305 PU M Tech Nano Sciences and Technology

1 of 100
177 PU_2016_305_E
The ability of the material to absorb energy on elastic deformation is known as:-

- Impact
- Resilience
- creep
- Toughness

2 of 100
207 PU_2016_305_E
Membrane proteins are:-

- Aligned diagonally
- Arranged in a zigzag manner
- Symmetrically placed
- Asymmetrically placed

3 of 100
130 PU_2016_305_E
The half-life of a zero order reaction (A→P) is given by (K = rate constant):-

- $t_{1/2} = [A]_0/k$
- $t_{1/2} = 1/ k [A]_0$
- $t_{1/2} = 2.303/k$
- $t_{1/2} = [A]_0/2k$

4 of 100
204 PU_2016_305_E
Plastids storing proteins are called:-

- Aleuroplasts
- Oleosomes
- Phaeoplasts
- Elaioplasts

5 of 100
192 PU_2016_305_E
The fatigue strength of mild steel is:-

- lower than its yield strength
- equal to its tensile strength
- equal to its yield strength

- more than its tensile strength

6 of 100

168 PU_2016_305_E

The number of solutions of equation 6 |cosx| - x = 0in [0, 2π] are:-

- 2
- 6
- 3
- 4

7 of 100

181 PU_2016_305_E

In general, more ductile material has the following structure:-

- body centered cubic lattice
- diamond cubic
- hexagonal close packed
- face centered cubic

8 of 100

156 PU_2016_305_E

Area of region on the complex plane which is bounded by the curve | z + 2i | + | z - 2i | = 8 is:-

- $3\sqrt{8}\pi$
- $16\pi\sqrt{3}$
- $4\sqrt{12}\pi$
- None of these

9 of 100

121 PU_2016_305_E

The e.m.f around a closed path is equal to negative rate of change of magnetic flux linked with the path in significance of:-

- Maxwell's first equation
- Maxwell's second equation
- Maxwell's third equation
- Maxwell's fourth equation

10 of 100

103 PU_2016_305_E

If horizontal and vertical components of the earth's magnetic field are equal at a certain place, then the angle of dip at that place is:-

- 22.50 N

- 11.25 N
- 45.00 N
- 7.20 N

11 of 100

148 PU_2016_305_E

A curve has equation $y = 3x^2 - 7x - 2$.

What is the gradient of the tangent at the point where x=3?

- 4
- 9
- 3
- 11

12 of 100

191 PU_2016_305_E

As compared to engineering stress strain curve, the true stress strain curve is:-

- crosses the engineering curve
- parallel to the engineering curve
- below and to the right
- above and to the left

13 of 100

194 PU_2016_305_E

The shear modulus, G, of plastic is related to the elastic modulus, E, and the Poisson ratio,v, through the equation:-

- E = (1-v) G
- E = (1+v) G
- E = 2(1-v) G
- E = 2(1+v) G

14 of 100

179 PU_2016_305_E

The percentage of carbon in cast iron is:-

- 4.5-6.5%
- 2.5-4%
- 0.5-1.5%
- less than 0.5%

15 of 100

114 PU_2016_305_E

The particles are assumed to obey Pauli's exclusion principle in:-

- Maxwell-Boltzmann statistics
- Bose-Einstein statistics
- Fermi-Dirac statistics
- None of these

16 of 100

201 PU_2016_305_E

Eukaryotic cells devoid of Endoplasmic reticulum are:-

- Mature erythrocytes
- Liver cells
- Kidney cells
- Mature leucocytes

17 of 100

120 PU_2016_305_E

Photons, phonons, helium, nuclei and mesons are treated with help of:-

- Fermi-Dirac statistics
- Bose-Einstein statistics
- Maxwell-Boltzmann statistics
- None of these

18 of 100

218 PU_2016_305_E

Which of the following bacteria are responsible for the conversion of pyruvic acid to propionic acid through oxaloacetic acid formation?

- Enterobacter
- Clostridium
- Lactobacillus
- Propionobacterium

19 of 100

175 PU_2016_305_E

Permanent deformation is related to:-

- fatigue
- plasticity
- creep
- elasticity

20 of 100

214 PU_2016_305_E
Mammals can regenerate:-

- Liver
- Urinary bladder
- Brain
- Lung

21 of 100

152 PU_2016_305_E
Let a ,b∈R-{0} and α,β,γ be the roots of the equation $x^3+ax^2+bx-b=0$. If $2/\beta = 1/\alpha + 1/\gamma$,then the minimum value of (a+b)/b is equal to:-

- 3/4
- 2/3
- 1/3
- 3/8

22 of 100

211 PU_2016_305_E
In human beings, which part shows the maximum increase in weight from birth to adulthood?

- Muscles
- Brain
- Skeleton
- Fat

23 of 100

144 PU_2016_305_E
The main component of the brass are:-

- Cu and Zn
- Cu and Al
- Cu and Sn
- Cu and Ni

24 of 100

162 PU_2016_305_E
Let (x , y , z) be points with integer co-ordinates satisfying the system of homogeneous equation3x - y - z = 0, -3x + z = 0, -3x + 2y + z = 0. Then the number of such points for which$x^2 + y^2 + z^2 \leq 100$ are:-

- 5
- 10
- 6
- 7

25 of 100
142 PU_2016_305_E
Clouds represent an example of dispersion of:-

- Liquid in gas
- Solid in gas
- Gas in liquid
- Gas in gas

26 of 100
216 PU_2016_305_E
Heriditary fructose intolerance is a condition caused by a deficiency of:-

- Phosphofructokinase
- Fructokinase
- Fructokinase 1,6-diphosphate aldolase
- Fructokinase 1-phosphate aldolase

27 of 100
186 PU_2016_305_E
Bainite forms when the transformation temperature is between pearlite and:-

- ferrite
- sorbite
- martensite
- cementite

28 of 100
135 PU_2016_305_E
In their metallic form, elements from which of the following groups are usually effective for hydrogenation catalyst:-

- Alkaline earth metals
- Halogens
- Actinides
- Pt metals

29 of 100
182 PU_2016_305_E
Psychrometry is related to the study of:-

- combustion
- moist air
- biomimetics

- luminescence

30 of 100

138 PU_2016_305_E

Random motions of colloidal particles is known as:-

- Electro osmosis
- Brownian movement
- Tyndall effect
- Dialysis

31 of 100

200 PU_2016_305_E

Protoplasm is:-

- Alveolar
- Crystallo-colloidal
- Fibrillar
- Granular

32 of 100

174 PU_2016_305_E

Cementite is a:-

- cement
- composite
- elastomer
- glass

33 of 100

136 PU_2016_305_E

Which of the following doesn't have a metal-metal bond?

- Al_2Cl_6
- Hg_2Cl_2
- $K_2Fe_2Cl_5$
- $Mn_2(CO)_{10}$

34 of 100

196 PU_2016_305_E

Protein synthesis takes place on groups or clusters of ribosomes which are called:-

- Polyribosomes
- Ergosomes
- Endoplasmic Reticulum

- Polysomes

35 of 100

173 PU_2016_305_E

The typical property of ceramic is:-

- Elasticity
- low hardness
- Brittleness
- machinability

36 of 100

153 PU_2016_305_E

Consider the function

$f(x) = (1 + m)\, x_2 - 2(3m + 1)x + (8m + 1)$, where $m \in R - \{-1\}$

The number of real values of 'm' such that $f(x) = 0$ has roots which are in the ratio 2:3 is /are:-

- 0
- 1
- 4
- 2

37 of 100

188 PU_2016_305_E

Which among the following parameters which strongly affects diffusivity?

- Presence of defects
- Lattice parameter
- Diffusing species
- Temperature

38 of 100

178 PU_2016_305_E

Which among the following has highest ductility?

- Cu
- W
- Ti
- Ni

39 of 100

146 PU_2016_305_E

The compound used in preparing antiseptic ointment:-

- Para-aldehyde
- Phenol

- Benzyl chloride
- Benzyl alcohol

40 of 100

212 PU_2016_305_E

As compared to whole body, the head of an adult human being is:-

- One-fifth
- One-seventh
- One-eighth
- One-sixth

41 of 100

149 PU_2016_305_E

Two circles have equations $x^2 + y^2 = 16$ and $(x - 2)^2 + y^2 = 4$.

Which of the following correctly describes the relative position of the two circles?

- The two circles touch externally
- The circles do not touch or intersect
- The two circles intersect
- The two circles touch internally

42 of 100

115 PU_2016_305_E

In Fermi-Dirac statistics, the particles are called fermions and in the case of Bose-Einstein statistics, the particles are called as:-

- Bosons
- Hyperons
- Mesons
- None of these

43 of 100

205 PU_2016_305_E

Glycophorin is a:-

- Cytosolic protein
- Triple α-helix
- Transmembrane protein
- Peripheral protein

44 of 100

109 PU_2016_305_E

An assembly of bosons is known as:-

- Bose-Einstein condensation
- Fermi-Dirac gas
- Bose-Einstein gas
- None of these

45 of 100

164 PU_2016_305_E

. If $\log_7\left\{\log_5\sqrt{(x^2+x+5)}\right\}=0$, then x is equal to:-

- 4
- -2
- 3
- 2

46 of 100

127 PU_2016_305_E

The molecular geometry of IF_5 is:-

- Trigonal planar
- Linear
- Square pyramidal
- Square planar

47 of 100

150 PU_2016_305_E

A, B and C have coordinates (1, -2, 4), (5, 4, -2) and (7, 7, -5) respectively.
Here are two statements about the points A, B and C
(1) A, B and C are collinear
(2) $\left|\overrightarrow{AC}\right| : \left|\overrightarrow{BC}\right| = 2:1$. Which of the following is true?

- Neither statement is correct
- Only statement 1 is correct
- Only statement 2 is correct
- Both statements are correct

48 of 100

137 PU_2016_305_E

Among the following one having highest bond strength is:-

- O_2^-
- O_2^+
- O_2

- O_2^{2-}

49 of 100

169 PU_2016_305_E

Area enclosed by inequality $2 \leq |x+y| + |x-y| \leq 4$is:-

- 5 sq. units
- 12 sq. units
- 8 sq. Units
- 4 sq. units

50 of 100

100 PU_2016_305_E

If m*h > m*e, then the position of Fermi energy level is:-

- Just above the centre of energy gap
- Just above valence band
- Just below conduction band
- At the centre of energy gap

51 of 100

184 PU_2016_305_E

Which micro-constituent is not the part of the iron-carbon system?

- Troostite
- Martensite
- Sorbite
- Magnesite

52 of 100

159 PU_2016_305_E

If a , b , c , d $\in$ {0 , 1}, then the probability that system of equations ax + by = 2 ; cx + dy = 4 is having unique solution is given by:-

- 5/8
- 1/2
- 1
- 3/8

53 of 100

219 PU_2016_305_E

Enterobacter helps in production of _____ from pyruvic acid.

- Propanol
- Acetone

- Butanediol
- Ethanol

54 of 100

161 PU_2016_305_E

Let 'ω' be the non-real cube root of unity, where $A=\begin{bmatrix}\omega & 0 & 0\\ 0 & \omega & 0\\ 0 & 0 & \omega\end{bmatrix}$, then A^{2010} is equal to:-

- I
- -A
- 0
- A

55 of 100

165 PU_2016_305_E

If $\log_{12} 27 = a$, then $\log_6 16$ is:-

- $2\left(\frac{4-a}{4+a}\right)$
- $2\left(\frac{3-a}{3+a}\right)$
- $4\left(\frac{3-a}{3+a}\right)$
- $3\left(\frac{3-a}{3+a}\right)$

56 of 100

158 PU_2016_305_E

If John is allowed to select at most (n + 1) chocolates from a collection of (2n + 2) distinct chocolates,then total number of ways by which John can select at leasttwo chocolates are given by:-

- $2(4)^n + 4.\ {}^{2n+1}C_n - 2n + 3$
- $2(4)^n + {}^{2n+1}C_n - 2n - 3$
- $(4)^n + 4.\ {}^{2n+1}C_n - 2n + 1$
- $2(4)^n - {}^{2n+1}C_n - 2n - 3$

57 of 100

172 PU_2016_305_E

Which among the following is NOT the typical metallic property?

- Lustre
- Formability
- Ductility
- High specific heat

58 of 100

125 PU_2016_305_E

Which one of the following exhibit rotational spectra?

- H_2
- N_2
- CO_2
- CO

59 of 100

167 PU_2016_305_E

If $\log x^2 - \log 2x = 3\log 3 - \log 6$, then x is:-

- 10
- 9
- 1
- 2

60 of 100

171 PU_2016_305_E

If $y = f(x)$ and $y\cos x + x\cos y = \pi$ for all $x \in R$, then $f''(0)$ is:-

- $-\pi$
- π
- 2π
- 0

61 of 100

230 PU_2016_305_M

pH value of buffer can be calculated using the equation pH = pKa + ...

- [acid]/[salt]
- [acid]/salt
- [acid]
- [salt]

62 of 100

231 PU_2016_305_M

An octahedral complex is formed when hybrid orbitals of the following type are involved:-

- sp^2d^2
- d^2sp^3
- dsp^2
- sp^3

63 of 100

228 PU_2016_305_M

The complex compound in which oxidation number of metal is zero is:-

- $[Pt(NH_3)_4]Cl_2$
- $[K_4Fe(CN)_6]$
- $K_3[Fe(CN)_6]$
- $[NiCO_4]$

64 of 100

251 PU_2016_305_M

Desirable property for components to withstand shock and impact load?

- toughness
- brittleness
- strength
- stiffness

65 of 100

234 PU_2016_305_M

Ground state term for the d^7 configuration:-

- ^3p
- ^5d
- ^1s
- ^4f

66 of 100

236 PU_2016_305_M

The equation of common tangent to the curves $y = 6 - x - x^2$ and $xy = x + 3$ is:-

- $3x + y = 10$
- $3x + y = 7$
- $2x + y = 4$
- $3x - y = 8$

67 of 100

247 PU_2016_305_M

Diamagnetic materials are:-

- are magnetized in direction opposite to that of applied field
- can be magnetized in one direction only
- non magnetic
- cannot be magnetized

68 of 100

243 PU_2016_305_M

The centre of smallest circle which cuts the circles $x^2+ y^2 = 1$ and $x^2 + y^2 + 8x+ 8y - 33 = 0$ orthogonally is:-

- $(\sqrt{3},2)$
- (2, 2)
- $(2\sqrt{2}, \sqrt{3})$
- $(2,2\sqrt{2})$

69 of 100

241 PU_2016_305_M

If the straight lines 6x + 3y - 10 = 0, 6x + Ky- 4 = 0 and 2x + y - 3 = 0 are concurrent, then:-

- K = 3
- $K \in \Phi$
- K = 1
- $K \in R$

70 of 100

237 PU_2016_305_M

Equation of normal to curve $y = (1+x)^y+ \sin\text{-}1(\sin^2 x)$at x = 0 is:-

- x + y - 1 = 0
- x - y + 1 = 0
- x + y = 0
- x + y + 1 = 0

71 of 100

240 PU_2016_305_M

If L1 ,L2 , L3 are three non-concurrent and non parallel lines in 2-dimesional plane, then maximum number of points which are equidistant from all the three lines is/are:-

- 3
- 2
- 1
- 4

72 of 100

258 PU_2016_305_M
Respiration is regarded as:-

- Synthetic process
- Reduction process
- Catabolic process
- Anabolic process

73 of 100

225 PU_2016_305_M
The waves of frequency 12 MHZ are emitted by a radio station. The velocity of radio waves is 3 $X10^8$ milli per second. The wavelength of emitted waves will be _____.

- 25 m
- 36 m
- 3.6 m
- 2.5 m

74 of 100

227 PU_2016_305_M
A free electron is placed in the path of a plane electromagnetic wave. The electron will start moving _____.

- Along the magnetic field
- In a plane containing the magnetic field and the direction of propagation
- Along the electric field
- Along the direction of propagation of the wave

75 of 100

254 PU_2016_305_M
Small nuclear RNAs are involved in:-

- Splicing and processing of both rRNA and mRNA
- Splicing of RNAs
- Splicing and processing of mRNA
- Binding of DNA

76 of 100

235 PU_2016_305_M
Potential of hydrogen electrode at pH 10:-

- -0.059V
- 0.59V
- -0.59V
- 0.00 V

77 of 100
222 PU_2016_305_M
In which of the following, the speed of sound will be maximum?

- Water
- Air
- Vacuum
- Steel

78 of 100
220 PU_2016_305_M
In a nuclear reactor, the control rods are made of _____.

- Uranium-238
- Uranium-235
- Plutonium
- Cadmium

79 of 100
224 PU_2016_305_M
The displacement current arises due to _____.

- Positive charges only
- Time varying electric field
- Both positive and negative charges
- Negative charges only

80 of 100
255 PU_2016_305_M
Signal theory is related to:-

- Nervous system
- Synthesis of secretory proteins
- Emergency
- Formation of special membrane lipiol

81 of 100
262 PU_2016_305_D
Specific heat of the water is minimum at:-

- 0°C
- 0K
- 273°C
- 4°C

82 of 100

264 PU_2016_305_D

The main significance of the relativistic formula for the variation of mass with velocity is that no material body can have _____.

- A velocity equal to or greater than the velocity of light
- A velocity equal to or lesser than the velocity of light
- A velocity lesser than the velocity of light
- None of these

83 of 100

260 PU_2016_305_D

A monochromatic electromagnetic waves means that _____.

- The wave always travels in the same direction
- Electric field vector E lies in one direction only
- Magnetic field vector B must be perpendicular to the direction of propagation
- The field strength at a point varies with time according to sine or cosine function

84 of 100

297 PU_2016_305_D

Which is the final electron acceptor in respiration?

- Oxygen
- Dehydrogenase
- Cytochrome
- Hydrogen

85 of 100

269 PU_2016_305_D

The nature of ether is:-

- Amphoteric
- Acidic
- Neutral
- Slightly basic

86 of 100

273 PU_2016_305_D

The entropy of the universe is:-

- Continuously increasing
- Constant
- Zero

- Continuously decreasing

87 of 100

287 PU_2016_305_D

The corrosion resistance of stainless steel primarily arise from the presence of:-

- Ni
- Cr
- P
- Co

88 of 100

284 PU_2016_305_D

Addition of _____ increases the machinability of aluminium.

- Magnesium
- lead and bismuth
- Silicon
- Copper

89 of 100

286 PU_2016_305_D

The degree of freedom when ice, water and water vapour co-exist in equilibrium is:-

- 3
- 0
- 2
- 1

90 of 100

289 PU_2016_305_D

Which is not the metal joining process:-

- slip casting
- welding
- soldering
- brazing

91 of 100

295 PU_2016_305_D

Mineral activator needed for the enzymes carboxylase of TCA cycle is:-

- Mo
- Mg
- Fe

- Mn

92 of 100

267 PU_2016_305_D

There is universal equivalence between mass and energy i.e. mass may appear as energy and energy as mass is called _____.

- Mass-velocity equivalence
- Mass-energy variation
- Mass-energy equivalence
- None of these

93 of 100

277 PU_2016_305_D

Minimum distance between the ellipse $x^2x^2+ 2y^2= 6$ and the line x +y - 7 =0 is equal to:-

- $4\sqrt{2}$
- $\sqrt{5}$
- $2\sqrt{2}$
- $\sqrt{10}$

94 of 100

281 PU_2016_305_D

When $\nabla \times \vec{A} = 0$ then the vector field is:-

- Irrotational
- Sinusoidal
- Solenoidal
- Constant

95 of 100

270 PU_2016_305_D

If 1 mol of NH3 is mixed with 1 molHCl in closed container to form NH_4Cl gas then:-

- $\Delta H = \Delta U$
- $\Delta H > \Delta U$
- $\Delta H < \Delta U$
- There is no relationship

96 of 100

266 PU_2016_305_D

One atomic mass unit is equal to _____.

- 931.3 MeV
- 911.3 MeV

- 913.3 MeV
- None of these

97 of 100

268 PU_2016_305_D

Saturated solution of KNO3 is used to make salt bridge because:-

- Velocity of both are nearly same
- Velocity of K^+ is greater than NO_3^-
- KNO_3 is highly soluble in water
- Velocity of NO_3^- is greater than K^+

98 of 100

261 PU_2016_305_D

Which of the following statements is true?

- In air the sound waves are transverse and the light waves are longitudinal
- Both the sound and the light waves are transverse waves
- In air the sound waves are longitudinal and the light waves are transverse
- The sound and the light waves are both longitudinal waves

99 of 100

294 PU_2016_305_D

To a living organism which of the following has the greater amount of available energy per molecule:-

- ADP
- H_2O
- CO_2
- ATP

100 of 100

299 PU_2016_305_D

Action of ATPase needs the presence of:-

- Na^+ and K^+
- Mg^{++} and K^+
- Cu^{++} and Fe^{++}
- Ca^{++} and Mg^{++}