

RGUCET 2022

MSc Physics

1	Sort out the odd one out of the four meaningful words:					
	a) papaya	b) guava	c) mango	d) watermelon	d	watermelon
2	Arrange the following words as being found in English Dictionary: 1. Sesquipedalism 2. Shire 3. Sequence 4. Sauce 5. Sense 6. sarcastic					
	a) 1,2,3,4,5,6	b) 6,4,2,5,1,3	c) 6, 4,5,3, 1,2	d) 6, 5,4,1,3,2	c	6, 4,5, 3, 1,2
3	It is very odd to write letter.....red or green ink.					
	a) by	b) with	c) in	d) on	c	in
4	Now he _____ his father's business.					
	a) looks into	b) looks after	c) looks out	d) looks back	b	looks after
5	The Chairman is ill and we'll have tothe meeting for few days.					
	a) put on	b) put in	c) put away	d) put off	d	put off
6	He is very good making stories					
	a) in	b) about	c) at	d) for	c	at
7	Main component of bones and teethes are					
	a) Calcium carbonate	b) Calcium phosphate	c) Calcium sulphate	d) Calcium nitrate	b	Calcium phosphate
8	Sprinkler is used for					
	a) Vaccuming Lawn	b) Cutting Grass	c) Watering lawn	d) Washing floor	c	Watering lawn
9	Demonetization of all 500 and 1000 banknotes of the Mahatma Gandhi series was announced in the year					
	a) 2015	b) 2016	c) 2017	d) 2018	b	2016
10	Which of the following is NOT a Software?					
	a) Compiler	b) Adobe	c) Microsoft Office	d) Drivers	a	Compiler
11	Which of the following is not a member of the vitamin B complex?					
	a) Thiamine	b) Riboflavin	c) Folic acid	d) Ascorbic acid	d	Ascorbic acid
12	A 650 TFLOPS-Supercomputing facility is set to be installed in which institution?					
	a) IIT Mumbai	b) IIT Delhi	c) IIT Guwahati	d) IIT Chennai	c	IIT Guwahati
13	There are how many languages and dialects used in India.					
	a) < 100	b) between 100 to 500	c) between 500 to 1000	d) > 1000	d	> 1000
14	The natural process of the earths atmosphere heating through the trapping of re-radiated infra-red radiation is known as					

	a) Global warming	b) Green house effect	c) Solar heating	d) Thermal inversion	b	Green house effect
15	Which of the following section of the Indian Penal Code (IPC) related to the Sedition law is kept in abeyance by the Supreme court recently?					
	a) 122A	b)123A	c)124A	d)125A	c	124A
16	Sun is to star as Mars is to....?					
	a) planet	b) solar system	c)asteroid	d)galaxy	a	planet
17	Which state has renamed the dragon fruit as 'Kamalam'?					
	a)Assam	b)Gujarat	c)Tripura	d)Goa	b	Gujarat
18	What is the name of the line between India and China border?					
	a) Redcliff Line	b) Durand Line	c) Mcmohan Line	d) Silent line	c	Mcmohan Line
19	Currently, how many languages are listed in the eight schedule of constitution					
	a) 24	b) 21	c) 2 2	d) 20	c	22
20	At the end of a business conference the ten people present all shake hands with each other once. How many handshakes will there be altogether?					
	a) 20	b) 45	c) 55	d) 90	b	45
21	A number consists of two digits. The digit at the ten's place is two times the digit at the one's place. The number formed by reversing the digits is 36 less than the original number. Then the original number is					
	a) 84	b) 63	c) 48	d) 42	a	84
22	The angle of elevation of the sun, when the length of the shadow of a tree 3 times the height of the tree, is:					
	a) 30°	b) 45°	c) 60°	d) 50°	a	30°
23	An observer 1.6 m tall is 203 away from a tower. The angle of elevation from his eye to the top of the tower is 30°. The heights of the tower is:					
	a) 21.6 m	b) 23.2 m	c) 24.72 m	d) 22.12 m	a	21.6 m
24	If $\cos \theta = \frac{1}{\sqrt{2}}$, $\sin \theta$ equals					
	a) $\frac{1}{\sqrt{2}}$	b) $\sqrt{2}$	c) 1/2	d) 0	a	$\frac{1}{\sqrt{2}}$
25	The digit in the unit place of 9998877621^{909} is					
	a) 9	b) 3	c) 1	d) 2	c	1
26	Who measured the size of the nucleus					
	a) Rutherford	b) Thomson	c) Newton	d) None of these	a	Rutherford
27	Uranium-235 had how many neutrons in the nucleus:					
	a)231	b)100	c)143	d)243	c	143
28	In neutral atom, the electrons are bound to the nucleus by					

	a)Magnetic force	b)Electrostatic force	c)Friction force	d) Centripetal force	b	Electrostatic force
29	The materials used to decelerate fast moving neutrons is called					
	a)coolant	b)moderator	c)controller	d)reactor	b	moderator
30	Which isotope of Uranium has the capacity to sustain the chain reaction?					
	a)U-230	b)U-235	c)U-245	d)U-225	b	U-235
31	The binding energy per nucleon is maximum for the nucleus					
	a) ⁵⁶ Fe	b) ⁴ He	c) ²⁰⁸ Pb	d) ¹⁰¹ Mo	a	⁵⁶ Fe
32	Primary cosmic rays are composed of very energetic					
	a)Electrons	b)Mesons	c)Protons	d)Neutrons	c	Protons
33	The crystal used in Bragg's spectrometer to diffract X-rays is					
	a)Ammonium carbonate	b)Copper sulphate	c)Sodium chloride crystal	d)Zinc sulphide	c	Sodium chloride crystal
34	The elements whose atomic number is greater than 82 are naturally					
	a)unstable nuclei	b)stable nuclei	c)positive nuclei	d)negative nuclei	a	unstable nuclei
35	In beta decay the nucleon number					
	a)decreases by 1	b)increases by 1	c)increases by 2	d)remains unchanged	d	remains unchanged
36	The radius of a hydrogen atom in its ground state is					
	a)10 ⁻⁴ cm	b)10 ⁻⁶ cm	c)10 ⁻⁸ cm	d)10 ⁻¹⁰ cm	c	10 ⁻⁸ cm
37	The spectrum of sodium atom can be explain by considering					
	a)J-J coupling	b)Relativistic correction	c)L-S coupling	d)Heitler London theory	b	Relativistic correction
38	What is a process with identical end states called?					
	a)phase	b)path	c)cycle	d)Either path or phase	c	cycle
39	Nuclear forces are mediated by					
	a)Proton	b)Neutron	c)Meson	d)Electron	c	Meson
40	The fourth state of matter is known as					

	a)Electrons	b)Gas	c)Vapour	d)Plasma	d	Plasma
41	Which of the following temperature scales doesn't have negative numbers?					
	a) Celsius	b) Kelvin	c) Reaumur	d) Fahrenheit	b	Kelvin
42	Which of two temperature change are equivalent?					
	a) 1 K = 1 F	b) 1 F = 1 C	c) 1 Re = 1 F	d) 1 K = 1 C	d	1 K = 1 C
43	A container with rigid walls filled with a sample of ideal gas. The absolute temperature of the gas is doubled. What happens to the pressure of the gas?					
	a) Doubles	b) Quadruples	c) Triples	d) half	a	Doubles
44	The average molecular kinetic energy of a gas depends on:					
	a) Pressure	b) Volume	c) Temperature	d) Number of moles	c	Temperature
45	The process of heat transfer by the movement of mass from one place to another is called:					
	a) Convection	b) Conduction	c) Radiation	d) Induction	a	Convection
46	Which one of the following thermodynamic quantities is not a state function?					
	a) Gibbs free	b) enthalpy	c) entropy	d) work	d	work
47	All of the following have a standard heat of formation value of zero at 25°C and 1.0 atm except:					
	a) N ₂ (g)	b) Fe(s)	c) Ne(g)	d) H(g)	d	H(g)
48	The graph between volume and temperature in Charles' law is					
	a) an ellipse	b) a circle	c) a straight line	d) a parabola	c	a straight line
49	In concave mirror, the size of image depends upon					
	a) size of object	b) position of object	c) area covered by	d) shape of object	b	position of object
50	When a ray of light enters from denser medium to rare medium it bends					
	a) towards normal	b) away from normal	c) perpendicular	d) parallel to normal	b	away from normal
51	If the momentum of a particle is increased to four times, then the de-Broglie					
	a) 2 times	b) 4 times	c) 1/2 times	d) 1/4 times	d	1/4 times
52	Assuming the velocity to be same, which particle is having longest wavelength					

	a) an electron	b) a proton	c) a neutron	d) an α -particle	a	an electron
53	Matter waves were first experimentally observed by:					
	a) de-Broglie	b) Schrodinger	c) Davisson and Germer	d) Bohr	c	Davisson and Germer
54	Dual nature of matter was predicted by:					
	a) Schrodinger	b) Louis de-Broglie	c) G.P. Thomson	d) Werner Heisenberg	b	Louis de-Broglie
55	Compton effect is associated with:					
	a) visible light	b) X-rays	c) beta-rays	d) positive rays	b	X-rays
56	The trace of a 4 by 4 matrix is 20. If three of them are 2,5 and 10, the other one is					
	a)1	b)2	c)3	d)4	c	3
57	The Jacobian of the transformation: $x=u-v$ and $y=u+v$ is					
	a) 2	b) 4	c) 1	d) 0	a	2
58	The matrix, $B = \frac{1}{\sqrt{3}} \begin{vmatrix} 1 & 1+i \\ 1-i & -1 \end{vmatrix}$ is					
	a) orthogonal	b) unitary	c) skew symmetric	d) symmetric	b	unitary
59	The value of $\nabla^2 \left(\frac{1}{r_1 - r_2} \right)$ where $r_1 \neq r_2$ is					
	a) -4π	b) π	c) 0	d) ∞	c	0
60	The particular integral of $\frac{d^2y}{dx^2} + y = e^{-x}$ is					
	a) $e^x/2$	b) $\frac{e^{-x}}{2}$	c) $e^{-\frac{x}{2}}$	d) e^x	b	$\frac{e^{-x}}{2}$
61	If F is a gradient of V, then					
	a) $\vec{\nabla} \times \vec{F} = 0$	b) $\vec{\nabla} \cdot \vec{F} = 0$	c) $\vec{\nabla} V = 0$	d) $\nabla^2 V = 0$	a	$\vec{\nabla} \times \vec{F} = 0$
62	The solution of $d^2y/dx^2 + y = 0$ is					
	a) e^{ix}	b) x^2	c) e^{ix}	d) $1/x^2$	a	e^{ix}
63	For a negative charge placed at the centre of a sphere, the direction of electric field will be					
	a) radially outward	b) radially inward	c) along the tangent to the sphere	d) inclined at 45°	b	radially inward
64	The direction of electromagnetic wave is given by					
	a) $E \times B$	b) $E \cdot B$	c) E	d) B	a	$E \times B$
65	The total charge on the finite plane sheet having surface charge density $\sigma = 4xy$ and bounded by $0 \leq x, y \leq 1$ on the $z=0$ plane is					
	a)1	b)2	c) -1	d) -2	a	1
66	Given that $E = x + y^2 j$ C/m ² , the volume charge density at (1,1) is					
	a) -1ϵ	b) 3ϵ	c) 2ϵ	d) 0	b	3ϵ
67	The electric dipole moment (in Cm) of two equal and opposite charges of 1C separated by 2 m					
	a)0.5	b) 0.1	c) -2	d) 2	d	2
68	If the electric potential $V=x+y$ in free space, the energy stored in a volume					

	bounded by $-1 \leq x, y, z \leq 1$ is					
	a) $6\epsilon_0$	b) $8\epsilon_0$	c) $10\epsilon_0$	d) $4\epsilon_0$	b	$8\epsilon_0$
69	The charge $9 \text{ t}^2 \text{ C}$ is removed from a sphere through a wire. The current in the wire at $t=2\text{s}$ is					
	a) 26	b) 30	c) 24	d) 36	d	36
70	Plane $y=0$ carries a uniform current of 30 mA/m . At $(1, 10, -2)$, the magnetic field intensity is					
	a) -15 mA/m	b) -25 mA/m	c) -35 mA/m	d) -45 mA/m	a	-15 mA/m
71	Which of the following capacitor can have the highest capacitance value					
	a) Mica	b) Paper	c) Ceramic	d) Electrolytic	d	Electrolytic
72	A resistor has colour-code bands brown, black, green and gold. Its nominal value is					
	a) $1 \text{ k}\Omega \pm 10\%$	b) $10 \text{ k}\Omega \pm 10\%$	c) $1000 \text{ k}\Omega \pm 10\%$	d) $1 \text{ M}\Omega \pm 10\%$	c	$1000 \text{ k}\Omega \pm 10\%$
73	The modulus of elasticity is dimensionally equivalent to					
	a) Strain	b) Stress	c) Surface tension	d) Poisson's ratio	b	Stress
74	The slope of the kinetic energy versus position vector gives the rate of change of					
	a) Momentum	b) Velocity	c) Force	d) Power	c	Force
75	The time period of function $\cos \frac{\pi}{2}(t + 2)$ is					
	a) 4s	b) 6s	c) 2s	d) 8s	a	4s
76	If the displacement x and velocity v of a particle executing simple harmonic motion are related through the expression $4v^2 = 25 - x^2$, its time period is					
	a) π	b) 2π	c) 4π	d) 6π	c	4π
77	The value of R_{EQ} between the point 'A' and 'B' in the following figure is					
	a) 10 ohm	b) 12 ohm	c) 16 ohm	d) 8 ohm	a	10 ohm
78	When a pentavalent impurity is added to a pure semiconductor, it becomes					
	a) An insulator	b) An intrinsic semiconductor	c) p-type semiconductor	d) n-type semiconductor	d	n-type semiconductor
79	The barrier voltage at a pn junction for germanium is about					
	a) 5 V	b) 3 V	c) Zero	d) 0.3 V	d	0.3 V
80	Schotky diodes has junction made up of					
	a) metal to n region	b) p to n region	c) metal to semiconductor	d) metal to insulator	c	metal to semiconductor
81	The dc load line of a transistor					
	a) Has a positive slope	b) Has a negative slope	c) Is a plot of I_C vs I_B	d) None of the above	b	Has a negative slope
82	The JFET is					

	a) A bipolar device	b) Current controlled device	c) Voltage controlled device	d) Not a device	c	Voltage controlled device
83	In electronic communication, modulation process is done in					
	a) Transmitter	b) Receiver	c) Both in transmitter and receiver	d) Transformer	a	Transmitter
84	For low values of V_{DS} , the JFET behaves like a					
	a) Resistance	b) Constant voltage device	c) Constant current device	d) Negative resistor	a	Resistance
85	On which of the following does the energy of a simple harmonic motion depend					
	a) 4ω	b) $\frac{1}{\omega^2}$	c) $\frac{1}{a^2}$	d) a^2	d	a^2
86	The gravitational force between two masses is					
	a) Repulsive	b) Attractive	c) Zero	d) Infinity	b	Attractive
87	The angular momentum in a central force field is					
	a) Zero	b) Not conserved	c) infinity	d) conserved	d	conserved
88	For hyperbolic orbit the values of energy E and eccentricity ϵ are					
	a) $E=0$ and $\epsilon>1$	b) $E>0$ and $\epsilon>1$	c) $E>0$ and $\epsilon=1$	d) $E>0$ and $\epsilon=0$	b	$E>0$ and $\epsilon>1$
89	The degree of freedom for a free particle in space are					
	a) one	b) two	c) three	d) zero	c	three
90	The generalized coordinates for motion of a particle moving on the surface of a sphere of radius ' α ' are					
	a) α and θ	b) α and ϕ	c) θ and ϕ	d) 0 and ϕ	c	θ and ϕ
91	The moment of inertia is a tensor of rank					
	a) One	b) Two	c) Three	d) Zero	b	Two
92	In variational principle the line integral of some function between two end points is					
	a) zero	b) infinite	c) extremum	d) one	c	extremum
93	The path of a particle is _____ when it is moving under constant					

	conservative force field					
	a) cycloid	b) hyperbolic	c) parabolic	d) straight line	a	cycloid
94	At the turning point in an arbitrary potential field the radial velocity is					
	(a) Zero	(b) 1	(c) Infinity	(d) 1/2	a	Zero
95	The number of independent variable for a free particle in space are					
	a) N	b) 2N	c) 3N	d) zero	c	3N
96	What is the possible number of different types of lattices (3D)?					
	a) 4	b) 8	c) 14	d) 17	b	8
97	Which of the following covalent compounds conduct electricity?					
	a)Silica	b)Hydrogen chloride	c) Diamond	d)Graphite	d	Graphite
98	Packing factor of diamond cubic crystal structure is					
	a) 60%	b) 56%	c) 90%	d) 34%	d	34%
99	What is the maximum proportion of volume available in FCC arrangement of spheres?					
	a) 10%	b) 20%	c) 26%	d) 30%	c	26%
100	At Curie temperature spontaneous magnetization for ferromagnetic materials is					
	a) Infinity	b) 1	c) Zero	d) -1	c	Zero