PU M Tech Green Energy Technology

196 PU_2015_307
Enzyme that is involved in the interconversion of relaxed and supercoil DNA is:-

☐ Exonuleases

☐ RNA Polymerases

☐ Topoisomerases

☐ DNA Polymerases

133 PU_2015_307
A unit matrix of order n is of rank:-

☐ n

☐ 1

☐ 2n

☐ 0

168 PU_2015_307
Aluminum is obtained from alumina by:-

☐ Reduction with zinc

☐ Reduction with carbon

☐ Electrolytic reduction

☐ None

181 PU_2015_307
How many number bacteria are there in 0.1μl of 106 cells/ml of culture?

☐ 100

☐ 10

☐ 1000

☐ 1

166 PU_2015_307
The transition metal present in vitamin B-12 is:-

☐ Fe

☐ Cu

☐ Co

☐ None

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Which of the following molecules show EPR resonance?

- H_2O
- H_2O_2
- O_2
- CO_2

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

- 2
- 4
- 1
- 0.5

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Oxidation number of Fe in Fe_3O_4 is:-

- 4/3
- 8/3
- 5/3
- 2/3

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Solution of the differential equation

$$\frac{d^2x}{dy^2}+x=0, \quad x=0 \quad at \quad y=0 \quad and \quad x=1 \quad at \quad y=\frac{\pi}{2}$$

- $x = \sin(y)$
- $x = \sin^{-1}(y)$
- $x = \sin(y)+\cos(y)$
- $x = \cos(y)$

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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:-

- 1 : 1
- 1 : 2

2 : 1

1 : 3

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Which of the following is paramagnetic?

$[Cr(CO)_6]$

$[Fe(CO)_6]$

$[Ni(CO)_6]$

$[V(CO)_6]^+$

180 PU_2015_307
Thermophile bacteria that grow in the temperature range of:-

30 ℃ to 75 ℃ ;

15 ℃ to 45 ℃ ;

-10 ℃ to 20 ℃ ;

Above 100 ℃.

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Which of the following molecules will have a permanent dipole moment?

XeF_4

BF_3

SiF_4

SF_4

210 PU_2015_307
Enzyme that are used to hydrolyse fats into diglycerides, monoglycerides, fatty acids and glycerol is:-

Protease

Zymase

Cellulase

Lipase

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The function f(z) = is differentiable at:-

i

-I

-1

1

114 PU_2015_307

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

◻ $|x+y|$

◻   The average of $|x|$ and $|y|$

◻   the maximum of x and y

◻   the minimum of x and y

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If ΔG° is zero for a reaction, then:-

◻   ΔH = 0

◻   k = 1

◻   ΔS = 0

◻   k (equilibrium constant) = 0

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The absorption maxima of chlorophyll in PhotoSystemII is:-

◻   700nm

◻   600nm

◻   680nm

◻   780nm

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Density Of States (DOS) is maximum for:-

◻   Quantum rod

◻   Quantum well

◻   Quantum dot

◻   Quantum wire

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Which of the following is not a restriction endonuclease?

◻   Eco R1

◻   DNA Ligase

◻   Bam H1

◻   Hind III

134 PU_2015_307

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

○ m=n

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

○ m≠nand the coefficient matrix is non-singular

○ m≠n

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A silver cube having edge size 1 mµ was subdivided into 10 nm silver cubes. The surface to volume ratio is expected to:-

○ Decrease

○ Unaltered

○ Increase

○ Unity

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A skew symmetric matrix cannot be of rank:-

○ 1

○ greater than 1

○ 0

○ -1

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If g is a function defined on the open interval (a,b) such that $a < g(x) < x$ for all $x \in (a,b)$ then

○ An unbounded function

○ a strictly increasing function

○ a non-negative function

○ a non-constant function

188 PU_2015_307

Beta sheets in a protein are formed due to:-

○ Due to Sulpher bridge between two residues

○ Covalent bonding between amino acids in a polypeptide

○ Ionic bond between the residues

○ Hydrogen bonding between polypeptide chain

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The structure of O_3 and N_3^- are:-

◻ bent and linear, respectively

◻ Linear and bent, respectively

◻ both bent

◻ both linear

139 PU_2015_307
For joint probability $P(A \cap B)$ for two events A and B:-

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

◻ $P(A \cap B) = P(A) + P(B)$

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

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

102 PU_2015_307

If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ then A^{50} is

◻ $\begin{bmatrix} 1 & 0 & 0 \\ 25 & 1 & 0 \\ 25 & 0 & 1 \end{bmatrix}$

◻ $\begin{bmatrix} 1 & 0 & 0 \\ 50 & 1 & 0 \\ 50 & 0 & 1 \end{bmatrix}$

◻ $\begin{bmatrix} 1 & 0 & 0 \\ 48 & 1 & 0 \\ 48 & 0 & 1 \end{bmatrix}$

◻ $\begin{bmatrix} 1 & 0 & 0 \\ 24 & 1 & 0 \\ 24 & 0 & 1 \end{bmatrix}$

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Waxes are:-

◻ Saturated long chain hydrocarbons

◻ Lipids with long chain carbohydrates

◻ Ether link of long chain fatty acid with long chain alcohol

◻ Lipids with a polypeptide linkage

178 PU_2015_307
What among following is used to produce artificial rain?

- carbon monoxide

- copper oxide

- silver iodide

- silver nitrate

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

- greater than or equal to r

- Equal to r

- less than r

- less than or equal to r

152 PU_2015_307
The point group symmetry of H_2S molecule is:-

- D_{3h}

- C_{2v}

- C_{1v}

- C_{2v}

182 PU_2015_307
Which of the following is the perfect ligand for avidin?

- streptavidin;

- IP3

- nicotine;

- biotin;

175 PU_2015_307
Osmimum tetroxide is a reagent used for:-

- Hydroylation of acetylene

- Hydroxylation of olefins to give trans diols

- Hydroxylation of carbonyl compounds

- Hydroxylation of olefins to give cis diols

137 PU_2015_307
The equation of a straight line that passes through point A(1,-1) and has a slope equa to -1 is:-

☐ y=x+1

☐ y=x

☐ y=1/x

☐ y=-x

143 PU_2015_307
In the exothermic reaction, the enthalpy of a reaction is always:-

☐ Positive

☐ Zero

☐ Negative

☐ All

129 PU_2015_307

Let X=$\begin{bmatrix} 2 & 0 & -3 \\ 3 & -1 & -3 \\ 0 & 0 & -1 \end{bmatrix}$. A matrix P such that P^{-1}XP is a diagonal matrix is

☐ $\begin{bmatrix} -1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$

☐ $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$

☐ $\begin{bmatrix} 1 & -1 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$

☐ $\begin{bmatrix} -1 & -1 & 1 \\ 0 & -1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$

138 PU_2015_307
Root of the equation $x^2+ix+2=0$, where i=$\sqrt{-1}$ is:-

☐ (-1, 1)

☐ (-2i, i)

☐ (i, 1)

☐ no root exist

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The structure of NaCl is:-

☐ Cubic

☐ Trigonal

☐ Monoclinic

☐ Triclinic

135 PU_2015_307
Derivative of $y=2^x$ is:-

☐ $\dfrac{dy}{dx} = -x2^{x-1}$

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

☐ $\dfrac{dy}{dx} = 2.3\log 2 \cdot 2^x$

☐ $\dfrac{dy}{dx} = x\,2^{x-1}$

123 PU_2015_307
A drawn contains 2 blue, 4 red, and 2 yellow socks. If 2 socks are to be randomly selected from the drawer, what is the probability that they will be same color?

☐ 2/7

☐ 3/5

☐ 3/7

☐ 2/5

117 PU_2015_307
When two vectors A(i) and B(j) are orthonormal then:-

☐ A(i).B(j) = 0

☐ A(i).B(j) = 1

☐ A(i).B(j) = δij

☐ none of the above

186 PU_2015_307
RNA Polymerase is an enzyme that:-

☐ Translate RNA

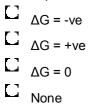☐ Transcribe DNA

○ Replicate DNA

○ Replicate RNA

148 PU_2015_307
The bond order of C_2 molecule is:-

○ 0

○ 3

○ 2

○ 1

142 PU_2015_307
For a spontaneous reaction:-

○ ΔG = -ve

○ ΔG = +ve

○ ΔG = 0

○ None

174 PU_2015_307
The number of orbitals present in the n = 4 atomic shell is:-

○ 32

○ 8

○ 16

○ 64

126 PU_2015_307
If $y=5x^2+3$, then the tangent at x=0, y=3:-

○ has a slope -1

○ Passes through x=0, y=0

○ has a slope +1

○ is parallel to the x-axis

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The 'd' orbital which has the maximum electronic probability electron density lying along two axis is known as:-

○ dx

○ dx^2-y^2

- [ ] dx^2
- [ ] dxy

141 PU_2015_307
The planar geometry is exhibited by:-

- [ ] CO_3^{2-}
- [ ] NI_3
- [ ] PF_5
- [ ] ClO_4-

146 PU_2015_307
Which one of the following high-spin complexes has the highest CFSE?

- [ ] $[Cr(H_2O)6]^{2+}$
- [ ] $[Mn(H_2O)6]^{3+}$
- [ ] $[Mn(H_2O)6]^{2+}$
- [ ] $[Cr(H_2O)6]^{3+}$

153 PU_2015_307
A Carnot engine operates between 600 and 800K, and observes 2000 calories heat from the source. The work done (in cal) is:-

- [ ] 2000
- [ ] 666
- [ ] 1000
- [ ] 500

192 PU_2015_307
End-to-end length of a bacteriophage DNA having 48kbp is:-

- [ ] 150µm
- [ ] 15.4µm ;
- [ ] 1.54µm ;
- [ ] 1.50µm;

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Autotrophic microbes:-

- [ ] Releases CO_2 ;
- [ ] Fixes O_2

Fixes CO_2 ;

Releases O_2 ;

54 of 100
121 PU_2015_307

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

9

5

19

-13

55 of 100
170 PU_2015_307

The metal used in storage battery is:-

Pt

Pb

Ag

Au

56 of 100
132 PU_2015_307

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

3

2

0

1

57 of 100
219 PU_2015_307

Which of the following is a green house gas?

SO_2

NO_2

CO

CO_2

58 of 100
100 PU_2015_307

If D_x and D_y represents the partial derivative operators, then the expression $\frac{1}{D_x^2 - D_y^2} \sin(x - y)$ is equal to:-

$-\frac{x}{2} \cos(x - y)$

$$-\frac{x}{2}\sin(x-y)\cos(x-y)$$

$$-\frac{x}{2}\cos(x-y)+\sin(x-y)$$

$$\frac{3x}{2}\sin(x-y)$$

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Chloroflorocarbon in the atmosphere causes depletion of:-

Carbondioxide

Nitrogen

Oxygen

Ozone

163 PU_2015_307
One of the following molecules used as food preservatives is:-

Ethylene glycol

Sodium alkyl benzene sulphonate

Sodium benzoate

None

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In a refrigerator the heat exhausted to the outer atmosphere is:-

Same as that absorbed from the contents

More than that absorbed from the contents

Less than that absorbed from the contents of the refrigerator

Any of the above depending upon the working substance

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In a heat engine the maximum heat that can be converted into mechanical work:-

Depends upon working temperatures

Depends upon friction

Depends upon the working

Is 100%

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The area of the Carnot cycle on a T-S diagram represents:-

Heat rejected to the sink

- Efficiency of the engine

- Work done in a cycle

- Heat absorbed from the source

258 PU_2015_307

When a voltmeter is placed across a forward biased diode, it will read a voltage approximately equal to:-

- The diode barrier potential

- 0V

- The bias battery voltage

- The total circuit voltage

246 PU_2015_307

At 0 K fluids are assumed to have:-

- Minimum entropy

- Zero entropy

- Fixed value of entropy

- Maximum entropy

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The depletion region is created by:-

- Diffusion

- Recombination

- Ionization

- All of these

242 PU_2015_307

Critical temperature is defined as the:-

- Highest temperature at which the gas can be liquefied at constant pressure

- Lowest temperature at which the gas can be liquefied at constant pressure

- Lowest temperature at which the gas can be liquefied by increase of pressure alone

- Highest temperature at which the gas can be liquefied by increase of pressure alone

232 PU_2015_307

The path of the particles for a motion in a uniform electric field is:-

- Parallel

- Circular

- Parabola
- Perpendicular

225 PU_2015_307
The Poisson's equation in CGS Gaussian system is:-

- $\nabla^2 V = \dfrac{-\rho}{\varepsilon_0}$

- $\nabla^2 V = -4\pi\sigma$

- $\nabla^2 V = -4\pi\rho$

- $\nabla^2 V = 0$

224 PU_2015_307
The electrical field intensity on the surface of a charged conductor is:-

- Directed tangentially to the surface
- Zero
- Directed along 45° to the surface
- Directed normally to the surface

259 PU_2015_307
Load regulation is determined by:-

- Changes in load resistance and input voltage
- Changes in load current and input voltage
- Changes in load current and output voltage
- Changes in zener current and load current

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A better power supply should possess:-

- Lower output impedance
- Higher input impedance
- Total voltage regulation
- Lower input impedance

230 PU_2015_307
The electric and magnetic fields share the energy of electromagnetic wave in the ratio:-

- 1:1

- 2:1
- 1:2
- 1:4

237 PU_2015_307
The device which converts heat into mechanical work is:-

- Motor
- Genertaor
- Heat Engine
- Energy converter

223 PU_2015_307
Quantum dot is referred as:-

- One dimensional structure
- Zero dimensional structure
- Z-dimensional structure
- Two dimensional structure

234 PU_2015_307
A quarter-wave transformer matching a 75Ω source with a 300 Ω load should have a characteristic impedance of :-

- 150Ω
- 50Ω
- 100Ω
- 200Ω

235 PU_2015_307
A cavity resonator can be represented by:-

- A lossy capacitor
- A lossy inductor
- An LC circuit
- An LCR circuit

221 PU_2015_307
The refractive index of material is the ratio:-

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

- Speed of light in vacuum/ speed of light in air

- Speed of light in water/ speed of light in air

79 of 100

251 PU_2015_307

The temperature at which a gas liquefies is called:-

- Critical temperature

- Boiling point

- Melting point

- Boyle's temperature

80 of 100

222 PU_2015_307

Optical cavity in LASERS used to obtain:-

- Radiated emission

- Stimulated emission

- Spontaneous emission

- Excited emission

81 of 100

275 PU_2015_307

The maximum demand of a consumer is 2 KW and the corresponding daily energy consumption is 30 units. What is the corresponding load factor?

- 50%

- 62.5%

- 75%

- 25%

82 of 100

292 PU_2015_307

The parameters used by *American Society of Mechanical Engineers (ASME)* to define fans, blowers and compressors is _____.

- specific ratio

- twist factor

- blade ratio

- fan ratio

83 of 100

288 PU_2015_307

Which one of the following is correct for a selective surface for solar thermal applications?

- High absorptivity and high emissivity

- Low absorptivity and low emissivity

- High absorptivity and low emissivity

Low absorptivity and high emissivity

262 PU_2015_307
Which of the following does not represent the important quality of CI engine fuel?

Viscosity

Anti-knock quality

Ignition quality

Volatility

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Cross flow heat exchangers are popularly used for heat transfer:-

gas and gas or liquid and gas

liquid and evaporating fluid

liquid and liquid

condensing fluid and liquid

267 PU_2015_307
When heat is transferred by molecular collision, it is referred to as heat transfer by:-

Convection

Radiation

Scattering

Conduction

260 PU_2015_307
Bernoulli's equation describes:-

Kinetic energy balance in turbulent flow

Mechanical energy balance in boundary

Kinetic energy balance in laminar flow

Mechanical energy balance in potential flow

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Latent heat of steam with increase of pressure:-

increases

remains same

decreases

behaves unpredictably

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Which one of the following materials is a sensible heat storage material?

☐ Servotherm

☐ Lauric acid

☐ Acetamide

☐ Capric acid

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If the temperature of a solid surface changes from 27°C to 627°C, then its emissive power changes at which ratio?

☐ 6:1

☐ 27:1

☐ 9:1

☐ 81:1

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Which one of the following is not a ceramic?

☐ Whisker

☐ Alumina

☐ Pyrosil

☐ Porcelai

296 PU_2015_307
In a vapour compression refrigeration plant, the refrigerant leaves the evaporator at 195 kJ/kg and the condenser at 65 kJ/kg. For 1 kg/s of refrigerant, what is the refrigeration effect?

☐ 100 KW

☐ 70 KW

☐ 160 KW

☐ 130 KW

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One ton refrigeration is equal to:-

☐ 3402 Kcal/hr

☐ 4302 Kcal/hr

☐ 3204 Kcal/hr

☐ 3024 Kcal/hr

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The ratio of inertia force and surface tension force is referred to as:-

☐ Froude number

☐ Mach number

☐ Weber number

☐ Pressure coefficient

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Air is best heated with steam in a heat exchanger of:-

☐ Shell and tube type

☐ Double pipe type with fins on steam side

☐ Plate type

☐ Double pipe type with fins on air side

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Property of a fluid by which its own molecules are attracted is called:-

☐ Adhesion

☐ Compressibility

☐ Viscosity

☐ Cohesion

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In free convection heat transfer, Nusselt number is function of:-

☐ Grashoff no. and Reynol d no.

☐ Grashoff no., Prandtl no. and Reynol d no

☐ Prandtl no. and Reynol d no.

☐ Grashoff no. and Prandtl no.

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Log mean temperature difference in case of counter flow compared to parallel flow heat exchanger will be:-

☐ more

☐ less

☐ same

☐ depends on other factors

281 PU_2015_307

Which of the following is not the property of the system?

- ☐ Internal energy

- ☐ Entropy

- ☐ Specific heat

- ☐ Heat

283 PU_2015_307

Reheating in a multi-stage expansion gas turbine cycle:-

- ☐ Improves thermal efficiency

- ☐ Improves work ratio

- ☐ Avoids pollution

- ☐ Reduces compressor work