307 PU M Tech Green Energy Technology

129 PU_2016_307
The maximum slope of the curve x^2+6x^2+2x+1 is:-

○ 16

○ 19

○ -13

○ 14

119 PU_2016_307
The triangle of maximum area inscribed in a circle of radius r is:-

○ An isosceles triangle of height r

○ An equilateral triangle

○ A right angled triangle with hypotenuse measuring 2r

○ None of these

136 PU_2016_307

The coefficient of $(z-\pi)^2$ in the Taylor expansion of $f(z)\begin{cases} \dfrac{\sin(z)}{z-\pi} & if\, z \neq \pi \\ -1 & if\, z = \pi \end{cases}$

arround π is:-

○ 1/6

○ -1/6

○ 1/2

○ -1/2

115 PU_2016_307

If $A\begin{bmatrix} -2 & 1 \\ 3 & 5 \end{bmatrix} = \begin{bmatrix} -1 & 7 \\ -1 & 20 \end{bmatrix}$ then the matrix A is equal to:-

○ $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

○ $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

○ $\begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$

$$\begin{bmatrix} -2 & 1 \\ 3 & 5 \end{bmatrix}$$

121 PU_2016_307

The area bounded by the curves y =√x , 2y+3πx and x axis in the first quadrant is:-

○ π/2

○ π/4

○ 9

○ 18

137 PU_2016_307

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

○ $\lim_{x \to 0} f(x) = 0$

○ $\lim_{x \to 0} f(x) = \pi^6/2$

○ $\lim_{x \to 0} f(x)\, doesnot\ exist$

○ $\lim_{x \to 0} f(x) = 1$

103 PU_2016_307

Solution of the differential equation $\frac{d^2 x}{dy^2} + x = 0$, x = 0 at y=0 and x = 1 at y = π/2:-

○ sin⁻¹(y)

○ x = sin(y)+cos(y)

○ x = sin(y)

○ x = cos(y)

111 PU_2016_307

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:-

○ 1/f2

○ xf

9 of 100
125 PU_2016_307

If a function f(z)=u(x,y)+iv(x,y) of the complex variable z=x+iy, where x, y, u and v are real, is analytic in a domain D of Z then which of the following is true:-

○ $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$ and $\frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$

○ $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial x}$ and $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial y}$

○ $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$

○ $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$

10 of 100
107 PU_2016_307

A field F is irrotational if:-

○ curl F = 0

○ grad F = 0

○ div F = 0

○ none of these

11 of 100
123 PU_2016_307

If g is a function defined on the open interval (a, b) such that a<g(x)<x for all x ∈ (a, b) then g is:-

○ a non-negative function

○ a non-constant function

○ An unbounded function

○ a strictly increasing function

12 of 100
131 PU_2016_307

Which of the following is a linear differential equation:-

○ $(1+y)\frac{dy}{dx} + + \sin(x) = 0$

○ $\frac{dy}{dx} + y(y+x) = x^2$

○ $\frac{dy}{dx} + x^2 y = \sin(y)$

○ $\frac{dy}{dx} - x^2 y = \sin(x)$

127 PU_2016_307

If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and a+d=1 and ad-bc=1 then A^3 equals:-

○ 0

○ 3I

○ I

○ none of these

138 PU_2016_307

Let C be the contour $|z| = 2$ oriented the anti-clockwise direction. The value of the

integral $\oint_C ze^{3/z}dz$ is:-

○ 5πi

○ 9πi

○ 7πi

○ 3πi

117 PU_2016_307

The matrix $A = \begin{bmatrix} cos\alpha & -sin\alpha \\ sin\alpha & cos\alpha \end{bmatrix}$ is:-

○ Orthogonal

○ Unitary

○ hermitian

○ skew hermitian

113 PU_2016_307
The possible set of eigen values of a 4x4 skew-symmestric orthogonal real matrix is:-

○ {±i ; ±1}

○ {±1}

○ {0,±i }

○ {±i }

105 PU_2016_307
For XOR operator ⊕ which one is not correct?

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

18 of 100

133 PU_2016_307

$y = x^{-n}$ where n is a positive integer represents:-

- straight line
- ellipse
- parabola
- hyperbola

19 of 100

109 PU_2016_307

The volume of the parallelepiped whose edges are represented by

$\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$ $\vec{c} = 3\hat{i} - \hat{j} + 2\hat{k}$ is:-

- 28
- 7
- 6
- 15

20 of 100

101 PU_2016_307

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:-

- 196
- 280
- 140
- 346

21 of 100

161 PU_2016_307

The point group symmetry of the staggered form of ethane molecule is:-

- D_{3d}
- D_{3h}
- D_3
- C_{3v}

171 PU_2016_307
Which among the following will be paramagnetic?

○ $V(CO)_6$

○ $Cr(CO)_6$

○ $Fe(CO)_5$

○ $Fe2(CO)_9$

145 PU_2016_307
Any substance which completely destroys or reduces the activity of the catalyst is called:-

○ Catalyst

○ Inhibitor

○ Catalyst poison

○ Promoter

153 PU_2016_307
The oxidation state of Cr in CrO_5 is:-

○ +2

○ +10

○ +4

○ +6

169 PU_2016_307
IUPAC name of $[Pt(NH_3)_3(Br)(NO_2)Cl]Cl$ is:-

○ Triamminenitrochlorobromo platinum (IV) chloride

○ Bromochloro nitrotriammine platinum (IV) chloride

○ Triamminebromo chloronitro platinum (IV) chloride

○ Triamminechloro bromonitro platinum (IV) chloride

143 PU_2016_307
The compound $YBa_2Cu_3O_7$ is used as:-

○ Superconductor

○ Super-cooled material

○ Semiconductor

○ Dielectric

167 PU_2016_307
In second order reaction A → B, if the concentration of A is doubled, the half-life of the reaction will be:-

○ Halved

○ Unchanged

○ Quadrupled

○ Doubled

147 PU_2016_307
The Bragg condition is:-

○ $\sin\theta = n\lambda$

○ $d\sin\theta = 2\lambda$

○ $\sin\theta = \lambda/d$

○ $2d\sin\theta = n\lambda$

179 PU_2016_307
Which of the following statement is true for electrochemical cells?

○ H_2 is anode and Cu is electrode

○ Reduction occurs at H_2 electrode

○ H_2 is cathode and Cu is anode

○ oxidation occurs at Cu electrode

141 PU_2016_307
Sea water will boil at a temperature_____.

○ Same as that of pure water

○ Higher than pure water

○ Lower than pure water

○ Cannot be predicted

177 PU_2016_307
How many NMR signals are formed in cis-dimethyl cyclopropane and transdimethyl cyclopropane:-

○ 1,2

○ 3,4

○ 8,10

○ 2,3

175 PU_2016_307
In the Boat conformation of cyclohexane the most destabilizing interaction is:-

○ Eclipsing

○ Flagpole-Flangpole

○ 1,3 - diequatorial

○ 1,3 - diaxial

155 PU_2016_307
The complexes $[Co(H_2O)_4Cl_2]NO_2$ and $[Co(H_2O)_4Cl(NO_2)]Cl$ are:-

○ optical isomers

○ linkage isomers

○ ionization isomers

○ positional isomers

157 PU_2016_307
Atoms of different elements containing the same number of neutrons but different number of total nucleons is known as:-

○ Isodiaphers

○ Isotones

○ Isotopes

○ Isosterism

173 PU_2016_307
BF_3 is used as a catalyst in several industrial processes due to:-

○ Weak Lewis acid character

○ Strong reducing nature

○ Strong Lewis acid nature

○ Weak reducing action

163 PU_2016_307
PF3 belongs to the point group:-

○ D_{2d}

○ C_{3v}

○ D_{3h}

○ D_{2h}

149 PU_2016_307
Borax is used in preparing:-

○ Portland cement

○ Soda glass

○ Pyrex glass

○ Opal glass

151 PU_2016_307
Mossbauer effect is also related with resonance fluorescence of:-

○ Beta rays

○ Alpha rays

○ Gamma rays

○ X-rays

165 PU_2016_307

In the reaction $KIO_3 + 5KI + 6HCl \longrightarrow 3I_2 + 6KCl + 3H_2O$:-

○ KI is reduced to I_2

○ KIO_3 is reduced to I_2

○ KIO_3 is oxidised to I_2

○ None of the above

159 PU_2016_307
Which among the following is not true for electrochemical cell?

○ It consists of a battery

○ Anode acquires negative charge

○ It consists of generally two electrolytes

○ It needs a porous partition

203 PU_2016_307
In LASER, at threshold condition:-

○ Stimulated emission is dominant over illumination

○ Stimulated emission is dominant over resistance

○ Stimulated emission is dominant over absorption

○ Stimulated emission is dominant over spontaneous emission

183 PU_2016_307
Atomic bonding is established due to:-

○ gravitational force

○ electrostatic force

○ magnetic force

○ nuclear force

215 PU_2016_307
The Young's modulus is obtained from the ratio between:-

○ Strain and the length

○ Strain and elongation

○ Strain and the stress

○ Strain and the diameter

197 PU_2016_307
Alpha decay of an atom/isotope results the loss of:-

○ Two neutrons

○ Two protons and two neutrons

○ Two Electrons

○ Two photons

191 PU_2016_307
The potential barrier at P-N junction arises due to:-

○ minority carriers

○ majority carriers

○ both majority and minority carriers

○ Fixed donor and acceptor concentration

205 PU_2016_307
A tunnel diode is fabricated using:-

○ Intrinsic semiconductor

○ Shallow doped pn junction

○ Heavily doped pn junction

○ A high resistive pn junction

217 PU_2016_307
The value of solar constant is:-

○ 1.36 J/ m^2-s

○ 1.36 KW/m^2-s

○ 1.36 W/ m^2-s

○ 1.46 KW/ m^2-s

219 PU_2016_307
The ratio of the charge sensitivity and the current sensitivity of a ballistic galvanometer is:-

○ T/2π

○ 2π/T

○ ½π

○ 2

187 PU_2016_307
The magnetization of a superconductor is:-

○ -H

○ 0

○ -1

○ -B

181 PU_2016_307
The effective mass of an electron in a semiconductor can be:-

○ negative near the bottom of the band

○ zero at the centre of the band

○ A scalar quantity with a small magnitude

○ negative near the top of the band

185 PU_2016_307
The decrease in free energy during recrystallization originates mainly from:-

○ lower energy of the new crystal structure

○ grain boundaries

○ excess dislocations

○ excess point defects

189 PU_2016_307
The temperature of the antiferromagnetic-to-paramagnetic transition is called:-

○ Debye temperature

○ Curie-Weiss temperature

○ Neel temperature

○ antiferromagnetic Curie temperature

209 PU_2016_307
Device isolation in an integrating Circuit fabrication is achieved using:-

○ SiO_2 deposition

○ Etching

○ Metalization

○ Photomasking

211 PU_2016_307
Improper biasing to the Transistor circuit leads to:-

○ Heavy loading of the emitter terminal

○ Distortion in the output signal

○ Faulty location of the load line

○ Excess heat production at the collector terminal

213 PU_2016_307
When a body is thrown, the horizontal range of projectile 'R" can be defined as:-

○ $R = (u. Sin2\theta)/g$

○ $R = (2u. Sin2\theta)/g$

○ $R = (2g. Sin2\theta)/g$

○ $R = (uv. Sin2\theta)/g$

195 PU_2016_307
NAND gate does the function of:-

○ Subtraction

○ Addition

○ Inversion

○ Multiplication

199 PU_2016_307
Acceleration "f" of a charge "q" caused by an applied electric field "E" is defined as:-

○   f = μm* E/q

○   f = μE/q

○   f = q E/ m*

○   f = m* E/q

193 PU_2016_307
Electric motor works under the:-

○   Fleming's Right hand rule

○   Faraday's rule

○   Fleming's left hand rule

○   Einstein's rule

207 PU_2016_307
The trans-conductance "g" of JFET is equal to:-

○ $[2/|V_p|]\sqrt{(I_{DSS}*I_D)}$

○ $[I_{DSS}/V_p]\{1-(V_{GS}/V_p)\}$

○ $[-2/V_p]\{1-(V_{GS}/V_p)\}$

○ $-2I_{DSS}/V_p$

201 PU_2016_307
The angular frequency of rotation (ω_c) upon interaction between electron and magnetic field without collision is:-

○ $\omega_c = \sigma eB/m*$

○ $\omega_c = eB/m*$

○ $\omega_c = B/m*e$

○ $\omega_c = \sigma m*/B$

253 PU_2016_307
Electron acceptor in Photosystem II is:-

○   Ferredoxin

○   Quinone

○   Plastoquinone

○   Cytochrome

251 PU_2016_307
Kinases carry out:-

○ Removal of phosphates

○ Phosphorylation

○ Transfer of galactose

○ Hydrolysis

231 PU_2016_307
Which of the following is a termination codon in a polypeptide synthesis?

○ AUG

○ UAA

○ GUG

○ UGG

257 PU_2016_307
Which one of the following amino acid is represented by single codon?

○ Valine

○ Lysine

○ Proline

○ Methionine

241 PU_2016_307
The following is a plant growth regulator used for quick ripening of fruit:-

○ Ethylene

○ Butylene

○ Auxin

○ Insulin

237 PU_2016_307
In the absence of molecular oxygen as in the skeletal muscles, pyruvate is converted into:-

○ Acetic Acid

○ Formic Acid

○ Lactic Acid

○ CO_2

227 PU_2016_307
Point Mutations are due to:-

○ Changes in normal arrangement of gene in a chromosome

○ Changes in number of chromosomes

○ Gross changes in chromosomes

○ Changes in nucleotide sequence of a gene

249 PU_2016_307
Enzymes that catalyses the linkage of molecule by splitting a phosphate bond is:-

○ Isomerase

○ Ligase

○ Lysase

○ Transferase

259 PU_2016_307
Growing plants from its parts such as leaf, stem, root is termed as:-

○ Vegetative propagation

○ Cloning

○ Seedless culture

○ Non-vegetative propagation

233 PU_2016_307
Percentage of light energy utilized in photosynthesis is generally around:-

○ 90%

○ 50%

○ 10%

○ 1%

235 PU_2016_307
Auxins inhibits the growth of:-

○ Parthinocarpic development of fruits

○ Roots

○ Lateral axillary buds

○ Apical buds

245 PU_2016_307
HCFC is an eco-friendly gas and it differs from CFC by:-

○ The deletion of CO from CFC

○ Nitrous oxide

○ By the addition of chlorine to CFC

○ The loss of chlorine and bromine

229 PU_2016_307
What can happen when wheat field is inoculated with Rhizobium?

○ Increase in production/ nitrogen content of the soil

○ Fertility of the soil decreases

○ No increase in production/ nitrogen content of the soil

○ Fertility of the soil increases

255 PU_2016_307
Which of the following is correct for B-DNA?

○ It has no helical sense

○ It has no phosphate backbone

○ It has right-handed helical sense

○ It has left-handed helical sense

243 PU_2016_307
Which of the following is not a vitamin?

○ Riboflavin

○ Folic Acid

○ Formic Acid

○ Ascorbic Acid

225 PU_2016_307
The correct sequence of mitosis in an animal cell is:-

○ Interphase, Metaphase, Prophase, Anaphase, Telophase

○ Metaphase, Anaphase, Prophase, Interphase, Telophase

○ Prophase, Interphase, Anaphase, Metaphase, Telophase

○ Interphase, Prophase, Metaphase, Anaphase, Telophase

239 PU_2016_307
Which of the following protein acts as an energy transduer?

○ Hemoglobin

○ Bacteriorhodopsin

○ Heat shock protein

○ G-protein

247 PU_2016_307
Internal phosphodiester bond in a nucleic acid molecule is hydrolysed by:-

○ DNA polymerase

○ Endonuclease

○ deoxyribonuclease

○ Exonuclease

221 PU_2016_307
Which side of t-RNA molecule hydrogen bonds to mRNA molecule?

○ 3' end of t-RNA molecule

○ 5' end of t-RNA molecule

○ Anticodon

○ Codon

223 PU_2016_307
Okazaki fragment relate to:-

○ Partially synthesized mRNA

○ DNA Primers for leading strand synthesis

○ SiRNA fragments

○ DNA fragment that help synthesis of lagging strand

263 PU_2016_307
Log mean temperature difference in case of counter flow compared to parallel flow heat exchanger will be:-

○ less

○ same

○ more

275 PU_2016_307

The rate of conductive heat transfer across $1m^2$ of a mild steel plate that has a constant thickness of $5 \times 10^{-3}m$ and a thermal conductivity of 45 W/mK, when the temperature of hot and cold surfaces are 100 °C and 99.9 °C, is:-

○ 90 W

○ 9 W

○ 900 W

○ 0.007 W

271 PU_2016_307

An engine working on carnot cycle rejects 40% of absorbed heat from the source, while the sink temperature is maintained at 27°C, then what is the source temperature?

○ 477°C

○ 67.5°C

○ 750°C

○ 203°C

289 PU_2016_307

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

○ change in absolute kinetic energy

○ change in pressure energy

○ change in relative kinetic energy

○ change in energy balance because of centrifugal force

281 PU_2016_307

The thermal efficiency of a carnot heat engine is 30%. If the engine is reversed in operation to work as a heat pump with operating conditions unchanged, then what will be the COP for heat pump?

○ 0.33

○ 0.30

○ 2.33

○ cannot be calculated

273 PU_2016_307

In a throttling process, which one of the following parameters remains constant?

○ entropy

○ enthalpy

○ temperature

○ pressure

87 of 100
283 PU_2016_307
In a psychrometric chart, what does a vertical downward line represent?

○ dehumidification process

○ sensible cooling process

○ humidification process

○ adiabatic saturation process

88 of 100
269 PU_2016_307
The refrigerant for a refrigerator should have:-

○ high latent heat

○ high total heat

○ low latent heat

○ high sensible heat

89 of 100
298 PU_2016_307
A metal plate has a surface area of 2 m^2, thickness 10 mm and a thermal conductivity of 200 W/m K. What is the thermal resistance of the plate?

○ 2.5 x 10^{-3} K/W

○ 2.5 x 10^{-5} K/W

○ 4 x 10^4 K/W

○ 1.5 x 10^{-5} K/W

90 of 100
299 PU_2016_307
A 3 m wide rectangular channel carries 15 m^3/sec of water. Its critical depth is equal to:-

○ 2m

○ 1.6m

○ 1m

○ 1.5m

91 of 100
287 PU_2016_307
Which one of the following metal forming processes is not a high energy rate forming process?

○ Electro-magnetic forming

○ Roll-forming

○ Electro-hydraulic forming

○ Explosive forming

92 of 100
261 PU_2016_307
Thermal conductivity of solid metals with rise in temperature normally:-

○ decreases

○ increases

○ remains constant

○ unpredictable

93 of 100
279 PU_2016_307
The vanes of a centrifugal pump are generally:-

○ Curved backward

○ Twisted

○ Radial

○ Curved forward

94 of 100
291 PU_2016_307
The power absorbed by hydraulic pump is directly proportional to which one of the following?

○ N

○ N^4

○ N^3

○ N^2

95 of 100
265 PU_2016_307
The vapour pressure of refrigerant should be:-

○ equal to atmospheric pressure

○ lower than atmospheric pressure

○ higher than atmospheric pressure

○ could be anything

96 of 100
285 PU_2016_307

Which thermodynamic property is evaluated with the help of Maxwell equations from the data of other measurable properties of steam?

Entropy

Enthalpy

Specific heat

Latent heat

267 PU_2016_307
Air can be best heated by steam in a heat exchanger of:-

plate type

shell and tube type

double pipe type with fins on steam side

double pipe type with fins on air side

296 PU_2016_307
A three phase 6 pole 50 HZ induction motor is running at 5% slip. What is the speed of the motor?

850 rpm

1000 rpm

900 rpm

950 rpm

294 PU_2016_307
A gas turbine plant working on Joule cycle produces 4000 kW of power. If its work ratio is 40%, what is the power consumed by compressor?

8000 KW

2000 KW

6000 KW

4000 KW

277 PU_2016_307
The value of solar constant is:-

1637 W/m^2

1763 W/m^2

1000 W/m^2

1367 W/m^2