PU Ph D Green Energy Technology

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131 PU_2015_159

If $A = \begin{bmatrix} 2 & 1-i \\ 1+i & 6 \end{bmatrix}$ then A is:-

- Symmetric
- skew symmetric
- hermitian
- skew hermitian

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107 PU_2015_159
The straight lines L_1: x=0, L_2:y=0 and L_3: x+y=1 are mapped by the transformation $w=z^2$ into the curves C_1, C_2 and C_3 respectively. The angle of intersection between the curves at w=0 is:-

- $\pi/4$
- π
- $\pi/3$
- 0

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104 PU_2015_159
The first order differential equation M(x,y) dx+N(x,y) dy=0 is exact if:-

- $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$
- $\frac{\partial M}{\partial x} \neq \frac{\partial N}{\partial y}$
- $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$
- $\frac{\partial M}{\partial y} = \frac{\partial M}{\partial x}$

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135 PU_2015_159

$\int_a^b x^{-1+\varepsilon} dx$ where $\varepsilon \to 0$ is

- 1/ ε
- ln(b/a)

- $b^{\varepsilon}-a^{\varepsilon}$
- 0

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120 PU_2015_159

The singularity of $e^{\sin Z}$ at Z= ∞ is:-

- A pole
- non isolated essential singularity
- a removable singularity
- isolated essential singularity

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117 PU_2015_159

complex conjugate of $\frac{i\sqrt{-9}+5i}{1+\sqrt{-1}}$ is:-

- i-5
- 1+5i
- i+5
- 1-5i

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108 PU_2015_159

The possible set of eigen values of a 4x4 skew-symmestric orthogonal real matrix is:-

- $\{\pm i, \pm 1\}$
- $\{\pm 1\}$
- $\{\pm i\}$
- $\{0, \pm i\}$

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105 PU_2015_159

If $y = \sum_{m=0}^{\infty} C_m x^{r+m}$ is assumed to be a solution of the differential equation $x^2y'' - xy' - 3(1+x^2)y = 0$ then the values of r are:-

- -1 and 3
- 1 and 3
- -1 and -3

- 1 and -3

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106 PU_2015_159

If a transformation y=uv transforms the given differential equation $f(x)y'' - 4f'(x)y' + g(x)y = 0$ into the equation of the form $v'' + h(x)v = 0$ then u must be:-

- f^2
- xf
- 1/2f
- $1/f^2$

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132 PU_2015_159

If there exist a non-zero minor of order r, then rank of A is:-

- less than r
- greater than or equal to r
- Equal to r
- less than or equal to r

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114 PU_2015_159

If A is an nxn non-singular matrix then which of the following is true?

- $adj(adj\ A) = |A|^{(n-1)}$
- $|adj(adj\ A)| = |A|^{2(n-1)}$
- $|adj(adj\ A)| = |A|^{(n-1)^2}$
- $adj(adj\ A) = |A|^{(n-1)^2}$

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123 PU_2015_159

The residue of $\frac{sinZ}{Z^8}$ at Z=0 is:-

- 0
- $-\frac{1}{7!}$

- $-\frac{1}{5!}$
- none of these

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128 PU_2015_159

If $x > 1$ and $\frac{\sqrt{x}}{x^3} = x^m$, what is the value of m?

- 2
- $-\frac{5}{2}$
- -2
- $-\frac{3}{2}$

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113 PU_2015_159

The determinant $\begin{vmatrix} a1 & a2 & a3 \\ b1 & b2 & b3 \\ c1 & c2 & c3 \end{vmatrix} \times \begin{vmatrix} a1 & a2 & a3 \\ b1 & b2 & b3 \\ c1 & c2 & c3 \end{vmatrix}$ is a determinant of order:-

- 6
- 9
- 3
- 27

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137 PU_2015_159

For XOR operator $\oplus$ which one is not correct?

- $0 \oplus 0 = 1$
- $1 \oplus 0 = 1$
- $0 \oplus 1 = 1$
- $1 \oplus 1 = 0$

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119 PU_2015_159

When Cos Θ=-1/2, then Θ is in:-

- quadrant II
- quadrant I
- quadrant IV
- quadrant III

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122 PU_2015_159

$\int_0^1 \frac{x}{1+x^2} dx$ is:-

- π/4
- 1
- log2
- log√2

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130 PU_2015_159

All the diagonal elements of a skew symmetric matrix are:-

- one
- Zero
- real
- pure imaginary

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124 PU_2015_159

The maximum value of $\frac{\log(x)}{x}$ in (0,∞) is:-

- 1/e
- 1
- e
- none of these

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129 PU_2015_159

Let $f(x) = \sum_{n=1}^{\infty} \frac{\sin(nx)}{n^2}$ then:-

- $lim_{x \to 0} f(x) = 0$
- $lim_{x \to 0} f(x) doesnot\ exist$
- $lim_{x \to 0} f(x) = 1$
- $lim_{x \to 0} f(x) = \pi^6/2$

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118 PU_2015_159

The sum of the natural numbers between 100 and 1000 which are multiples of 5:-

- 100000
- 98450
- 94850
- none of these

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136 PU_2015_159

The equation of a straight line that passes through point A(1,-1) and has a slope equa to -1 is:-

- y=1/x
- y=-x
- y=x+1
- y=x

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110 PU_2015_159

The value of $\begin{vmatrix} 265 & 240 & 219 \\ 240 & 225 & 198 \\ 219 & 198 & 181 \end{vmatrix}$ is:-

- 1161
- 251
- 2151
- 0

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111 PU_2015_159

If $A = \begin{bmatrix} cos\alpha & -sin\alpha \\ sin\alpha & cos\alpha \end{bmatrix}$ then A-1 is:-

- $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$
- Not existing
- $\begin{bmatrix} cos\alpha & sin\alpha \\ -sin\alpha & cos\alpha \end{bmatrix}$
- $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

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112 PU_2015_159

If $A = \begin{bmatrix} x & y \\ z & w \end{bmatrix}$ then Adj(Adj(A)) is equal to:-

- $\begin{bmatrix} x & z \\ y & w \end{bmatrix}$
- $\begin{bmatrix} z & w \\ x & y \end{bmatrix}$
- $\begin{bmatrix} z & x \\ w & y \end{bmatrix}$
- $\begin{bmatrix} x & y \\ z & w \end{bmatrix}$

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174 PU_2015_159

An element 'X' emits successively two α particles. The mass and atomic numbers of the element are decreased by, respectively.

- 4 and 8
- 2 and 4
- 4 and 6
- 4 and 4

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172 PU_2015_159

When an atom/ion is missing from its normal lattice position creating vacancy, it is known as:-

- Frenkel defect
- Line defect
- Schotky defect

- None

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159 PU_2015_159

The electrolyte used in lead-acid battery is:-

- HCl
- H_2SO_4
- HNO_3
- H_2O

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178 PU_2015_159

The point group of NH_3 molecule is:-

- C_{1v}
- C_{2v}
- C_{3v}
- $C_{v\alpha}$

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167 PU_2015_159

The bond order of C_2 molecule is:-

- 1
- 2
- 0
- 3

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The number of peaks in the EPR spectrum of $CH_3^{\bullet}$ radical is:-

- 2
- 3
- 1
- 4

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143 PU_2015_159

According to Arrhenius equation, $k = A \cdot e\text{-}(E_a/RT)$, as 'T' approaches infinity, 'k' will approach:-

- A
- 0
- 1

- Infinity

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A Carnot engine operates between 600 and 800K, and observes 2000 calories heat from the source. The work done (in cal) is:-

- 1000
- 666
- 2000
- 500

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As we move from bulk materials to nanostructured materials, the density of states (DOS):-

- Remains same
- Not applicable
- Increases
- Decreases

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173 PU_2015_159

The intense color of $KMnO_4$ is due to:-

- MLCT
- LMCT
- None
- d-d transition

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170 PU_2015_159

The number of normal modes of vibration for H_2O molecule is:-

- 3
- 1
- 4
- 2

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149 PU_2015_159

One of the following molecules used as food preservatives is:-

- Sodium benzoate
- Ethylene glycol

- Sodium alkyl benzene sulphonate
- None

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147 PU_2015_159

The Bayer's angle strain is expected to be maximum in:-

- Cyclopentane
- Cyclodecane
- Cyclooctane
- Cyclohexane

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156 PU_2015_159

An example for the species having quadruple bond is:-

- $Mn_2(CO)_{10}$
- $Hg_2(CH_3COO)_2$
- $Cr_2O_7^{2-}$
- $Re_2Cl_8^{2-}$

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162 PU_2015_159

An example for spinel compound is:-

- $CaTiO_3$
- Co_3O_4
- $MgAl_2O_4$
- None

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176 PU_2015_159

Lead acid battery uses _____ as anode.

- PbO_2
- $PbSO_4$
- $PbCl_2$
- Pb

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161 PU_2015_159

The molar entropy of crystalline CO at absolute zero is:-

- Zero
- Rln2

- 2Rln2
- –Rln2

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142 PU_2015_159

The point group symmetry of H_2O molecule is:-

- C_{2v}
- C_{1v}
- D_{3h}
- C_{3v}

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163 PU_2015_159

The most symmetrical crystal system is:-

- Trigonal
- Cubic
- Triclinic
- Monoclinic

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164 PU_2015_159

Optical isomerism is exhibited by:-

- $K_4[Fe(CN)_6]$
- $K_3[Fe(CN)_6]$
- $[Co(H2O)_6]^{3+}$
- $[Co(en)_3]^{3+}$

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146 PU_2015_159

The absorption maximum of CdS is 470 nm. The approximate band gap in eV is:-

- 4.63
- 2.63
- 3.63
- 1.63

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171 PU_2015_159

A solution of sodium in liquid ammonia is blue in color due to the presence of:-

- Sodamine
- Solvated electrons

- Solvated sodium ions
- Solvated sodium atoms

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153 PU_2015_159
Cathode of lead-acid battery is:-

- PbO_2
- Cd
- Pb
- $PbSO_4$

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166 PU_2015_159
All radioactive reactions are:-

- First order reactions
- Second order reactions
- Third order reactions
- Zero order reactions

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160 PU_2015_159
Picric acid is:-

- Trinitrobenzene
- Trinitrophenol
- Tribromobenzene
- Trinitrotoluene

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193 PU_2015_159
In gluconeogenesis, Glucose is synthesized from two molecules of pyruvate and:-

- Two molecule of ATP
- Four molecules of ATP
- Six molecules of ATP
- Eight molecules of ATP

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196 PU_2015_159
Enzyme that are used to hydrolyse fats into diglycerides, monoglycerides, fatty acids and glycerol is:-

- Protease
- Zymase

- Cellulase
- Lipase

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208 PU_2015_159

The residue which has least conformational hindrance and thus can covers most of the area of Ramachandran plot is:-

- Alanine
- Lysine
- Glycine
- Proline

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215 PU_2015_159

A true breeding tall plant is crossed with a true breeding short plant and the F_1 generation produced is self-pollinated to produce F_2 generation. Ratio of true breeding tall and true breeding short plant in F_2 generation will be:-

- 2 : 1
- 1 : 2
- 1 : 3
- 1 : 1

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211 PU_2015_159

Breakdown of pyruvate to give carbon dioxide, water and energy takes places in:-

- Cytoplasm
- Nucleus
- Chloroplast
- Mitochondria

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187 PU_2015_159

What happen when wheat field is inoculated with *Rhizobium*?

- Fertility of the soil decreases
- No increase in production / nitrogen content of the soil
- Fertility of the soil increases
- Increase in production/ nitrogen content of the soil

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209 PU_2015_159

Specific group of atoms that is needed to mount the immune response of the antigen is called:-

- Antigenic determinant
- Fab Fragment
- Antigen molecule
- Fc Fragment

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185 PU_2015_159
For an ecosystem, which of the following is incorrect?

- Energy movement is non-cyclic
- Energy is lost irretrievably
- Energy movement is unidirectional
- Energy movement is from higher to lower trophic level

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207 PU_2015_159
Which of the following is not an Antigen Presenting Cell?

- Monocytes
- thymus epithelial cells
- macrophage
- T cell

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206 PU_2015_159
Which of the following can be classified as second messenger molecule?

- G protein
- adenylecyclase
- cyclic adenosine monophophate
- phospholipase

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216 PU_2015_159
A frog that feeds on insects is as:-

- Tertiary consumer
- Primary consumer
- Decomposures
- Secondary consumer

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186 PU_2015_159
Which of the following chemicals that can be related to biological magnification?

- Phospholipids
- Organophosphates
- Cholesterol
- Fatty acids

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200 PU_2015_159
Example of a light-driven proton pump is:-

- Bacteriorhodopsin
- ATP Synthase
- Na Channel
- Connexin

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214 PU_2015_159
How many genes a child receives from its father?

- 25%
- 75%
- 50%
- 100%

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197 PU_2015_159
A method of purification of proteins according to their specificity to particular antibody/ substrate/ cofactor is called:-

- Electrophoresis
- Affinity Chromatography
- Gel filtration Chromatography
- Ion exchange Chromatography

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228 PU_2015_159
The viscosity of gas is directly proportional to:-

- characteristic gas constant
- density of gas
- square root of temperature
- temperature

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247 PU_2015_159

A semiconductor with equal concentration of acceptor and donor type of impurities is termed as:-

- Compensated
- Intrinsic
- Amphoteric
- None of these

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248 PU_2015_159

An insulator is really a semiconductor which melts:-

- At low temperature
- At high temperature
- At very high temperature
- None of these

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257 PU_2015_159

The sun release energy by:-

- Nuclear fusion
- Hydro-thermal process
- Spontaneous combustion
- Nuclear fission

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227 PU_2015_159

A constant volume gas thermometer works on:-

- Archimede's law
- Charle's law
- Boyle's law
- Pascal's law

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253 PU_2015_159

What is the average binding energy of a nucleon in the nucleus of an atom?

- 7.8 eV
- 7.8 KeV
- 7.8 MeV
- 7.8 BeV

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246 PU_2015_159

The expression for Fourier level in a metal is:-

- $E_f = \frac{h^2}{8m}\left[\frac{3L}{N^3}\right]^{1/3}$
- $E_f = \frac{h^2}{8m}\left[\frac{3N}{\pi L^3}\right]^{2/3}$
- $E_f = \frac{h^2}{8m}\left[\frac{3\pi N}{L^3}\right]^{3/2}$
- None of these

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Nuclear fission required high temperature because:-

- The mass deficit must be supplied
- All nuclear reactions absorb heat
- The particles cannot come closer unless they are moving rapidly
- The binding energy must be supplied from an external source

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244 PU_2015_159

Which type of crystals are generally good optical reflectors?

- Metals
- Ionic crystals
- Covalent crystals
- All of the above

75 of 100

245 PU_2015_159

Electronic contribution to the specific heat of a metal at low temperature is:-

- An exponential function of T
- A linear function of T
- Zero
- None of these

76 of 100

256 PU_2015_159

The mean life time of one of the atoms of a radioactive sample is:-

- λ
- $2 \ln \lambda$
- $(1/\lambda)$
- $\lambda \ln 2$

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224 PU_2015_159

The angular velocity of the body:-

- $\omega = \theta/t$
- $\omega = \theta/t\sin\theta$
- $\omega = 2\Pi r/t$
- $\omega = 2\Pi r/ t\sin\theta$

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234 PU_2015_159

In case of single core cable if the inner radius and outer radius of the insulation are doubled, the capacity of the cable will:-

- become half
- remain same
- become four times
- Become double

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252 PU_2015_159

The susceptibility of a superconductor is:-

- Negative and unity
- Positive and small
- Positive and unity
- Negative and small

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236 PU_2015_159

Isotopes of given elements must have the same:-

- number of proton in the nucleus
- molecular weight
- number of neutrons in the nucleus
- Atomic weight

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238 PU_2015_159

Which of the following wavelength falls in X-ray region?

- 10-4 Å
- 1000 Å
- 10000 Å
- 1 Å

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242 PU_2015_159
The one which is not compatible with crystal symmetry is:-

- Three-fold symmetry
- One-fold symmetry
- Six-fold symmetry
- Five-fold symmetry

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226 PU_2015_159
The profile of advancing liquid through a tube is:-

- straight line
- hyperbola
- semicircle
- parabola

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243 PU_2015_159
Germanium and silicon have diamond structure for which the molecules per unit cell are equal to:-

- 2
- 8
- 4
- 1

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225 PU_2015_159
The Centre of Gravity of triangular lamina lies at:-

- in centre
- orthocenter
- circum centre
- centroid

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223 PU_2015_159
The total current density through the reverse biased depletion region under study state is:-

- $J_{tot} = \log J + J_{diff}$
- $J_{tot} = J_{dr} + J_{diff}$
- $J_{tot} = J_n + J_p$
- $J_{tot} = \log J + V$

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237 PU_2015_159
Which of the following can be deflected by a magnet?

- radio waves
- Ultra-violet rays
- beta rays
- X-rays

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254 PU_2015_159
The classical electron radius is of the order of:-

- 10^{-8} cm
- 10^{-13} cm
- 10^{-15} cm
- 10^{-11} cm

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232 PU_2015_159
When viewed in white light, a soap bubbles show colour because of:-

- Dispersion
- Diffraction
- Scattering
- Interference

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233 PU_2015_159
What type of waves carry sound in air?

- Longitudinal wave
- Electromagnetic wave
- Transverse wave
- Transverse and longitudinal wave

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293 PU_2015_159
What is the purpose of supercharging an engine?

- To improve cooling of cylinders
- To reduce the noise of the engine
- To reduce specific fuel consumption
- To increase the power output of engine

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282 PU_2015_159
The Rockwell number refers to a material's:-

- Plasticity
- Hardness
- Toughness
- Malleability

93 of 100
288 PU_2015_159
Which one of the following statements is correct? In a boiler, the air preheater is invariably:-

- Condenser and feed pump
- Forced draft fan and furnace
- Forced draft fan and chimney
- Economizer and feed pump

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283 PU_2015_159
In diesel cycle:-

- Compression ratio is greater than the expansion ratio
- Compression ratio is less than the expansion ratio
- Compression ratio and expansion ratio are the same
- Compression ratio + expansion ratio= 1

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274 PU_2015_159
Stefan Boltzmann law is applicable for heat transfer by:-

- Conduction
- Radiation
- Convection
- Conduction and radiation

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269 PU_2015_159
In heat exchangers, degree of approach is defined as the difference between temperatures of:-

- Hot medium outlet and cold water outlet
- Hot medium outlet and cold water inlet
- Cold water inlet and outlet
- Hot medium inlet and outlet

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275 PU_2015_159

Two plates spaced 150mm apart are maintained at 1000°C and 70°C.The heat transfer will take place mainly by:-

- Convection
- Radiation
- Forced convection
- Free convection

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268 PU_2015_159

Thermal conductivity of air with rise in temperature:-

- Remains constant
- Increases
- May increase or decrease depending on temperature
- Decreases

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295 PU_2015_159

When a liquid flows through a tube with sub-cooled or saturated boiling, what is the process known?

- Pool boiling
- Bulk boiling
- Forced convection boiling
- Convection boiling

100 of 100

277 PU_2015_159

Critical pressure of a liquid is the pressure:-

- Above which liquid becomes solid
- Above which liquid becomes gas
- Above which liquid becomes vapour
- Above which liquid will remain liquid

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208 PU_2016_159_E
The number of terminal carbonyl groups present in $Fe_2(CO)_9$ is:-

- 3
- 5
- 6
- 2

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134 PU_2016_159_E

For all real numbers x, y the expression $\frac{x+y+|x-y|}{2}$ is equal to (*):-

- the maximum of x and y
- the minimum of x and y
- The average of $|x|$ and $|y|$
- $|x+y|$

3 of 100
143 PU_2016_159_E
Which phenomena causes the polarization of light:-

- Reflection
- Double reflection
- Double refraction
- Diffraction

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171 PU_2016_159_E
In XRD analysis, determination of crystalline size is limited by the:-

- Crystalline absorption coefficient
- Lattice points
- Lattice absorption coefficient
- Mass absorption Coefficient

5 of 100
146 PU_2016_159_E
The viscosity of gas is directly proportional to:-

- temperature
- Characteristic gas constant
- square root of temperature
- density of gas

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114 PU_2016_159_E

For a system of m linear equations in n unknowns, the Cramer's rule is applicable when:-

- m = n and the coefficient matrix is non-singular
- m≠n and the coefficient matrix is non-singular
- m≠n
- m = n

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112 PU_2016_159_E

If $A = \begin{bmatrix} 5 & 0 & 2 \\ 0 & 1 & 0 \\ -4 & 0 & -1 \end{bmatrix}$ and I be 3x3 unit matrix, If M=I-A, then rank of I-A is:-

- 0
- 3
- 1
- 2

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203 PU_2016_159_E

The emf of a Daniel cell having 0.01 M $CuSO_4$ and 0.2 M $ZnSO_4$ solution at 25°C is:-
(Zn^{2+}/Zn = -0.76 V and Cu^{2+}/Cu = 0.34 V)

- 1.10 V
- -1.032 V
- 1.129 V
- 1.032 V

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148 PU_2016_159_E

The diffusion coefficient (D) of atoms with respect to temperature can be defined as:-

- $D = K_o \exp(-\Delta W/KT)$
- $D = T_0 \exp(-\Delta W/KT)$
- $D = W_0 \exp(-\Delta W/KT)$
- $D = D_o \exp(-\Delta W/KT)$

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172 PU_2016_159_E

Quantum confinement in solid occurs, when the size shrinks below:-

- Einstein wavelength
- Mean free path
- Green wavelength
- De-Broglie wavelength

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190 PU_2016_159_E

The number of unpaired electrons in d^6, low spin octahedral complex is:-

- 4
- 1
- 3
- 0

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192 PU_2016_159_E

The compound which obeys 18-electron rule is:-

- $Cr(CO)_6$
- $Mn(CO)_5$
- $V(CO)_6$
- $Fe(CO)_4$

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191 PU_2016_159_E

In the following incomplete nuclear equation $^{64}_{29}Cu \longrightarrow ? + {}^{64}_{28}Ni$, the missing term is:-

- A positron
- A neutron
- An electron

- A proton

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131 PU_2016_159_E

If f(1) = 2 and f(x) = f(n-1)+1/2 for all integers n>1, then F(101) is (*):-

- 50
- 52
- 49
- 51

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103 PU_2016_159_E

The number of ways in which 6 men and 5 women can dine at a round table if no two women are to sit together is:-

- 7!*5!
- 30
- 5!*4!
- 6! *5!

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170 PU_2016_159_E

Thermoelectric generator works on the principle of:-

- Meissner effect
- Thompson effect
- Peltier effect
- See beck Effect

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164 PU_2016_159_E

The difference between the DC and AC power is arrived using:-

- V^2R
- $Cos\Phi$
- $Cos\omega t$
- $Sin\omega t$

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178 PU_2016_159_E

The Load resistance of a Solar cell is defined from the ration between:-

- Maximum output voltage and maximum output voltage
- Maximum output current and the maximum output voltage

- Maximum output voltage and short circuit current
- Output current and the output voltage

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133 PU_2016_159_E

$\int_0^1 \frac{x}{1+x^2} dx$ is:-

- π/4
- $log\sqrt{2}$
- log(2)
- 1

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176 PU_2016_159_E

A monostable multivibrator circuit:-

- deliver two outputs
- Store energy
- Returns to its stand by state automatically
- Has no stable state

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194 PU_2016_159_E

The 'Strainless theory' for the stability of cyclic compounds was postulated by:-

- Sachse-Mohr
- Baeyer
- Ingold
- Robinson

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102 PU_2016_159_E

A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of ways he can choose the question is:-

- 140
- 346
- 280
- 196

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141 PU_2016_159_E
The relationship between the orbital quantum number "l" and the azimuthal quantum number n_Φ is:-

- $l = n_\Phi + 1$
- $l = n_\Phi$
- $l = n_\Phi - 1$
- $l = n_\Phi + (1/2)$

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116 PU_2016_159_E
Which one is not true for the curve $y = a(x-n)^2$

- horizondal line y = n is an axis of symmetry
- Represent a parabola
- for a > 0 has a minimam y = 0 at x = n
- vertical line x = n is an axis of symmetry

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117 PU_2016_159_E
The equation of a straight line that passes through point A(1,-1) and has a slope equation to -1 is:-

- y = x
- y = -x
- y = x+1
- y = 1/x

26 of 100

175 PU_2016_159_E
Isotopes of an atom differ with:-

- Difference in their Protons
- Difference in their Neutrons
- Difference in their electrons
- None of the above

27 of 100

104 PU_2016_159_E
The area of the region bounded by the curves y = |x-2|, x =1, x =3 and the x-axis is:-

- 3
- 2
- 1
- 4

28 of 100

147 PU_2016_159_E
When the acceleration due to gravity at the surface of Earth is "g", the potential energy gain of a mass "m" raised to the radius of the Earth "R" can be:-

- ¼ mgR
- mgR
- 2mgR
- ½ mgR

29 of 100
132 PU_2016_159_E

If $\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$ is invertible under matrix multiplication then its inverse is:-

- $\frac{1}{a^2+b^2}\begin{bmatrix} a & b \\ -b & a \end{bmatrix}$
- $\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$
- $\frac{1}{a^2+b^2}\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$
- $\begin{bmatrix} a & b \\ -b & a \end{bmatrix}$

30 of 100
142 PU_2016_159_E
The resolving power of microscope is :-

- Unlimited
- Limited by the wavelength of light used
- Limited by the diameter of objective lens
- Limited by the kind of glass used

31 of 100
201 PU_2016_159_E
The splitting of energy levels in the presence of an external electric field is_____.

- Zeeman effect
- Kerr effect
- Compton effect
- Stark effect

32 of 100
145 PU_2016_159_E

The angular velocity of the rotating body is,

- $\omega = \theta/t$
- $\omega = \theta/t\sin\theta$
- $\omega = 2\pi r/t$
- $\omega = 2\pi r/ t\sin\theta$

33 of 100

113 PU_2016_159_E

A unit matrix of order n is of rank:-

- 0
- 1
- n
- 2n

34 of 100

144 PU_2016_159_E

The type of wave that carries sound in air is :-

- Transverse wave
- Longitudinal wave
- Electromagnetic wave
- Transverse and longitudinal waves

35 of 100

101 PU_2016_159_E

The remainder when $2x^3+x^2-1$ is divided by (x-2) is:-

- 5
- 19
- -13
- 9

36 of 100

163 PU_2016_159_E

In Rayleigh scattering is caused by the.:-

- Refraction
- Reflection
- Difference in the Air Mass density
- Flow of wind

37 of 100

200 PU_2016_159_E

Acetylene has the point group:-

- $D_{\infty h}$
- $C_{\infty v}$
- C_{2h}
- C_{2v}

38 of 100

100 PU_2016_159_E

The quadratic equation $4kx^2-8x+k = 0$ has equal roots. Then the value of k is:-

- 2
- 0.5
- 4
- 1

39 of 100

149 PU_2016_159_E

In MOSFET, the oxide field strength is defined as:-

- $E(x) = V_G-V_c(x)/t$
- $E(x) = V_s-V_d(x)/t$
- $E(x) = V_d-V_c(x)/t$
- $E(x) = V_d-V_s(x)/t$

40 of 100

205 PU_2016_159_E

Among the following, the complex used for cancer chemotherapy is_____.

- $[Pt(NH_3)_4]^{2+}$
- $[Pt(Cl)_4]^{2-}$
- cis-$[PtCl_2(NH_3)_2]$
- trans-$[PtCl_2(NH_3)_2]$

41 of 100

118 PU_2016_159_E

Root of the equation $x^2+ix+2 = 0$, where $I = \sqrt{-1}$ is:-

- no root exist
- (i, 1)
- (-2i, i)
- (-1, 1)

42 of 100

111 PU_2016_159_E

A skew symmetric matrix cannot be of rank:-

- 1
- 0
- greater than 1
- -1

43 of 100

110 PU_2016_159_E

If there exist a non-zero minor of order r, then rank of A is:-

- greater than or equal to r
- less than r
- less than or equal to r
- Equal to r

44 of 100

161 PU_2016_159_E

The spontaneous emission in LASER is achieved by:-

- Quantum well layers
- Super lattice
- Optical cavity
- Ohmic contacts

45 of 100

162 PU_2016_159_E

3Dimensional confinement is achieved using:-

- Quantum rod
- Optical cavity
- Quantum Dot
- Quantum Well

46 of 100

115 PU_2016_159_E

Derivative of $y=2^x$ is:-

- $\frac{dy}{dx} = x\,2^{x-1}$
- $\frac{dy}{dx} = 2.3\log 2.\,2^x$
- $\frac{dy}{dx} = -x2^{x-1}$

- $\frac{dy}{dx} = \frac{2^{x-1}}{x}$

47 of 100

174 PU_2016_159_E

The difference in carrier density causes:-

- Carrier tunneling
- Carrier drift
- Carrier diffusion
- Carrier recombination

48 of 100

179 PU_2016_159_E

The plants convert the poly sac rides in to cellulose by activating:-

- Covalent bond
- Metallic Bond
- Hydrogen bond
- None of the above

49 of 100

207 PU_2016_159_E

The IUPAC nomenclature of $K[PCl_6]$ is:-

- potassium hexachlorophosphite(V)
- potassium hexachlorophosphate(V)
- potassium hexachlorophosphine(V)
- potassium hexachlorophosphine

50 of 100

204 PU_2016_159_E

Activation energy can be determined from a plot of_____.

- k Vs. (1/T)
- Log k Vs. (1/T)
- k vs. T
- log k Vs. T

51 of 100

202 PU_2016_159_E

The Henderson equation is_____.

- $pH = pK_a + \log[Salt]/[Acid]$
- $pH = pK_a - \log[Salt]/[Acid]$

- pH = -log[H3O+]
- pH = pK_a + log[Acid]/[Salt]

52 of 100

209 PU_2016_159_E

Alkali metals in liquid ammonia are blue in colour because:-

- Solvated electrons
- An ion pair is formed
- The contain alkali metal cations
- An amide ion formed

53 of 100

119 PU_2016_159_E

For joint probability P(A∩B) for two events A and B:-

- $P(A \cap B) = P(A)P(B) - P(A \cup B)$
- $P(A \cap B) = P(A) + P(B) - P(A \cup B)$
- $P(A \cap B) = P(A) + P(B) + P(A \cup B)$
- $P(A \cap B) = P(A) + P(B)$

54 of 100

130 PU_2016_159_E

If $f(x) = \int_e^x log t \, dt$ for all position x, the $f'(x)$ is:-

- x log(x)
- log (x)
- x
- 1/x

55 of 100

193 PU_2016_159_E

Which of the following does not possess any element of symmetry?

- (+) tartaric acid
- Ethane
- Carbon tetrachloride
- Mesotartaric acid

56 of 100

160 PU_2016_159_E

The refractive index of material is the ratio between:-

- Speed of light in vacuum/ speed of light in air
- Speed of light in vacuum/ speed of light in material
- Speed of sound/ Speed of light
- Speed of light in water/ speed of light in air

57 of 100

140 PU_2016_159_E

Raman Effect is due to the collision of ____.

- Photon with Electron
- Electron with atom
- Photon with molecule
- Electron with photon

58 of 100

177 PU_2016_159_E

The sweep speed of a simple RC circuit is given by:-

- I.t/C
- Ts/RC
- V.Ts/RC
- I/C

59 of 100

206 PU_2016_159_E

The elements $_{14}^{30}$SI, $_{15}^{31}$P, and $_{16}^{32}$S are called_____.

- Isotopes
- Isotones
- Isomers
- Isobars

60 of 100

173 PU_2016_159_E

The mean free path (λ) increases with:-

- Increase in pressure
- Increase in collision
- Increase in temperature
- Increase in vacuum

61 of 100

245 PU_2016_159_M

Synthesis of glucose from non-carbohydrate precursors is called:-

- Glycolysis
- Gluconeogenesis
- Glycosylation
- Saccharification

62 of 100

226 PU_2016_159_M

Link between Glycolysis and Kreb Cycle is:-

- Oxaloacetate
- Citric Acid
- Pyruvic Acid
- Acetyle CoA

63 of 100

229 PU_2016_159_M

The species in which the evolutionary process has been influenced by man to meet his needs is called:-

- Adventive species
- Domesticated species
- Introduced species
- Neutralized species

64 of 100

246 PU_2016_159_M

Molecule that promote release of O_2 from hemoglobin is:-

- 2,3-mercapitoethanol
- Acetylcholine
- 3,2 - hemoglycerate
- 2,3 - bisphosphoglycerate

65 of 100

225 PU_2016_159_M

Formation of glucose from source other than CO_2 is known as:-

- Glycolysis
- Gluconeogenesis
- Hydrogenesis
- Hydrolysis

66 of 100

239 PU_2016_159_M

Mitotic cycle is initiated by the activation of:-

- Tubulin protein
- RNA polymerase
- MPF protein kinase
- Kinotochore protein

67 of 100

238 PU_2016_159_M

Acid rain occurs because of pollution of air by:-

- Chlorine
- Carbon Monoxide
- CO_2
- SO_2

68 of 100

236 PU_2016_159_M

Heteroblastic development is a characteristic feature of:-

- Submerged aquatic plants
- Free-floating aquatic plants
- Emergent aquatic plant
- All aquatic plants

69 of 100

247 PU_2016_159_M

Which of the following have more energy yield per unit mass?

- Proteins
- Fatty acids
- DNA
- Carbohydrate

70 of 100

228 PU_2016_159_M

Selectable marker that provides resistance to the antibiotic Kanamycin is:-

- Neomycin phosphotransferase
- Streptomycin phosphotransferase
- Hygromycinphosphotransferase
- Gentamycin acetyletransferase

71 of 100

227 PU_2016_159_M

Increased melting temperature for a double strand DNA results from high content of:-

- Cytosine+Guanine
- Adenine+ guanine
- Adenine+Cytosine
- Cytocine+Thymine

72 of 100

259 PU_2016_159_M

In protein secondary structure, the electrostatic interaction between two ionic group of opposite charges are referred as:-

- Hydrogen bonds
- Van der Waals bond
- disulfide bonds
- Salt bridges

73 of 100

249 PU_2016_159_M

Single strand DNA can self-bind to create type of secondary structures called:-

- α helix & β sheets
- Bubbles and knots
- Hairpin & loops
- minor grooves and double helix

74 of 100

255 PU_2016_159_M

Identify the second messenger molecule from the following:-

- cyclic adenosine monophophate;
- adenylecyclase;
- G protein;
- phospholipase

75 of 100

256 PU_2016_159_M

Adipose tissue stores:-

- Proteins
- Starch
- Triacyleglycerol
- Carbohydrates

76 of 100

237 PU_2016_159_M
The eye spot or stigma perform the function of:-

- Photosynthesis
- Visibility
- Photosensitization
- Respiration

77 of 100

248 PU_2016_159_M
The Antigen Presenting Cell among the following is:-

- Macrophage
- Monocytes
- T cell
- thymus epithelial cells

78 of 100

257 PU_2016_159_M
Typical denaturization temperature in a PCR is:-

- 95 °C
- 37 °C
- 25 °C
- 65 °C

79 of 100

258 PU_2016_159_M
Approximate end-to-end distance of $3X10^4$ base pair DNA is:-

- 3 µm
- 100 µm
- 30 µm
- 10 µm

80 of 100

235 PU_2016_159_M
Agar Agar is extracted mostly from:-

- Agaricusspp
- Phaeophyceaespp
- Argemonespp
- Rhodophyceaespp

81 of 100

268 PU_2016_159_D
In an axial flow impulse turbine, energy transfer takes place due to:-

- change in pressure energy
- change in energy because of centrifugal force
- change in relative kinetic energy
- change in absolute kinetic energy

82 of 100

297 PU_2016_159_D
During which of the following process heat rejection takes place in Carnot cycle?

- Isothermal expansion
- Isothermal compression
- Isentropic expansion
- Isentropic compression

83 of 100

277 PU_2016_159_D
Dissipation factor, tan δ, of a capacity measure by which bridge?

- Schering bridge
- Anderson bridge
- Hay Bridge
- Wien bridge

84 of 100

267 PU_2016_159_D
An isolated system is one in which:-

- both energy and mass cross the boundaries of the system
- neither mass nor energy crosses the boundaries of the system
- mass does not cross boundaries of the system, though energy may do so
- mass crosses the boundary but not the energy

85 of 100

295 PU_2016_159_D
A closed system is one in which:-

- mass does not cross boundaries of the system, though energy may do so
- mass crosses the boundary but not the energy
- neither mass nor energy cross the boundaries of the system
- both energy and mass cross the boundaries of the system

86 of 100

275 PU_2016_159_D
The overall heat transfer coefficient is the:-

- resistance due to wall material
- sum of conductances
- sum of resistances
- sum of convection coefficients

87 of 100

285 PU_2016_159_D
At thermal equilibrium:-

- absorptivity is lesser than emissivity
- sum of absorptivity and emissivity is unity
- absorptivity is equal to emissivity
- absorptivity is greater than emissivity

88 of 100

299 PU_2016_159_D
The measurement of a thermodynamic property known as temperature is based on:-

- none of these
- Zeroth law of thermodynamics
- Second law of thermodynamics
- First law of thermodynamics

89 of 100

278 PU_2016_159_D
If the enthalpy drop in the moving blades and fixed blades of a steam turbine is 10 kJ/kg and 15 kJ/kg respectively then what is the degree of reaction?

- 40%
- 33%
- 60%
- 67%

90 of 100

298 PU_2016_159_D
Otto cycle is also known as:-

- constant temperature cycle
- constant volume cycle
- constant temperature and pressure cycle
- constant pressure cycle

91 of 100

287 PU_2016_159_D

Intensive property of a system is one whose value:-

- remains constant
- depends on the mass of the system like volume
- does not depend on the mass of the system, like temperature, pressure, etc.
- is not dependent on the path followed but on the state

92 of 100

289 PU_2016_159_D

Which one of the following is NOT an accessory for the boiler?

- Condenser
- Economizer
- Air preheater
- Feed water pump

93 of 100

279 PU_2016_159_D

A penstock pipe of 10 cm diameter carries water under a pressure head of 100 m. If the wall thickness is 9 mm, what is the tensile stress in the pipe wall in MPa?

- 272.5
- 2725
- 545
- 1090

94 of 100

265 PU_2016_159_D

The ratio of maximum demand of the plant to the sum of individual maximum demand of various equipments is called:-

- demand factor
- diversity factor
- load factor
- maximum demand

95 of 100

266 PU_2016_159_D

Specific ratio for a blower is:-

- 1.20 to 1.32
- 1.11 to 1.20
- 0 to 1.11

- more than 1.32

96 of 100

276 PU_2016_159_D

Fin effectiveness will be increased more by:-

- higher thermal conductivity
- longer circumference
- having higher value of convection coefficient
- higher sectional area

97 of 100

286 PU_2016_159_D

Superheated vapour behaves as:-

- exactly as gas
- approximately as a gas
- as steam
- as ordinary vapour

98 of 100

269 PU_2016_159_D

If the distribution voltage is raised from 11 KV to 33 KV, the line power loss would be lowered by a factor:-

- 1/9
- 1/3
- 3
- 9

99 of 100

288 PU_2016_159_D

A power station's plant load factor is defined as the ratio of:-

- average load to peak load
- minimum load to peak load
- minimum load to average load
- the energy generated to that of maximum energy

100 of 100

296 PU_2016_159_D

For a perfect gas, according to Boyle's law (where p = Absolute pressure, v = Volume, and T = Absolute temperature):-

- v/T = constant, if p is kept constant
- p v = constant, if T is kept constant

- p/T = constant, if v is kept constant
- T/p = constant, if v is kept constant

Examination: **Ph.D. Green Energy Technology**

Section 1 - Section 1

Question No.1 4.00

Bookmark

A one-dimensional crystal of lattice dimension 'a' is metallic. If the structure is distorted in such a way that the lattice dimension is enhanced to '2a'

- The width of conduction band increases
- The width of the conduction band remains unchanged
- The electronic structure remains unchanged
- The width of conduction band decreases and a band gap is generated

Question No.2 4.00

Bookmark

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.
(i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
(ii) Motivation should be organised immediately after Assessment Centre.
(iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
(iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

Which of the pairs of lectures were organised on first and last day?

- Quality Circle and Motivation
- Group Discussion and Quality Circle
- Group Discussion and Decision Making
- None of these

Question No.3 4.00

Bookmark

As a country, the United States is _____ that there are five time zones.

- too big
- very big
- much big
- so big

Question No.4 4.00

Bookmark

Based on the information given, answer the below question.
1. A,B,C,D,E and F are travelling in a bus.
2. There are two reporters, two mechanics, one photographer and one writer in the group.
3. Photographer A is married to D who is a reporter.
4. The writer is married to B who is of the same profession as that of F.
5. A,B,C,D are two married couples and no one in this belong to the same profession.
6. F is the brother of C.

Which of the following is the pair of reporters?

- DF
- DE
- Cannot be determined
- AE

Question No.5 4.00

Bookmark

Silicates with continuous 3D frame work are

- Neso-Silicates
- Soro-Silicates
- Tecto-Silicates
- Phyllo-Silicates

Question No.6 4.00

Bookmark

For a simple cubic crystal, X-ray diffraction shows intense reflections for angles and which are assigned to [1 0 1] and [1 1 1] planes, respectively. The ratio $\sin\theta_1 / \sin\theta_2$ is

- 1.22
- 1.5
- 0.67
- 0.82

Question No.7 4.00

Bookmark

If the sheet of a bakelite is inserted between the plates of an air capacitor, the capacitance will

- Increase
- Zero
- Decrease
- Remains unchanged

Question No.8 4.00

Bookmark

Let $\vec{F}$ be a vector field and ϕ be a scalar field. Then which of the following is *not* meaningful?

- $(\nabla \times \vec{F}) \cdot (\nabla \phi)$
- $\vec{F} \cdot \nabla \phi$
- $\phi \vec{F}$
- $\nabla \times (\nabla \cdot \vec{F})$

Question No.9 4.00

Bookmark

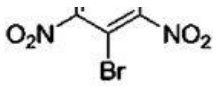
Choose the best synonym of the italicized word.
Reena has an *insatiable* love for music.

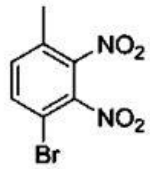
- unquenchable
- undesirable
- unchanging
- irreconcilable

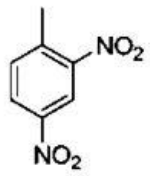
Question No.10 4.00

Bookmark

The major product formed in the dinitration of 4-bromotoluene is







Question No.11 4.00

Bookmark

IPM stands for

- Integrated Plant Management
- Invasive Pest Management
- Integrated Pest Monitoring
- Integrated Pest Management

Question No.12 4.00

Bookmark

Identify the adverb in the following sentence:
We looked upwards and saw a bright shooting star

- looked
- upwards
- bright
- shooting

Question No.13 4.00

Bookmark

The differential equation

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$$

- has only one solution
- has only two linearly independent solutions
- has only three linearly independent solutions
- has only two solutions

Question No.14 4.00

Bookmark

Anand is heavier than Gopal.Mohan is lighter than Jagan.Pandian is heavier than Jagan but lighter than Gopal. Who is the heaviest of all ?

- Gopal
- Anand
- Pandian
- Jagan

Question No.15 4.00

Bookmark

The COP of a heat pump working on a reversed Carnot cycle is

- $(T_1-T_2) / T_1$
- $(T_1-T_2) / T_2$
- $T_2 / (T_1-T_2)$
- $T_1 / (T_1 - T_2)$

Question No.16 4.00

Bookmark

The percentage of CO_2 in biomethane is

- 45-55%
- 25-30%
- 32-43%
- 15-20%

Question No.17 4.00

Bookmark

Polio vaccines used currently

- is an animal derived virus
- consists of only live attenuated virus
- May be killed virus
- May be either killed or attenuated

Question No.18 4.00

Bookmark

Solar constant is ……

- 342 W/m^2
- 1497 W/m^2
- 1597 W/m^2
- 1367 W/m^2

Question No.19 4.00

Bookmark

The maximum efficiency of full –wave rectifier

- 18.2
- 81.2
- 64.6
- 40.6

Question No.20 4.00

Bookmark

Which process improves the efficiency of solid waste management?

- Composting
- Disposal
- Processing
- Incineration

Question No.21 4.00

Bookmark

50% of the species in the total world is present in

- coral reefs
- tropical rain forest
- deciduos forests
- temperate rain forest

Question No.22 4.00

Bookmark

An ideal gas was subjected to a reversible adiabatic expansion and then its initial volume was restored by a reversible isothermal compression. If q denotes the heat added to the system and w the work done by the system, then

- W<0, q>0
- w>0, q>0
- W<0<, q<0
- w>0, q<0

Question No.23 4.00

Bookmark

Helminth infections are characterised by

- High levels of IgE
- Decresaed eosinophils
- High levels of IgA
- Increased activity of Th1 cells

Question No.24 4.00

Bookmark

The structures of XeF_2 and XeO_2F_2 respectively are

- bent, tetrahedral
- bent, see-saw
- linear, see-saw

- linear, square planar

Question No.25 4.00

Bookmark

Which of the following matrices has a rank less than 3?

- $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 3 & 3 & 5 \end{pmatrix}$
- $\begin{pmatrix} 1 & 1 & 1 \\ 2 & 1 & 1 \\ 0 & 1 & 0 \end{pmatrix}$
- $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 3 & 3 & 6 \end{pmatrix}$
- $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 3 & 1 & 2 \end{pmatrix}$

Question No.26 4.00

Bookmark

The system of equations

$$\begin{aligned} x - 2y + 3z &= \alpha \\ 10x - 20y + 30z &= \beta \end{aligned}$$

- Has only one solution if $\beta = 10\alpha$
- Has infinitely many solutions if $\beta = 10\alpha$
- Has no solution if $\beta = 10\alpha$
- Has infinitely many solutions only if $\alpha = \beta = 0$.

Question No.27 4.00

Bookmark

When a bar is subjected to a change of temperature and its deformation is prevented, which of the following stresses are induced

- Thermal Stress
- Tensile Stress
- Compressive Stress
- Shear Stress

Question No.28 4.00

Bookmark

Due to _____, the subways were closed all morning.

- floods
- are flooded
- its flooding
- flood

Question No.29 4.00

Bookmark

In a step down transformer, the number of turns in the primary ……that in secondary

- Lesser than
- Has no effect
- Greater than
- Same

Question No.30 4.00

Bookmark

A carnot takes up 90 J of heat from the source kept at 300 K. The correct statement among the following is

- It transfers 50 J of heat to the sink at 250 K
- It transfers 60 J of heat to the sink at 200 K
- It transfers 60 J of heat to the sink at 250 K
- It transfers 50 J of heat to the sink at 200 K

Question No.31 4.00

Bookmark

In the mass spectrum of 1,2-dichloroethane, approximate ratio of peaks at m/z values 98, 100, 102 will be

- 9:06:01
- 1:02:01
- 1:01:02
- 3:01:01

Question No.32 4.00

Bookmark

In which of the following detector the pn-junction is used

- Surface barrier detector
- Scintillation counter
- GM counter
- Proportional counter

Question No.33 4.00

Bookmark

The condensation of a hydroxy acid produces a polyester with the probability of linkage at both ends being p. The mole fraction of k-mer chain formation is

- $p^{k-1}(1-p)$
- p^{k-1}
- p^{k}
- $p(1-p)^{k-1}$

Question No.34 4.00

Bookmark

X is twice as good a workman as Y and together they finish a piece of work in 18 days. In how many days will X alone finish the work?

- 28
- 27
- 25
- 26

Question No.35 4.00

Bookmark

Which of the following statements about cyclic photophosphorylation is correct?

- Cyclic photophosphorylation utilizes excess ATP.
- Cyclic photophosphorylation reduces NADP+ to NADPH
- Cyclic photophosphorylation occurs in the cytochrome bf complex and utilizes electrons from photosystem I.
- Cyclic photophosphorylation utilizes electrons from photosystem II.

Question No.36 4.00

Bookmark

Bristle : Brush

- Stage: Chairs
- Art: Sculpture
- Arm : Leg
- Key: Piano

Question No.37 4.00

Bookmark

The dissipation factor of a good dielectric is of the order of

- 0.02
- 0.2
- 0.0002
- 0.002

Question No.38 4.00

Bookmark

Mark-Houwink equation is used for the determination of

- number-average molar mass
- weight-average molar mass
- viscosity-average molar mass
- z-average molar mass

Question No.39 4.00

Bookmark

The structure obtained when all the tetrahedral holes are occupied in a fcc structure is of the type

- NaCl
- CaF2
- CsCl

- ZnS

Question No.40 4.00

Bookmark

A 6 pole, 3 phase induction motor running at 960 rpm is connected to 50 Hz supply. Its slip is

- 2%
- 8%
- Zero
- 4%

Question No.41 4.00

Bookmark

Fluorides in water can be removed by

- Stagnation
- Boiling
- Reverse osmosis
- Filtration

Question No.42 4.00

Bookmark

The heat sink is generally used with a transistor to……

- Increase the forward current
- Compensate for excessive doping
- Decrease the forward current
- Prevent excessive temperature rise

Question No.43 4.00

Bookmark

The scalar triple product of three vectors is 0 if

- if they form the edges of a solid parallelepiped
- if they are coplanar.
- they are mutually perpendicular
- any two of them are perpendicular

Question No.44 4.00

Bookmark

Kohlrausch's law is applicable to a dilute solution of

- Potassium chloride in water
- Hydrochloric acid in water
- Benzoic acid in benzene
- Acetic acid in water

Question No.45 4.00

Bookmark

The species having the strongest gas phase proton affinity among the following

- NF_3
- NH_3
- $N(CH_3)_3$
- N^{3-}

Question No.46 4.00

Bookmark

Einstein's formula for heat capacity

- Fails at all temperature range
- Fails at higher temperature
- Fails at lower temperature because it decreases exponentially instead of T^3
- Fails at lower temperature because it goes as T instead of T^3

Question No.47 4.00

Bookmark

Let C be the portion of the parabola $y = x^2$ between $(0, 0)$ and $(1, 1)$ directed from the origin to $(1, 1)$. For the scalar field $\phi = xy^2z^3$, the line integral $\oint_C \nabla\phi \cdot \vec{dr}$ is

- π
- $-\pi$
- $\pi/2$
- 0

Question No.48 4.00

Bookmark

Which of the following uses Life Cycle Analysis attempts to offer alternatives to waste management

- Incineration
- Resource Recovery
- Energy Recovery
- Pyrolysis

Question No.49 4.00

Bookmark

The ratio of lateral strain to linear strain is known as

- Elastic Limit
- Poisson's ratio
- Modulus of Elasticity
- Modulus of Rigidity

Question No.50 4.00

Bookmark

Assertion: Crude oil is abundantly found in nature

Reason: It is the main raw material for all automobiles

- A is false but R is true
- Both A and R are true and R is the correct explanation of A
- Both A and R are true and R is not the correct explanation of A
- A is true but R is false

Question No.51 4.00

Bookmark

In the following question, the first two words (given in italics) have a definite relationship. Choose one word out of

In the following question, the first two words (given in italics) have a definite relationship. Choose one word out of the given four alternatives which will fill the blank space and showthe same relationship with the third word as between the first two.

Truthfulness is to *Liar* as *Loyalty* is to ……?…….

- Traitor
- Falsehood
- Devotion
- Worker

Question No.52 4.00

Bookmark

Oxidation of alcohol to acids involve formation and cleavage of bonds. Which of the following possibilities is valid in the process?

- Formation of C=O bond and cleavage of O-H bond
- Formation of C=O bond and cleavage of O-H and C=H bonds
- Formation of C=O bond and cleavage of O-H and C-H bonds
- Formation of C=O bond and cleavage of C-H bond

Question No.53 4.00

Bookmark

How many ATP molecules are required to fix one molecule of nitrogen

- 12
- 16
- 20
- 6

Question No.54 4.00

Bookmark

The most appropriate reagent suitable for the conversion of 2-octyne into trans-2-octene is

- Zinc and acetic acid
- 10 % Pd/C
- Lithium in liquid ammonia
- Hydrazine hydrate

Question No.55 4.00

Bookmark

The mother gripped her child's arm_____ he be trampled.

- if
- if not
- unless
- lest

Question No.56 4.00

Bookmark

Thermal radiations occur in the portion of electromagnetic spectrum between the wavelengths

- 10^{-1} to 10^{2} micron
- 0.1 to 10^{2} micron
- 10^{-2} to 10^{-4} micron
- 10^{-1} to 10^{-2} micron

Question No.57 4.00

Bookmark

For sphere, the critical thickness of insulation is given by

- 2k / h
- h / 2k
- k / h
- h / (2 x k)

- n / (2 p n)

Question No.58 4.00

Bookmark

Horizontal axis and vertical axis are the types of

- Wind mills
- Solar cell
- Nuclear reactor
- Biogas reactor

Question No.59 4.00

Bookmark

Let O be the origin and OA and OB be two sides of the parallelogram $OABC$. Then we have

- $\vec{OA} + \vec{OB} = \vec{OC}$
- $\vec{OA} + \vec{OB} = \vec{OC}$
- $\vec{OA} + \vec{OB} = \vec{OC}$
- $\vec{OA} + \vec{OB} = \vec{OC}$

Question No.60 4.00

Bookmark

Choose the best antonym of the italicized word.
The task assigned to him was *arduous.*

- plain
- absorbing
- good
- easy

Question No.61 4.00

Bookmark

All-natural processes are irreversible. This is a direct consequence of

- First law of thermodynamics
- Third law of thermodynamics
- Second law of thermodynamics
- Gibb's paradox

Question No.62 4.00

Bookmark

……..has a non-linear stress-strain curve

- Low carbon steel
- Copper
- Rubber
- Aluminium

Question No.63 4.00

Bookmark

For V_{GS} = 0V, the drain current becomes constant when VDS exceeds

- V_P
- Cut off
- 0V
- V_{DD}

Question No.64 4.00

Bookmark

Study the following information carefully and answer the question below it:

Aasha, Bhuvnesh,Charan, Danesh, Ekta, Farhan, Ganesh and Himesh are sitting around a circle, facing the centre. Aasha sits fourth to the right of Himesh while second to the left of Farhan. Charan is not the neighbour of Farhan and Bhuvnesh. Danesh sits third to the right of Charan. Himesh never sits next to Ganesh.

Who is to the immediate left of Aasha?

- Aasha
- Bhuvnesh
- Ganesh
- Charan

Question No.65 4.00

Bookmark

For an Op-amp with negative feedback, the output is …….

- Equal to the input
- Increased
- Fed back to the non-inverting input
- Fed back to the inverting input

Question No.66 4.00

Bookmark

Ripple factor for half –wave rectifier

- 2
- 1.21
- 0.48
- 1

Question No.67 4.00

Bookmark

In a throttling process

- $h_1^2 = h_2$
- $h_1 = h_2$
- $h_1 = 2287 \times h_2$
- $h_1 = 2h_2$

Question No.68 4.00

Bookmark

If λ_1 is one of the eigenvalues of the matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$, then the other eigenvalue λ_2 is given by

- $\lambda_2 = ad - bc - \lambda_1$
- $\lambda_2 = \frac{ac-bd}{\lambda_1}$
- $\lambda_2 = a + d - \lambda_1$

- $\lambda_2 = \frac{a+d}{\lambda_1}$

Question No.69 4.00

Bookmark

At 0 K, fluids are assumed to have

- Zero entropy
- Maximum entropy
- Minimum entropy
- Fixed value of entropy

Question No.70 4.00

Bookmark

A, B, C are 2×2 matrices such tha $AB = AC$. Which of the following is true?

- If A is a matrix all of whose entries are not zero, then $B = C$
- A is the zero matrix.
- $B = C$
- If $|A| \neq 0$, then $B = C$

Question No.71 4.00

Bookmark

The common energy source in Indian villages is

- Coal
- Sun
- Electricity
- Wood and animal dung

Question No.72 4.00

Bookmark

Choose the missing term: SHG, RIF, QJE, PKD, ?

- NMD
- OLC
- MLB
- OLD

Question No.73 4.00

Bookmark

The Genetic code is unambiguous meaning that each triplet specifies

- Only single amino acid
- Many amino acids
- No amino acids
- Two amino acids

Question No.74 4.00

Bookmark

If Milk is water, water is sugar, sugar is road, road is sky and sky is track where do aeroplanes fly?

- Sky
- Sugar
- Milk
- Road

Question No.75 4.00

Bookmark

The area of the triangle whose vertices are given by $(0,0,0)$, $(1,2,-2)$, $(-1,1,1)$ is

- $\sqrt{33}$
- $\sqrt{14}$
- $\frac{\sqrt{14}}{2}$
- $\frac{\sqrt{3}}{2}$

Question No.76 4.00

Bookmark

The number of coordinates in the phase space of a single particle is

- 2
- 5
- 6
- 3

Question No.77 4.00

Bookmark

The function $f : [0, 3\pi] \longrightarrow I\!R$ defined as $f(x) = \sin x$ has

- Its minimum value is $3\pi/2$.
- Its minimum value is 0
- one maximum and two minima .
- two maxima and one minimum

Question No.78 4.00

Bookmark

For an ideal gas at 300K

- $(\frac{\partial U}{\partial T})_{\mathrm{V}} = 0$
- $(\frac{\partial H}{\partial T})_{\mathrm{P}} = 0$

- $\left(\frac{\partial G}{\partial T}\right)_P = 0$
- $\left(\frac{\partial U}{\partial V}\right)_T = 0$

Question No.79 4.00

Bookmark

Which of the following three vectors form the edges of a right angled triangle ?

- $(-0.5, 0, 0)$, $(0.5, 0, 0)$ and $(0, \sqrt{3}/2, 0)$
- $(2, -1, 1)$, $(3, 0, 2)$ and $(2, -1, 2)$
- $(-2, 0, 0)$, $(2,1,0)$, $(0, 0, 0)$
- $(1, 1, 1)$, $(2, 2, 2)$ and $(3, 3, 3)$

Question No.80 4.00

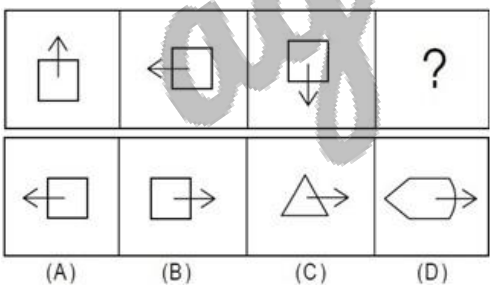
Bookmark

For a thermodynamic system, Helmholtz free energy is a function of

- S, V
- T, p
- S, p
- V, T

Question No.81 4.00

Bookmark



- C
- A
- B
- D

Question No.82 4.00

Bookmark

In solar cell (pn junction) the photo generated charge carrier are separated by

- Charge recombination
- Fermi level in n-type region
- Built in potential

- Built in potential
- Fermi level in p-type region

Question No.83 4.00

Bookmark

If the two strands of a DNA separated, the base sequence of each parental strand could serve as a template for the synthesis of new complementary strand, the process is called

- Semi-conservative Replication
- Multiplication
- Generation
- Duplication

Question No.84 4.00

Bookmark

Conservation within the natural habitat is called

- insitu conservation
- in vivo conservation
- ex vivo conservation
- ex situ conservation

Question No.85 4.00

Bookmark

Accuracy in the translation of mRNA into the primary structure of a polypeptide depends on specificity in the _____.

- binding of ribosomes to mRNA
- binding of the anticodon to small subunit of the ribosome
- attachment of amino acids to rRNAs
- binding of the anticodon to the codon and the attachment of amino acids to tRNAs

Question No.86 4.00

Bookmark

Ocean temperature increase slower than that of land primarily because of the larger ------ of the oceans

- Heat exchange
- Heat capacity
- Heat transfer
- Heat balance

Question No.87 4.00

Bookmark

The standard electrode potential E^o at a fixed temperature and in a given medium is dependent on

- the electrode composition and the extent of the reaction
- the extent of the electrode reaction only
- the electrode reaction and the electrode composition
- only the electrode composition

Question No.88 4.00

Bookmark

If $ABCD$ is a trapezium such that $AB \parallel CD$, then

- $\vec{AD} = c\,\vec{BC}$ for some scalar c.

- $\vec{AB} \times \vec{CD} = \vec{0}$
- $\vec{AB} \cdot \vec{BC} = 0$
- $\vec{AB} \cdot \vec{CD} = 0$

Question No.89 4.00

Bookmark

Density of states for a one-dimensional Fermi system is proportional to

- A constant
- ε
- $\varepsilon^{1/2}$
- $\varepsilon^{-1/2}$

Question No.90 4.00

Bookmark

Correct the error in the italicized part of the sentence by choosing the most appropriate option.
Whenever the two sisters *go out for shopping,* they take their pet dog with them.

- go out to shopping
- go out on shopping
- go out shopping
- go out of shopping

Question No.91 4.00

Bookmark

The unit of Hall coefficient is

- $Vm^2 A^{-1} Wb^{-1}$
- $Vm^2 A^{-2} Wb$
- $Vm^3 A^{-1} Wb^{-3}$
- $Vm^3 A^{-1} Wb^{-1}$

Question No.92 4.00

Bookmark

Evaluate the surface integral

$$\int\int_S (2 - x^2 - y^2 - z^2) dS$$

where S is the upper hemisphere of radius unity and center $(0, 0, 0)$.

- $\pi/2$
- $(2/3)\pi$
- 0
- π

Question No.93 4.00

Bookmark

Approximately what proportion of the human genome is made up of repetitive DNA sequences?

- 15%
- 50%
- 90%
- 1%

Question No.94 4.00

Bookmark

If a certain Zener diode has a Zener voltage of 3.6 V, it operates in

- Zener breakdown
- Avalanche breakdown
- Forward conduction
- Regulated breakdown

Question No.95 4.00

Bookmark

Consider the function $f : [-1, 1] \longrightarrow \mathbb{R}$ defined as $f(x) = x^3$. Then

- x = 0 is neither a maximum nor a minimum
- x = 0 is a maximum.
- x = 1 is a minimum
- x = 0 is a minimum.

Question No.96 4.00

Bookmark

During transcription, the transcript is identical in sequence with one strand of the DNA called

- Coding strand
- Main strand
- Coding molecule
- Primary strand

Question No.97 4.00

Bookmark

These poultry belong to Mr. Kishen, our new neighbor
The underlined word is a _____noun.

- abstract
- collective
- proper
- common

Question No.98 4.00

Bookmark

Which of the following is not required for the expression of genes in the lactose operon?

- Allolactose
- Adenylate cyclase
- lacI gene product
- cAMP

Question No.99 4.00

Bookmark

The directional derivative of $\phi = xy - z^2$ at $(1, 1, 1)$ in the direction of $(-1, 2, 10)$ is given by

- 0
- 23
- 1
- -19

Question No.100 4.00

Bookmark

Study the following information carefully and answer the question below it

(i) There is a group of five persons- A, B, C, D and E
(ii) One of them is manual scavenger, one is sweeper, one is watchman, one is human scarecrow and one is grave-digger
(iii) Three of them – A, C and grave-digger prefer tea to coffee and two of them – B and the watchman prefer coffee to tea
(iv) The human scarecrow and D and A are friends to one another but two of these prefer coffee to tea.
(v) The manual scavenger is C's brother

Which of the above statements is unnecessary?

- (ii)
- Nill
- (iv)
- (iii)