श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेंद्रम , केरल– 695 011
(एक राष्ट्रीय महत्व का संस्थान, विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार)
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Entrance Examination 2020 - PhD Bioengineering Sciences

Sl No	Question	Answer	OptionA	OptionB	OptionC	OptionD
1	Emmanuelle Charpentier and Jennifer A. Doudna received Nobel prize in the year 2020 for the development of a method for genome editing in the field of:	B	Physics	Chemistry	Physiology	Medicine
2	Due to an increase in taxes on electronic devices, the price of a cooler has increased to Rs. 8450, which is 30% increase of the original price. What was the original price of the cooler prior to its increase?	C	5154.5	5915.0	6500	6760
3	One-tenth of one bag of potatoes weighs the same as one-seventh of one bag of small pebbles. What is the ratio of the weight of 2 bags of potatoes to 3 bags of pebbles?	B	7:15	20:21	21:20	3:2
4	A and B started a business by investing Rs. 36,000 and Rs. 63,000 each. Find the share of each, out of the annual profit of Rs. 5500.	A	Rs. 2000, Rs. 3500	Rs. 2500, Rs. 3500	Rs. 3500, Rs. 2500	None of these
5	A sum of Rs. 13,950 should be divided among three persons A, B and C. B must get the double of A's share and C must get Rs. 50 less than the double of B's share. The share of A will be:	C	Rs. 1950	Rs. 1981.25	Rs. 2000	Rs. 2007.75
6	GENEALOGY: ANCESTRY, ENTOMOLOGY:_____	B	Words	Insects	Fossils	Inscriptions
7	Which number comes next in this sequence? 1, 1.5, 2.5, 4,___?	D	9	8	7	6
8	If 3 less than twice a certain number is equal to 2 more than 3 times the number, then 5 less than 5 times the number is:	A	-30	-20	-5	0
9	_____ helps in veiwing objects at the surface of water from a submarine under water	A	Periscope	Kaleidoscope	Telescope	Spectroscope
10	A person has the capability of thinking 100 lines of code in five minutes and can type 100 lines of code in 10 minutes. He takes a break for five minutes after every ten minutes. How many lines of codes will he complete typing after an hour?	B	100	250	350	600
11	A pescatarian is someone who eats	C	Egg	Chicken	Fish	Clams
12	If 'a' is the smallest prime number greater than 50 and 'b' is the largest prime number less than 10, then ab =	B	299	371	229	261
13	According to the Centre for Disease Control (CDC), what does 'N' in the N95 respirator stand for?	A	Not resistant to oil	Not resistant to water	Number of particles	Not resistant to bacteria
14	What is the greatest value of x for which (3x– 2)(x+ 1) = 0?	C	-1	-2/3	2/3	1
15	For safety, the fuse wire used in the mains for household supply of electricity must be made of metal having	B	high resistance	low melting point	low specific heat	high melting point
16	The radius as well as the height of a circular cone increases by 10%. The percentage increase in its volume is _____.	C	17.1	21	33.1	72.8
17	The perimeters of a circle, a square and an equilateral triangle are equal. Which one of the following statements is true?	A	The circle has the largest area.	The square has the largest area.	The equilateral triangle has the largest area.	All the three shapes have the same area.
18	In doing action research what is the usual sequence of steps?	B	Reflect, observe, plan, act	Plan, act, observe, reflect	Plan, reflect, observe, act	Act, observe, plan, reflect
19	Escape velocity of a rocket fired from the earth towards the moon is a velocity to get rid of the	C	Centripetal force due to the earth's rotation	Moon's gravitational pull	Earth's gravitational pull	Pressure of the atmosphere

20	A, B and C are intelligent, A, D and E are laborious and D, C and E are honest and A, B and E are ambitious. Who is neither laborious nor honest?	B	A and D	B only	E only	C only
21	Which is the odd number in the series: 81, 121, 169, 289, 361	A	81	169	289	361
22	Which pair of words among the following are odd ones Crime and Punishment, Exercise and Health, Judgement and Advocacy, Hardwork and Success, Slowth and Failure	C	Slowth and Failure	Hardwork and Success	Judgement and Advocacy	Exercise and Health
23	Select the lettered pair that best expresses a relationship similar to that expressed in the original pair COLOR : SPECTRUM	A	tone : scale	sound : waves	dimension : space	cell : organism
24	Frederick Sanger is a twice recipient of the Nobel Prize for	C	Chemistry in 1954 and Peace in 1962	Physics in 1956 and 1972	Chemistry in 1958 and 1980	Physics in 1903 and Chemistry in 1911
25	Fill up the blanks in the following sentence “Early _____ of hearing loss is _____ by the fact that the other senses are able to compensate for moderate amounts of loss, so that people frequently do not know that their hearing is imperfect.	C	discovery . . Indicated	development . . prevented	detection . . complicated	treatment . . facilitated
26	Choose word or phrase that is most nearly opposite in meaning to the word DIFFUSE	A	concentrate	contend	imply	pretend
27	Select the lettered pair that best expresses a relationship similar to that expressed in the original pair Antidote: Poison	B	Cure: recovery	Tonic: lethargy	Narcotic: sleep	Stimulant: relapse
28	The corporation expects only _____ increases in sales next year despite a yearlong effort to revive its retailing business.	D	dynamic	predictable	expanding	modest
29	Although it does contain some pioneering ideas, one would hardly characterize the work as _____.	C	orthodox	eccentric	original	trifling
30	NITI Aayog was established in?	B	03-Jan-19	01-Jan-15	01-Sep-15	26-Jan-19
31	Choose word or phrase that is most nearly opposite in meaning to the word AMALGAMATE	D	Circulate	Reduce	Endure	Separate
32	Choose word or phrase that is most nearly opposite in meaning to the word ENERVATE	C	Recuperate	Resurrect	Strengthen	Gather
33	A rectangle becomes a square when its length and breadth are reduced by 10 m and 5 m, respectively. During this process, the rectangle loses 650 sq.m of area. What is the area of the original rectangle in square meters?	B	1125	2250	2500	4500
34	A set of 4 parallel lines intersect with another set of 5 parallel lines. How many parallelograms are formed?	C	20	48	60	72
35	Which metal is used for galvanizing iron?	D	Lead	Copper	Aluminium	Zinc
36	This simple discovery led to a population boom in 1900	B	Pencillin	Haber-Bosch Process	Small pox vaccine	none of the above
37	A wire would enclose an area of 1936 sq.m, if it is bent into a square. The wire is cut into two pieces. The longer piece is thrice as long as the shorter piece. The long and the short pieces are bent into a square and a circle, respectively. Which of the following choices is closest to the sum of the areas enclosed by the two pieces in square meters?	C	1096	1111	1243	2486
38	Whose autobiography is the book " My Music, My Life"	B	Pandit Shiv kumarsharma	Pandit Ravi Shankar	Ustad Zakir Hussain	ustad Amjad Ali Khan
39	In which one of the following countries, is Tamil a major language?	A	Singapore	Indonesia	Mauritius	Myanmar
40	Biotic index gives us an idea about the pollution of:	A	water	air	sound	all the above
41	Which of the following statement is incorrect regarding monomeric G proteins?	D	Regulated by GTP-GDP exchange proteins	Regulated by GTPase activating proteins	Regulate vescile fusion	Aid in uncoating of proteins from vesicles
42	Cells typically propagate intracellular signalling by	B	Acylations	Phosphorylatio	Methylation	Decarboxylatio
43	Which of the following is not a secondary messenger	C	cAMP	Calcium ions	Triacylglycerol	Inositol triphosphate
44	Most abundant protein in human blood is	B	Albumin	Hemoglobin	Transferrin	Globulin
45	What is the frequency of AABb in the offspring of dihybrid parents AaBb	C	1 in 2	1 in 4	1 in 8	1 in 16

46	In a diploid cell having 6 chromosomes, how many random homogolous arrangements are possible during metaphase-I	A	4	6	8	64
47	Isotopes used for proving semiconservative replication of DNA are	B	N14 and P31	N14 and N15	N14 and C14	C14 and P31
48	In a PCR reaction, if the template [A+G/C+T] value was 0.97, what would be the [A+G/C+T] value of the product?	D	0.25	0.5	0.8	1.01
49	Pseudogenes are:	C	Two genes that arose from duplication of a gene within an individual	Genes that are same but are found in different individuals	Similar to functional genes but do not produce a functional product	Similar to non-functional genes but do produce a functional product
50	Which of the following is an antigen presenting cell?	A	Macrophase	T-Cell	B-Cell	NK-Cell
51	The following molecules inhibits viral replication in a cell	D	IL-1	IL-4	TNF-a	INF-a
52	The following helps a bacteria to protect from virus	A	Endonuclease	Polymerase	Ligase	Methylase
53	SmaI and XmaI are neoschizomers. A circular DNA has 2 SmaI and 1 XmaI sites. How many fragments would XmaI digestion generate?	C	1	2	3	4
54	Which of the following is not true?	A	pI is the pH value at which a protein has overall charge of +1	When pH equals to pI, a protein will not move in an electric field	An acidic protein will have pI less than 7	A basic protein will have a pI greater than 7
55	Restriction enzymes were discovered by	B	Karry Mullis	Smith and Nath	Francis Crick	Charles Darwin
56	For a polycondensation reaction, the degree of polymerization is estimated to be 100,000. The extent of conversion (%) required for this reaction would be:	D	99	99.9	99.99	99.999
57	Ceiling temperature is the temperature at which:	B	Maximum conversion of the monomer takes place	Rate of polymerization = the rate of depolymerisation	Rate of polymerization < the rate of depolymerisation	Rate of polymerization > the rate of depolymerisation
58	Characteristics of the stress-strain curve of a polymer show High Modulus, no yield stress, moderate ultimate strength, and low elongation at break. The polymer is:	D	Soft and Weak	Soft and tough	Hard and strong	Hard and brittle
59	Which among the following is a conducting polymer	C	Polyacrylonitrile	Polyisobutylene	Polybutylthiophene	Polyoxydiphenylene-pyromellitimide
60	In the 1930's which polymer was used for radio housings	B	Polyparaphenylene	Bakelite	Polypropylene	Poly(p-phenylene Vinylene)
61	Which polymer is obtained through an Enymatic polymerization reaction	C	Polycaprolactone	Polylactic acid	Poly 3-hydroxybutanoate	Ehylene vinylacetate
62	Amino resins or plastics is obtained by the polymerization of formaldehyde with	B	Acetic acid	Urea	Lactic acid	Teraphthalic acid
63	All monomers in a regular macromolecule of a vinyl polymer are linked in a head-tail configuration. Then all beta-substituents in the chain are seperated by how many C atoms.	A	3	2	4	1
64	Which is not an example of heterogeneous polymerization	B	Precipitation polymerization	Bulk polymerization	Suspension polymerization	Emulsion polymerization
65	Which polymer achieves true conformal thin film coating that have important applications in Electronics and Medical device industries.	A	Parylenes C	UHMWPE	Low density polyethylene	Polymethyl methacrylate
66	An oscillator converts	B	AC power into DC power	DC power into AC power	Mechanical power into AC power	None of the the options
67	An oscillator employs …… feedback	A	Positive	Negative	Neither positive nor negative	Data insufficient

68	The inputs of a NAND gate are connected together. The resulting circuit is	C	OR gate	AND gate	NOT gate	None of the the options
69	Any logic gate can be realised by the repeated use of:	C	OR gates	NOT gates	NAND gates	None of the these options
70	In the DC equivalent circuit of a transistor amplifier, the capacitors are considered:	B	Short	Open	Partially short	None of the these options
71	The purpose of DC conditions in a transistor is to	C	Reverse bias the emitter	Forward bias the collector	Set up operating point	None of the these options
72	A certain opamp noninverting amplifier has Ri of 1 kΩ and Rf of 100 kΩ. The closed-loop voltage gain is	C	100,000	1000	101	100
73	A voltage follower	D	has a voltage gain of 1	is noninverting	has no feedback resistor	has all of these
74	The Op-amp can amplify	C	AC signals only	DC signals only	both AC and DC signals	neither DC nor AC signals
75	A crystal diode is used as	B	an amplifier	a rectifier	an oscillator	a voltage regulator
76	The ideal Op – Amp has the following characteristics.	A	Ri = ∞, A = ∞, R0 = 0	Ri = 0, A = ∞, R0 = 0	Ri = ∞, A = ∞, R0 = ∞	Ri = 0, A = ∞, R0 = ∞
77	In a full wave rectifier, the current in each diode flows for :	B	whole cycle of the input signal	half cycle of the input signal	more than half cycle of the input signal	none of these
78	What is true about the breakdown voltage in a Zener diode?	D	It decreases when current increases	It destroys the diode	It equals the current times the resistance	It is approximately constant.
79	In CE configuration the output V-I characteristics are drawn by taking	B	V_{CE} vs.I_C for constant value of I_E	VCEvs.IC for constant value of IB	VCEvs.IC for constant value of VCB	None of these
80	The power dissipated by a transistor approximately equals the collector current times	C	base emitter voltage	base supply voltage	collector emitter voltage	0.7V
81	A silicon PN junction in forward conduction has a voltage drop closer to	C	0.1V	0.3V	0.7V	1.3V
82	The leakage current of a PN junction is caused by	A	Heat energy	Chemical energy	Barrier potential	Majority carriers
83	The number FF in hexadecimal system has equivalence in decimal system to	D	128	256	30	255
84	Binary number 1101 is equal to octal number:	C	17	16	15	14
85	A system with an input x(t) and output y(t) is described by the relation: y(t) = t. x(t). This system is(a)(b)(c)(d)	B	linear and time-invariant	linear and time-varying	non-linear & time-invariant	non-linear and time-varying
86	Two systems with impulse responses h1(t) and h2(t) are connected in cascade. Then the overall impulse response of the cascaded system is given by(a)(b)(t)(c)(d)	D	product of h1(t) and h2(t)	sum of h1(t) and h2(t)	subtraction of h2(t) from h1(t)	convolution of h1(t) and h2(t)
87	A signal $x(t)$=100cos(24π×103)t is ideally sampled with a sampling period of 50 µsec and then passed through an ideal low pass filter with cutoff frequency of 15 KHz. Which of the following frequency is/are present at the filter output?	A	12 KHz and 8 KHz	12 KHz only	8 KHz only	12 KHz and 9 KHz
88	A bulb in a staircases has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by and one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles:	D	an AND gate	an OR gate	a NAND gate	an XOR gate
89	Two capacitors of 2 µF and 4 µF capacitance are connected in series across a 30 V dc battery. After the capacitors have been charged, the voltage across them will be	C	15V each	10V and 20 V	20V and 10V	30V each
90	Three resistance of 15Ω each are connected in delta. The resistance of equivalent star will have a value of	B	12Ω	5Ω	5/3Ω	45Ω

91	The CMRR of a differential amplifier is 100dB and its gain is 1000. If for an input signal the common mode voltage is 10V and differential voltage is 1mV what is the output voltage?	C	1V	1.01V	1.1V	2V
92	If a signal of 200Hz frequency is sampled at 300Hz, what will be the frequency of the sampled signal?	A	100Hz	200Hz	300Hz	400Hz
93	Two fair dies (six sided) are thrown. What is the probability that the sum of the numbers on two dies is eight ?	D	1/36	2/36	3/36	5/36
94	Find the equation of the plane passing through (2,-2,1) and parallel to plane 2x + 3y + z = 0	D	4x+7y+6z=0	3x+2y-z=1	2x+3y+z=5	4x+6y+2Z+2=0
95	Which of the following ECG wave corresponds to ventricular relaxation?	C	P wave	QRS segment	T Wave	All of these
96	In the breakdown region, a zener didoe behaves like a …… source	A	constant voltage	constant current	constant resistance	None of the these options
97	If the PIV rating of a diode is exceeded, then	B	the diode conducts poorly	the diode is destroyed	the diode behaves like a zener diode	None of the these options
98	If a three-stage amplifier has individual stage gains of 10 db, 5 db and 12 db, then total gain in db is:	D	600 db	24 db	14 db	27 db
99	A sine wave voltage is applied across a capacitor. When the frequency of the voltage is decreased, the current	B	Ceases	Decreases	Increases	Remains constant
100	Convert the binary number 1011010 to hexadecimal	B	5B	5A	5F	5C