

Section 1 - Section 1

Question No.1

4.00

Bookmark

The frequency of damped oscillations as compared to frequency of undamped vibrations with viscous damping, is

- Less
- More
- Same
- Zero

Question No.2

4.00

Bookmark

Choose the correct meaning of the italicized idiom.

Those who work by *fits and starts* seldom show good results.

- Rarely
- Disinterestedly
- Irregularly
- Regularly

Question No.3

4.00

Bookmark

A partial differential equation requires

- Two or more independent variables
- Exactly one independent variable
- Equal number of dependent and independent variables
- More than one dependent variable

Question No.4

4.00

Bookmark

The carbon-14 activity of an old wood sample is found to be $14.2 \text{ disintegrations min}^{-1}\text{g}^{-1}$. Calculate age of oldwood sample, if for a fresh wood sample carbon-14 activity is $15.3 \text{ disintegrations min}^{-1}\text{g}^{-1}$ ($t_{1/2}$ carbon-14 is 5730 years), is:

- 877
- 5000
- 617
- 4000

Question No.5

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Bookmark

Which among the following amino acid residue is most likely getting phosphorylated in prokaryotes?

- Serine
- Tyrosine
- Threonine
- Histidine

Question No.6

4.00

Bookmark

The following is true for the following partial differential equation used in nonlinear mechanics known as the Korteweg-de Vries equation

- linear; 1st order
- nonlinear; 3rd order
- nonlinear; 1st order
- linear; 3rd order

Question No.7

4.00

Bookmark

In a single-component condensed system, if degree of freedom is zero, maximum number of phases that can co-exist _____.

- 0
- 2
- 1
- 3

Question No.8

4.00

Bookmark

Which one of the following gives the force required to accelerate a car of mass 2000 kg from rest to 30 m/s in 12 s, if the frictional force between the tyres and the ground is 0.2 N/kg ?

- 4600 N
- 5400 N
- 5000 N
- 400 N

Question No.9

4.00

Bookmark

A cantilever of length l is carrying a uniformly distributed load of w per unit run over the whole span. The deflection at the free end is given as

- $\frac{wl^3}{4EI}$
- $\frac{wl^4}{8EI}$
- $\frac{wl^4}{16EI}$
- $\frac{wl^2}{4EI}$

Question No.10

4.00

Bookmark

Which number replaces the question mark?



- 9
- 10
- 12
- 11

Question No.11

4.00

Bookmark

Choose the best antonym of the italicized word.
Many snakes are actually *innocuous*.

- ferocious
- harmful
- deadly
- poisonous

Question No.12

4.00

Bookmark

Chelate effect is

- due to equal contribution of entropy and enthalpy change
- predominantly due to entropy change
- predominantly due to enthalpy change
- independent of ring size

Question No.13

4.00

Bookmark

Which is the most economical section for a beam

- I- Section
- Circular
- Square
- Rectangular

Question No.14

4.00

Bookmark

The vapour of a pure substance, when cooled under a pressure less than its triple-point pressure

- Liquefies first and then solidifies
- Solidifies directly
- Liquefies
- Remains unchanged

Question No.15

4.00

Bookmark

"A total electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed" The above statement is associated with

- Maxwell's second law
- Coulomb's square law
- Gauss's law
- Maxwell's first law

Question No.16

4.00

Bookmark

If obtained solution has same number of constants as the order of the differential equation then the solution of the differential equation is

- Integrating factor
- Singular solution
- General solution
- Particular solution

Question No.17

4.00

Bookmark

The ratio of reverse resistance and forward resistance of a germanium crystal diode is about

- 1:1
- 1000:1
- 100:1
- 40,000:1

Question No.18

4.00

Bookmark

In a transformer the energy is conveyed from primary to secondary

- Through air
- By the flux
- Through cooling coil
- Both air and cooling coil

Question No.19

4.00

Bookmark

As per the kinetic theory of ideal gases, which of the following statements is NOT correct?

- Particles are in a Brownian motion between collisions
- During the collision, the system does not lose energy
- Gas molecules have mass but no volume
- Particles exert same force per unit area on all sides of the container

Question No.20

4.00

Bookmark

Which of the following equations are solutions to the partial differential equation?

$$\frac{\partial^2 u}{\partial x^2} = 9 \frac{\partial^2 u}{\partial y^2}$$

- $x^2 + y^2$
- $\sin(3x - 3y)$
- $\cos(3x - y)$
- $e^{-3\pi x} \sin(\pi y)$

Question No.21

4.00

Bookmark

Based on the information given answer the following question.

1. In a family of six persons, there are people from three generations. Each has separate professions and they like different colours. There are two couples.
2. Shyam is an Engineer and his wife is not a doctor and she does not like Red colour.
3. Chartered Accountant likes green colour and his wife is a teacher.
4. Manisha is the mother-in-law of Sunita and she likes orange colour.
5. Vimal is the grand father of Tarun and tarun is the Principal and likes black colour.
6. Nyna is the grand daughter of Manisha and she likes blue colour. Nyna's Mother likes white colour.

Which of the following is the correct pair of two couples?

- Shyam-Manisha, Vimal-Sunita
- Cannot be determined
- Tarun-Nyna, Shyam-Sunita
- Shyam-Sunita, Vimal-Manisha

Question No.22

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Bookmark

The following are the example for mobile elements

- Fe, Ca
- Mn, Mo
- Bo, S
- Cu, Mg

Question No.23

4.00

Bookmark

In a molecule of chlorine trifluoride, ClF₃ bond angle is

- 107.5°
- 78.5°
- 87.5°
- 109.5°

Question No.24

4.00

Bookmark

Beta particles are emitted

- Due to conversion of neutrons into protons in the nucleus
- Due to conversion of protons into neutrons
- Due to reversion of the excited nucleus to the ground state.
- When outermost orbital electron leave the atom

Question No.25

4.00

Bookmark

In a silicon transistor $\alpha_{dc} = 100$, $V_{CC} = 30V$, $R_C = 1.5 \text{ k}\Omega$. The saturation collector current of the transistor is

- 20mA
- 30mA
- 10mA
- 100mA

Question No.26

4.00

Bookmark

In recent times, the number of cases of death by poisoning _____ sharply.

- increased
- have increased
- had increased
- has increased

Question No.27

4.00

Bookmark

Choose the correct meaning of the italicized idiom.

You cannot throw *dust into my eyes*.

- Abuse me
- Terrify me
- Cheat me
- Hurt me

Question No.28

4.00

Bookmark

Water use efficiency is minimum in

- CAM plants
- All higher plants
- C4 plants
- C3 plants

Question No.29

4.00

Bookmark

The decreasing order of dipole moment of molecules is

- $\text{NH}_3 > \text{NF}_3 > \text{H}_2\text{O}$
- $\text{H}_2\text{O} > \text{NH}_3 > \text{NF}_3$
- $\text{NF}_3 > \text{NH}_3 > \text{H}_2\text{O}$
- $\text{H}_2\text{O} > \text{NF}_3 > \text{NH}_3$

Question No.30

4.00

Bookmark

In mitochondria, oxidation of one molecule of NADH results in formation of

- One molecule of ATP
- Two molecules of ATP
- Three molecules of ATP
- Four Molecules of ATP

Question No.31

4.00

Bookmark

"Silent spring" written by Rachel Carson deals with

- Excessive use of pesticides
- Air pollution
- Deforestation
- Water pollution

Question No.32

4.00

Bookmark

If A+B means A is daughter of B,

A-B means A is husband of B

A × B means A is brother of B

From the statement $P - Q + R \times S$, how is Q related to S?

- Niece
- Sister
- Mother
- None of these

Question No.33

4.00

Bookmark

If 5 men or 8 boys can do a work in 84 days. In how many days can 10 men and 5 boys can do the same work?

- 28
- 35
- 32
- 25

Question No.34

4.00

Bookmark

These boys need some new books, _____?

- is it?
- isn't it?
- don't they?
- do they?

Question No.35

4.00

Bookmark

The rate constant of unimolecular reaction was $2.66 \times 10^{-3} \text{ s}^{-1}$ and $2.2 \times 10^{-1} \text{ s}^{-1}$ at $T = 120 \text{ K}$ and 360 K respectively. The rate constant (in s^{-1}) at 240 K would be:

- 4.8×10^{-2}
- 1.8×10^{-3}
- 2.4×10^{-2}

2.4×10^{-1}

Question No.36

4.00

Bookmark

Which among the following is a C4 plant?

- Sugarcane
- Paddy
- Wheat
- Red gram

Question No.37

4.00

Bookmark

A semiconductor is known to have an electron concentration of $8 \times 10^{19} \text{ m}^{-3}$ and a hole concentration of $5 \times 10^{18} \text{ m}^{-3}$ (electron mobility = 2.0 and hole mobility = 0.01). The resistivity of the semiconductor is

- 25.6 Ωm
- 0.256 Ωm
- 2.56 Ωm
- 256 Ωm

Question No.38

4.00

Bookmark

The classical experiments of variation in plants by Gregor Mendel was performed in

- Arabidopsis
- Maize
- Rice
- Pea

Question No.39

4.00

Bookmark

Let $y = a \cos 4x + b \sin 4x$ is solution of a differential equation then its order must be.

- One
- Any Positive Number Could Be
- Three
- Two

Question No.40

4.00

Bookmark

A solution to a boundary value problem which satisfies boundary condition is a solution to the

- logical equation
- Differential equation
- Maxwell's equation
- Integral equation

Question No.41

4.00

Bookmark

Let A be a Hermitian matrix. Then, which of the following statements is false?

- If $A^2 = I$, then $A = I$.
- If $A^3 = I$, then $A = I$.
- The diagonal entries of A are all real.
- There exists a unitary U such that UAU is a diagonal matrix.

Question No.42

4.00

Bookmark

All the Eigen value of an orthogonal matrix are of unit modulus.

- The Eigen values of an orthogonal matrix may be any real matrix.
- true
- All are false.
- false

Question No.43

4.00

Bookmark

The dimensions of capacitance are

- $\text{M}^{-1}\text{L}^{-2}\text{T}^2\text{Q}^1$
- $\text{M}^{-1}\text{L}^{-1}\text{T}^2\text{Q}^2$

- $M^{-1}L^{-1}T^{-2}Q^{-2}$
- $M^{-2}L^{-2}T^2Q^2$
- $M^{-1}L^{-2}T^2Q^2$

Question No.44

4.00

Bookmark

A small loudspeaker radiates 5W of power and the intensity is 1 Wm^{-2} at a distance of 2m from the speaker. If the power of the speakers is doubled, the intensity in Wm^{-2} at a distance of 4m from the speaker is

- 1
- 4
- 2
- 0.5

Question No.45

4.00

Bookmark

Choose the missing term : AZ, GT, MN, ?, YB

- KE
- SH
- TS
- SX

Question No.46

4.00

Bookmark

The knee voltage of a crystal diode is approximately equal to

- Barrier Potential
- Breakdown Voltage
- Forward Voltage
- Applied Voltage

Question No.47

4.00

Bookmark

Iodinevalue of lipids is a measure of

- Degree of polysaturation of lipids
- Degree of monosaturation of lipids
- Degree of saturation of lipids
- Degree of unsaturation of lipids

Question No.48

4.00

Bookmark

A two digit number is three times the sum of its digits. If 45 is added to it, the digits are reversed. The number is

- 35
- 27
- 32
- 31

Question No.49

4.00

Bookmark

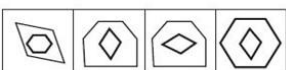
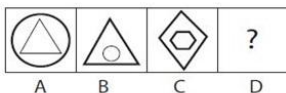
Two weights are suspended from a string thrown over a light frictionless pulley. The mass of one weight is 0,200 kg. If a heavy weight is attached to its other end, the tension in the string is

- 0.200 kgf
- Zero
- 0.600 kgf
- 0.400 kgf

Question No.50

4.00

Bookmark



- 1
- 3
- 4
- 2

Question No.51

4.00

Bookmark

In a transistor _____

- $I_E = I_C + I_B$
- $I_B = I_C + I_E$
- $I_C = I_E + I_B$

Question No.52

4.00

Bookmark

In Simpson's (1/3)rd rule the number of intervals is _____.

- multiple of 3
- Even
- multiple of 6
- Odd

Question No.53

4.00

Bookmark

For a face centered cubic lattice, the Miller indices for the first Bragg's peak (smallest Bragg angle) are

- 1 1 1
- 0 0 2
- 1 1 0
- 0 0 1

Question No.54

4.00

Bookmark

The geometries of $\text{Ni}(\text{CO})_4$ and $[\text{NiCl}_4]^{2-}$, respectively, are

- Square planar and square planar
- Tetrahedral and tetrahedral
- Tetrahedral and square planar
- Square planar and tetrahedral

Question No.55

4.00

Bookmark

In allene, hybridization of the central and terminal carbons, respectively, are

- sp and sp^2
- sp^2 and sp^3
- sp and sp^3
- sp^2 and sp^2

Question No.56

4.00

Bookmark

The efficiency of a Carnot engine working between 0°C and 100°C

- 1
- 100/273
- 100/373
- 0.5

Question No.57

4.00

Bookmark

Which of the following biological macromolecules are structurally diverse in living world?

- Carbohydrates
- Nucleic acids
- Proteins
- Lipids

Question No.58

4.00

Bookmark

As the temperature of transistor goes up, the base-emitter resistance _____

- Decreases
- First increases and then decreases
- Remains Same
- Increases

Question No.59

4.00

Bookmark

A metal crystallizes in fcc structure with a unit cell side of 500 pm. If the density of the crystal is 1.33 g/cc, the molar mass of the metal is

- 26
- 23
- 25
- 24

Question No.60

4.00

Bookmark

A dielectric material must be

- Resistor
- Good Conductor
- Semi conductor
- Insulator

Question No.61

4.00

Bookmark

The species ^{19}Ne and ^{14}C emit a positron and β^- particle respectively. The resulting species formed are respectively-

- ^{19}Na and ^{14}B
- ^{19}Na and ^{14}N
- ^{19}F and ^{14}B
- ^{19}F and ^{14}N

Question No.62

4.00

Bookmark

How many atoms are there in an element packed in a FCC structure

- 4
- 1
- 83
- 2

Question No.63

4.00

Bookmark

If in a certain language, GRASP is coded as BMVNK, which word would be coded as CRANE?

- XMVIZ
- FUDQH
- BQZMD
- HWFSJ

Question No.64

4.00

Bookmark

During tensile test, what does percentage elongation indicate

- Creep
- Malleability
- Ductility
- Fatigue Strength

Question No.65

4.00

Bookmark

If three $18\mu\text{F}$ capacitors are connected in series, the net capacitance is

- $18\mu\text{F}$
- $6\mu\text{F}$
- $54\mu\text{F}$
- $0\mu\text{F}$

Question No.66

4.00

Bookmark

A field line and an equipotential surface are

- Inclined at 30°
- Inclined at 210°
- Always parallel
- Always at 90°

Question No.67

4.00

Bookmark

Among the halides NCl_3 (A), PCl_3 (B) and AsCl_3 , those which produce two different acids

- A, B and C
- B and C
- A and B
- A and C

Question No.68

4.00

Bookmark

Correct sequence flow of reaction in bioethanol production

- Enzyme hydrolysis- Fermentation-distillation- bioethanol
- Distillation- Enzyme hydrolysis- Fermentation- - bioethanol
- Enzyme hydrolysis- distillation- Fermentation- bioethanol
- Fermentation- Enzyme hydrolysis- distillation- bioethanol

Question No.69

4.00

Bookmark

Moment of inertia of an object does not depend upon

- Angular velocity
- Mass of object
- Mass of distribution
- Axis of rotation

Question No.70

4.00

Bookmark

Which of the following is an "even" function of t ?

- $\sin(2t) + 2$

- $\sin(zt) + 3t$
- $t^2 - 4t$
- t^2
- $t^3 + 6$

Question No.71

4.00

Bookmark

Which is an intensive property?

- Refractive index
- Weight
- Mass
- Volume

Question No.72

4.00

Bookmark

The reverse current in a diode is of the order of

- kA
- μ A
- Amps
- mA

Question No.73

4.00

Bookmark

Which of the following amino acid is likely to destabilise an alpha helix?

- Leucine
- Histidine
- Proline
- Glycine

Question No.74

4.00

Bookmark

The excess of pressure inside a bubble in a liquid is

- $3T/r$
- T/r
- $4T/r$
- $2T/r$

Question No.75

4.00

Bookmark

If value of x for normal distribution is 35, mean of normal distribution is 65 and standard deviation is 25 then standardized random variable is

- 1.5
- 1.2
- 1.7
- 4

Question No.76

4.00

Bookmark

Statement: "A Car is required on rent"-An Advertisement

Assumptions:

- I. All types of Vehicles are available on Rent
- II. People will respond to the advertisements

- If neither I nor II is implicit
- If both I and II are implicit
- If only assumption I is implicit
- If only assumption II is implicit

Question No.77

4.00

Bookmark

A differential equation is considered to be ordinary if it has

- More than one independent variable
- One dependent variable
- One independent variable
- More than one dependent variable

Question No.78

4.00

Bookmark

If A is the amplitude of a wave from a point source at a distance R from the source,

- A is independent of R
- $A \propto 1/\sqrt{R}$

$A \propto 1/R$

$A \propto 1/R^2$

Question No.79

4.00

Bookmark

Analysis of boundary value problem involves functions of a differential operator. These functions are

- logical function
- algebraic function
- symmetric function
- Eigen function

Question No.80

4.00

Bookmark

A battery supplies 150W and 196W power to two resistors of 6Ω and 4Ω when they are connected separately to it.

The internal resistance of the battery is

- 2Ω
- 2.5Ω
- 1Ω
- 0.5Ω

Question No.81

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 among the following sits between Ganesh and Danesh?

- Bhuvnesh
- Ekta
- Charan
- Aasha

Question No.82

4.00

Bookmark

Transplastomics

- Provides exceptionally low yields of protein products
- Targets genes in the mitochondria
- Produces genes that are released in pollen
- Targets genes in the chloroplast

Question No.83

4.00

Bookmark

According to MO theory, for the atomic species ' C_2 '

- bond order is zero and it is paramagnetic
- bond order is two and it is diamagnetic
- bond order is two and it is paramagnetic
- bond order is zero and it is diamagnetic

Question No.84

4.00

Bookmark

Proteins specific to sugars are called

- Myoglobin
- Chitin
- Lectin
- Pectin

Question No.85

4.00

Bookmark

Which of the following is NOT true about condensin protein complex?

- binds two sister chromatids together
- twists the chromatin into coils and loops
- binds a single chromatid at multiple spots
- it is an elongated complex of several proteins that binds and encircles DNA

Question No.86

4.00

Bookmark

The differential equation $2\frac{dy}{dx} + x^2y = 2x + 3$, $y(0) = 5$ is

- Linear with fixed constants
- Undeterminable to be linear or nonlinear
- Nonlinear
- Linear

Question No.87

4.00

Bookmark

Which among the following is NOT an omega-3 fatty acid?

- Linoleic acid
- Alpha-linolenic acid
- Eicosapentaenoic acid
- Docosahexaenoic acid

Question No.88

4.00

Bookmark

The path of a magnetic flux in a transformer should have

- High reluctance
- Low resistance
- High resistance
- Low reluctance

Question No.89

4.00

Bookmark

A square matrix [A] is lower triangular if

- $a_{ij} \neq 0, i > j$
- $a_{ij} = 0, j > i$
- $a_{ij} = 0, i > j$
- $a_{ij} \neq 0, j > i$

Question No.90

4.00

Bookmark

Which is NOT required for "DNA replication?"

- Polymerase
- Helicase
- Kinase
- Primase

Question No.91

4.00

Bookmark

The angular momentum of the electron in the hydrogen atom can be

- $h/4\pi$
- $2h$
- $3h$
- h/π

Question No.92

4.00

Bookmark

When potassium is added to water, it is seen that the lower region becomes warm first and becomes less dense. It then moves up and the more dense cold water comes down and the process goes on. What is the process taking place?

- Convection
- Purification
- Conduction
- Radiation

Question No.93

4.00

Bookmark

Since the _____ of the motor car, road accidents have increased dramatically.

- inception
- advent
- inauguration
- initiation

Question No.94

4.00

Bookmark

Set of (x,y) ordered pair that can satisfy equation is called

- variable set
- pair set
- order set

- solution set

Question No.95

4.00

Bookmark

The unit of capacitance is

- Henry / Wb
- Volts/ Coulomb
- Coulombs / Volt
- Ohms

Question No.96

4.00

Bookmark

Choose the best antonym of the italicized word.

There are four chapters that are *extraneous* to the structure of the book.

- needful
- important
- integral
- relevant

Question No.97

4.00

Bookmark

The latent heat of vaporisation of water is 2,240 J. If the work done in the process of vaporisation of 1g is 168 J, then the increase in internal energy is

- 1904 J
- 2408 J
- 2072 J
- 2240 J

Question No.98

4.00

Bookmark

Choose the best synonym of the italicized word. The prisoners of war signed the document under *coercion*.

- supervision
- confusion
- security
- compulsion

Question No.99

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

Who is a manual scavenger?

- B
- C
- A
- D

Question No.100

4.00

Bookmark

Statements: All tools are books, Some books are pens.

Conclusion:

I. Some tools are pen

II. Some pens are books

- If either I or II follows
- If neither I nor II follows
- If only conclusion I follows
- If only conclusion II follows