer Sheets are liable for rejection.
- 5. Each question has four answer options marked (A), (B), (C) & (D).
- **6.** Answers are to be marked on the Answer Sheet, which is provided separately.
- 7. Choose the most appropriate answer option and darken the oval completely, corresponding to (A), (B), (C) or (D) against the relevant question number.
- 8. Use only Blue/Black Ball Point Pen to darken the oval for answering.
- 9. Please do not darken more than one oval against any question, as scanner will read such markings as wrong answer.
- 10. Each question carries equal marks. There will be no negative marking for wrong answer.
- 11. Electronic items such as calculator, mobile, etc., are not permitted inside the examination hall.
- 12. Don't leave the examination hall until the test is over and permitted by the invigilator.
- 13. The candidate is required to handover the original OMR sheet to the invigilator and take the question booklet along with the candidate's copy of OMR sheet after completion of the test.
- 14. Sheet for rough work is appended in the Test Booklet at the end.



1.	Whic	ch of the following material use	d first by human?	
	(A)	Steel		
	(B)	Iron literature		
	(C)	Bronze		
	(D)	Gold		
2.	The o	erystal structure of any material	is studied by	
	(A)	X-ray diffraction		
	(B)	Optical microscope		
	(C)	Spectrophotometer		
	(D)	Photoluminescence	Replication A	
3.	In ge	neral, different three dimension	al lattice types are classified into	Links -
	(A)	8 systems		
	(B)	14 systems		
	(C)	7 systems		3
	(D)	5 systems		
4.	The i	repeatable entity of a crystal stru		
	(A)	unit cell	Ductile	
	(B)	lattice	Low 154 hance	
	(C)	miller indices		
	(D)	crystal		
5.	The I	Miller indices of the crystal plan	nes cutting through the crystal axes	s (2a, 3b, c) is
	(A)	(012) Superson Jahna nei	Armadah arrada genasarad	
	(B)	(326)	Metals can be broken into anall	(8)
	(C)	(231)		
	(D)	(100)	and the oates.	.JI

6.	The v	acant space in BCC lattice cell is		
	(A)	26%		
	(B)	68%		
	(C)	32%		
	(D)	74%		
7.	The e	lements of symmetry in a crystal are	7	
	(A)	plane of symmetry		
	(B)	axis of symmetry		
	(C)	centre of symmetry		
	(D)	All of these		
8.	Whic	ch of the following is an amorphous material?		
	(A)	Brass	250 D. eV - d	
	(B)	Rubber		
	(C)	Gold	7 oj sterna -	
	(D)	Copper	7 35 - 77 P	
9.	Whic	ch of the following property makes the copper		
	(A)	Ductile		121
	(B)	Low resistance		
	(C)	Corrosion resistance		
	(D)	Low cost		
10.	Wha	it is meant by malleability?	her milicos of the	
	(A)	Metals undergo plastic deformation under p	Y	
	(B)	Metals can be broken into small pieces	(320)	(8)
	(C)	Both (A) and (B)		
		None of the above	CAH	(4)
	(D)	TIONS OF MIC MOOF		

11.	Bioser	nsors are used in							
	(A)	medical field							
	(B)	agricultural field							
	(C)	pollution monitoring							
	(D)	All of these							
12.	Which	one of the following is the best heat and corrosion resistant mater	ial?						
	(A)	Metals							
	(B)	Polymers and marger manulaph of the dible art in son become	247						
	(C)	Ceramics							
	(D)	None of these							
13.	How i	s Ester produced?							
	(A)	Addition polymerization							
	(B)	Condensation polymerization							
	(C)	Substitutional polymerization best mousebnessed temporarily exoled tem							
	(D)	None of these							
14.	Which type of materials are used as bridges between human tissues and metals?								
	(A)	Polymeric biomaterials							
	(B)	Ceramic biomaterials							
	(C)	Metallic biomaterials							
	(D)	All of these							
15.	Which o	of the following is used to determine surface morphology?	18						
	(A)	X-ray diffraction	(C)						
	(B)	Electron microscope	ng)						
	(C)	Both (A) and (B)							
	(D)	None of the above							
16.		astic stress strain behaviour of rubber is	(H)						
	linear	AARAA							
	moai								

	(C)	magnetic					
	(D)	none of these					
17.	In ordeleme	er to convert Si into a n-type semiconductont that having the valence of					ith
	(A)	2 companies mandel de le	(B)	3			
	(C)	4	(D)	5	11/	1/- 1	
18.	When	reversed biased, the width of the depletion	n regio	on in a	PN junction	n di	
	(A)	increases			Zamiený)		
	(B)	decreases				HI	
	(C)	remains the same				Desir!	
	(D)	None of these			que High/.		
19.	Inap	-type semiconductor, the Fermi surface ap	pears				
	(A)	just below the conduction band			onwinded	7	
	(B)	inst above the valence band					
	(C)	in the middle of the valence and conduct	ion ba	nd	l. spe of mo	Whiel	
	(D)	none of the above					
20.		niconductor diode consists of			C mic L		
20.	(A)	the junction of n and p-type semiconduct	dan tor				
	(B)	the junction of two p-type semiconducto	r				
	(C)	the junction of two p-type semiconducto	Hody r	ai yaiv	of the follow	Handlar	
	(D)	none of the above				12.1	
21.		sequence of layers in a FCC crystal structu	re is				
21.	(A)	ABCABC					
		ABABAB					
	(B)	AAAAAA					
	(C)	BBBBBB					
	(D)	טטטטטט					

(B) nonlinear

22.	Cryst	als of inert gas atoms are bound by	For puntition	ortf	. 战车
	(A)	Van der Waals interaction			
	(B)	electrostatic interaction			
	(C)	strong interaction			
	(D)	None of these	ð	())	
23.	Whic (A)	h among the following is the characteristic of polymers?  High tensile strength become and the benefit at the characteristic of polymers?			
	(B)	High coefficient of friction	arbitas	(7)	
	(C)	Low density	mand		
	(D)	All of these	licz		
24.	The v	vindow of aircraft is made of	None of	(D)	
	(A)	PMMA			
	(B)	PVC		The a	OF.
	(C)	PVDF	e e10/031	(A)	
	(D)	None of these			
25.	Whic	h of the following is the hardest material?	r IGCovil		
	(A)	Ceramic	Isonwies	(2)	
	(B)	Diamond	PROMINE	(D)	
	(C)	Gold Smiletomalia alguntes adtei gri woll	or only terr	art #	18
	(D)	Steel	vala.W		
26.	The v	veight percentage of carbon present in mild steels is	n/	(B	
	(A)	0.008 to 0.3	Milk	(C)	
	(B)	10 to 20 **	None of 1	. (CI)	
	(C)	0.8 to 2.11	uliffugsozi	m self	
•	(D)	None of these	painang		
27.	Whic	h of the following is not a metal?		(8)	
	(A)	Sulphur	negative		
	(B)	Phosphorous		(3)	
	(C)	Nitrogen		((1)	
	(D)	None of these			
WSS		al Science 7	punita? I	in and t	P.T.O.
11 2	ITAGEOTI				

28.	The valence of the element A in the oxide AO <sub>3</sub> is						
	(A)	2 reprised to dis					
	(B)	4 neithan					
	(C)	6	Stage and a treat				
	(D)	8	position of				
20							
29.		itmus paper is tuned to blue when immersed in a					
	(A)	acidic	ning fraction is typical pages				
	(B)	basic					
	(C)	salt	All of these				
	(D)	None of these	Harais la walse.				
30.	The a	atoms of elements having different atomic number	الملي	umber ar	e		
	(A)	isotopes	10 VS				
	(B)	isobars	None of the 2				
	(C)	isotones	ori vallai edili al				
	(D)	isomers	Ceremin	F			
31.				Hy +			
31.		h of the following is the example of emulsion?	let s T				
	(A)	Water					
	(B)	Air . ai alexampli in di terrem medino lu			ŕ		
	(C)	Milk					
	(D)	None of these	10 to 20	(11)			
32.	The s	usceptibility of diamagnetic substances is	11.1 (0.8.0)				
	(A)	positive	None of these short its folia win				
	(B)	negative					
	(C)	zero		H			
	(D)	None of these					

33.	As cor	npared to the magnetic moment of	•		lei
	(A)	smaller			
	(B)	greater			
	(C)	equal	onto a something and other		
	(D)	None of these	aver been water to		
34.	Which	of the following feature is present	in all materials?		
	(A)	paramagnetism	art Short on	1 7	
	(B)	diamagnetism	rainivana us		
	(C)	ferromagnetism sole older systems a	e at the tradewing concerts spla		
	(D)	antiferromagnetism	He a local		
35.	Whic	n of the followings relates dielectric	constant to electron polarizabil	lity?	
	(A)	Clausius-Mossotti relation			
	(B)	Debye T <sup>3</sup> law	Consult reti		
	(C)	Curie-Weiss law	is at the Colfe and exhibits mag factor-levinic materials		
	(D)	None of these	when the control of		
36.		ielectrics are	i are agains maierials		
30.		metals			
	(A)		औं स्थात हाथाका व की का रे छ :		
	(B)	insulators			
	(C)	semimetals			
	(D)		principals to promition?		
37.	Whi	ch arrangement of electrons leads to	antiferromagnetism:		
	(A)	$\uparrow\uparrow\uparrow\uparrow$	in quitering v and Lib W L a Ye		
	(B)	$\uparrow\downarrow\uparrow\downarrow$			
	(C)	Both (A) and (B)			
	(D)	None of these			

38.	The c	conductivity shown by MgCl <sub>2</sub> in its molten sta	te is me where the in	
	(A)	electronic		
	(B)	thermal	(b) after	14
	(C)	ionic		
	(D)	p-type		
39.	At ab	solute temperature, semiconductor behaves as		
	(A)	a superconductor		
	(B)	a superconductor  a semiconductor	of town in a draw	
	(C)	a conductor	merc servey,	
	(D)	an insulator		- []
40.	Whic	h of the following converts solar energy into e	lectrical energy?	· `) .
	(A)	Fuel cell	nashreim in his	
	(B)	Light emitting diode	urumpowania - 419	17,
	(C)	Photovoltaic cell	removed Mason in 179	
	(D)	Galvanic cell		
41.	Whic	h of the following exhibits magnetic hysteresis	s loop?	4 2
	(A)	Ferroelectric materials	VI 1 - 1 - 1 - 1 - 1 - 1 - 1	+ )
	(B)	Pyroelectric materials		
	(C)	Ferromagnetic materials	12 - 3(1)35(-,1)	
	(D)	None		
42.	The e	lectrode for a battery must be	1000-4	
	(A)	a semiconductor		
	(B)	an insulator		
	(C)	a good conductor of electricity	None of these	
	(D)	a bad conductor of electricity	ich errangement of ek	w)n
43.	Solde	r is a metal alloy consisting of		t,
	(A)	Sn and Pb		(月)
	(B)	Sn and Cu	Renfir All and (B)	
	(C)	Sn and Zn		
	(D)	Zn and Pb		

44.	Which	of the following is a renewable source	of energy?	m i II	42
	(A)	Wind energy		$(f_{\mathbf{v}})$	
	(B)	Nuclear energy	sanito chirale		
	(C)	Fossil fuel energy			
	(D)	None of these	have to haspif		
45.	Which (A)	of the following is not an inorganic fu Ferroelectric	nctional material?	Which	12
	(B)	Magnetic sensor	istalled water	(A)	
	(C)	Light detector	LPG	(4)	
	(D)	Reverse micelles	(Jasoline		
46.	Which	n type of material expands and contract	in response to an applied e	lectric fi	eld?
	(A)	Piezoelectric materials			
	(B)	Biomaterials	fa in	equity.	
	(C)	Nanomaterials	Freezign on acrist	( £. )	
	(D)	None of these	District and expensed	(B)	
47.	Whic	h of the following is a radioactive subst	ance?	(0)	
	(A)	Gadolinium	LANCE SINGLE	(0)	
	(B)	Francium	nym sa tao ha denn g te s	May	
	(C)	Carbon	yacrafts		
	(D)	Zirconium			
48.	Whic	ch of the following is true for ionic com	pounds?		
	(A)	Conduct electricity when dissolved in	Water		
	(B)	Conduct electricity in solid state	niriding 'your and		in the
	(C)	Conduct electricity in gaseous state			100
	(D)	None of the above			
49.	The	ionic compound has		(8)	
	(A)	High melting and boiling points	ÇM.		
	(B)	Low melting and boiling points	NH	(6)	
	(C)	Weak inter-atomic forces			
	(D)	None of these		n	тО
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50.	If a material generates electricity due to deformation, it is called					
	(A)	photochromic				
	(B)	photovoltaic			(11)	
	(C)	piezoelectric				
	(D)	liquid crystal				
51.	Which	of the following	is in pure form?			
	(A)	Distilled water				
	(B)	LPG				
	(C)	Gasoline		*1"		
	(D)	Air on the sun	eges in Barthas Tusteles qui no e in			
52.	When		is removed, which types of materia	ls maint		gnetic
	(A)	Ferromagnetic m	aterials	na Z	[.e)	•
	(B)	Diamagnetic mat		o aut s		
	(C)	Paramagnetic ma	terials whether a virusoum as garredo	oth both		
	(D)	All of the above	<del>c</del> nuie	ik sai		
53.	Maxir	num surface harde	ning is achieved by			
	(A)	refluxing			()	
	(B)	carburizing				
	(C)	flame hardening	coloring is one for service constraints?			
	(D)	nitriding	et e les meny m sond dans			
54.	Which	of the following	gas has the highest rate of diffusion?		(3)	
	(A)	CO.	over an te			
	(B)	$O_2$				
	(C)	$N_2$	ethiog guillos be conflex			
	(D)	NH <sub>3</sub>	states, garling Lar Laufes			
	\_ /	- 12-3				

55.	The su	ostances strongly repelled by the magnetic field a	re	11 %	
	(A)	paramagnetic	dimensional attention		
	(B)	superconducting	method o		
	(C)	ferromagnetic	gnic b		
	(D)	diamagnetic	a gonijunanceiras		
56.					
<b>30.</b>		teraction that holds the molecules together in a po		d is	
	(A)	dipole-dipole interactions	Detro maril		
	(B)	metallic bonding			
	(C)	hydrogen bonding	6)		
	(D)	none of these	street of an Thints		
57.	Whic	n materials possess remenant polarization?			
	(A)	Ferroelectric			
	(B)	Polymer			
	(C)	Ferromagnetic			
	(D)	None of these	no i ti istiyatiset		
58.		increasing temperature, the electrical conductivity	of metals		
50.		increases			
	(A)				
	(B)	decreases	d. la hano.		
	(C)	does not change			
	(D)	none of these	menit		
59.	Whic	ch of the following exhibits ferromagnetic property	? saite		
	(A)	Zinc	pent to the		
	(B).	Aluminium	се зинена Бин		
	(C)	Nickel			
	(D)	Rubber			
	(-)				

60.	The property of a substance to offer no resistance to the flow of electricity at particular temperature is known as					
	(A)	magnetism				
	(B)	doping				
	(C)	superconductivity				
	(D)	none of these	فأنسلك والالان			
61.	Whic	h of the following is a network solid?	about sub-main res	il wit		
	(A)	$H_2O$	ion i slegibisi vaik			
	(B)	Diamond	suite 4 2 nm			
	(C)	KF				
	(D)	CS <sub>2</sub>	gr balls it with	1 31		
62.	Whic	h of the following is an example of composite?				
	(A)	Steel "nottax inforq times and	espera de la seco			
	(B)	Nylon		7		
	(C)	Mica				
	(D)	Wood	dage et d			
63.	The r	most widely used metal in the world is				
	(A)	gold	58.84) + 1 5.81 X			
	(B)	ure, the electrical conductivity of Electrical raylis	terriqued guirterron	d. W		
	(C)	steel	mellator.			
	(D)	aluminium	derreines			
64.	Most	commercial glasses consist of	agenaty nor exat			
	(A)	soda				
	(B)	lime				
	(C)	silica				
	(D)	all of these				
65.	The v	word ceramic is meant for	Minimum V			
	(A)	burnt material				
	(B)	wet material	rodde M			
	(C)	dry material				
	(D)	none of these				

66.	Which of the following is the characteristic of ceramics?		
	(A)	High thermal stability	
	(B)	High mechanical strength	
	(C)	Low elongation	
	(D)	all of these	
67.	Raman effect is due to the scattering of		
	(A)	light by molecules of the medium	
	(B)	electron by molecules of the medium	
	(C)	electron by ions of the medium	
	(D)	none of the above	
68.	The d	The device which converts heat energy into mechanical energy is known as	
	(A)	motor	
	(B)	generator	
	(C)	heat engine	
	(D)	none of these	
69.	Visco-elastic behaviour exhibited by plastics correspond to that of a		
	(A)	solid	
	(B)	liquid	
	(C)	combination of (A) and (B)	
	(D)	none of these	
70.	Which type of fibre has cellulose as the main constituent?		
	(A)	acrylic	
	(B)	synthetic	
	(C)	spandex	
	(D)	natural	
*****			