

Section 1 - Section 1

Question No.1

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Bookmark

If degree of freedom (F) is equal to zero, then the system is called by

- Invariant
- Bivariant
- Univariant
- Trivariant

Question No.2

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Basicity order of pyrrole, furan, thiophene and benzene compounds is

- Pyrrole>thiophene>furan>benzene
- Furan>pyrrole>thiophene>benzene
- benzene>thiophene>furan>pyrrole
- Pyrrole>furan>thiophene>benzene

Question No.3

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- 2
- 3
- 1
- 4

Question No.4

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If $(x + iy) = \sqrt{\frac{1+2i}{3+4i}}$, then $(x^2 + y^2)^2 =$

- 5
- $\frac{2}{5}$
- $\frac{5}{2}$
- $\frac{1}{5}$

Question No.5

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Which is a vector in the following?

- Volume
- Mass
- Distance
- Velocity

Question No.6

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She studies very hard for the exams, _____?

- doesn't she?

○ doesn't she?

- isn't it?
- does she?
- is it?

Question No.7

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Nidhi walks 10 metres in front and 10 metres to the right. Then every time turning to her left, she walks 5, 15 and 15 metres respectively. How far is Nidhi now from her starting point?

- 10 metres
- 5 metres
- 15 metres
- None of the above

Question No.8

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$t_{1/2}$ of a second order reaction is ?

- $1/2ka$
- $1/ka^2$
- $0.693/k$
- $1/ka$

Question No.9

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The dimension of a plank's constant 'h' are?

- MLT^{-2}
- MLT
- ML^2T^{-1}
- MLT^{-1}

Question No.10

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Measurement of disorder of the system is called as

- Entropy
- Internal energy
- Free energy
- Enthalpy

Question No.11

4.00

Bookmark

Statement: Apart from its entertainment value of Television, its educational value cannot be ignored

Assumptions:

I. People take Television to be the means of entertainment only.

II. The educational value of Television is not realized properly

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

Question No.12

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Bookmark

A perfect black body

- Absorbs all the incident radiation
- Allows all the incident radiation
- Reflects all the incident radiation
- None of these

Question No.13

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Match the following:

- | | |
|-------------------|---|
| a. Newton-Raphson | 1. Integration |
| b. Runge-kutta | 2. Root finding |
| c. Gauss-seidel | 3. Ordinary differential equations |
| d. Simpson's rule | 4. Solution of system of linear equations |

- a-2, b-3, c-4, d-1
 a-3, b-2, c-1, d-4
 a-1, b-4, c-2, d-3
 None of these

Question No.14

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Which of the following can be used for cathodic protection?

- Al
 Cd
 Cu
 none of the these

Question No.15

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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 A × B × C × D, which of the following statement is not necessarily true?

- D is brother of C
 B is the brother of A
 A, B, C are male
 C is the brother of A

Question No.16

4.00

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Neutral amino acid is

- Histidine
 Leucine
 Aspartic acid
 Lysine

Question No.17

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Bookmark The value of $\lim_{x \rightarrow \infty} \frac{4x^2 - 5x}{1 - 3x^2}$

- $-\frac{3}{4}$
 $\frac{3}{4}$

- $\frac{4}{3}$
- $\frac{-4}{3}$

Question No.18

4.00

Bookmark

This is the school where I studied till class 5.

The underlined word is a

- preposition
- adverb
- adjective
- pronoun

Question No.19

4.00

Bookmark

If $A = x^2y\bar{i} - xyz\bar{j} + yz^2\bar{k}$, determine $\text{div } \bar{A}$ at point (1,2,3)

- 12
- 11
- 15
- 13

Question No.20

4.00

Bookmark

How many ^{13}C resonance signals are predicted for 1-phenyl-1-propanol?

- 8
- 10
- 9
- 7

Question No.21

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Bookmark

Which is a correct form of Cauchy-Riemann equation

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

Question No.22

4.00

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, using Cayley-Hamilton theorem find the value of A^2 ?

- $\begin{bmatrix} 22 & 15 \\ 10 & 7 \end{bmatrix}$
- $\begin{bmatrix} 8 & 11 \\ 15 & 22 \end{bmatrix}$
- $\begin{bmatrix} 7 & 10 \\ 15 & 22 \end{bmatrix}$
- $\begin{bmatrix} 7 & 11 \\ 16 & 21 \end{bmatrix}$

Question No.23

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Following which is not a linear equation

- $\frac{dy}{dx} + xy = 1$
- $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 0$
- $\frac{d^4y}{dx^4} + 3y = \sin x$
- $\frac{d^2y}{dx^2} + y\frac{dy}{dx} + y = x$

Question No.24

4.00

Bookmark

Which of the following has more tolerance for acidic pH (lower pH)?

- Yeast and moulds
- Bacteria
- E. coli
- None of these

Question No.25

4.00

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Which one is the heaviest particulate component of the cell?

- Cytoplasm
- Mitochondria
- Nucleus
- Golgi apparatus

Question No.26

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What is the process of adding impurity to an intrinsic semiconductor?

- Ionization
- Annihilation
- Doping
- Recombination

Question No.27

4.00

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The order and degree of the differential equation $\left[1 + 4\frac{dy}{dx}\right]^{\frac{2}{3}} = 4\frac{d^2y}{dx^2}$ are respectively

- 1, $\frac{2}{3}$
- 2, $\frac{2}{3}$
- 3, 2
- 2, 3

Question No.28

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What is the diameter of the atom?

- 10^{-10} mm
- 10^{-10} μ m
- 10^{-10} cm
- 10^{-10} m

Question No.29

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A can finish a work in 18 days and B can do the same work in half the time taken by A. Then, working together, what part of the same work they can finish in a day?

- 0 1/8
- 0 1/4
- 0 1/6
- 0 1/2

Question No.30

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Who discovered superconductivity in 1911?

- KamerlinghOnnes
- Charless Coulomb
- Alex Muller
- Geory Bednorz

Question No.31

4.00

Bookmark

In the medium of free space, the divergence of the electric flux density will be

- 1
- 1
- 0

- Infinity

Question No.32

4.00

Bookmark

What is the x-axis of a mass spectrum?

- Mass/charge
- Charge
- Mass/energy
- Mass

Question No.33

4.00

Bookmark

Crumb : Bread ::

- Water : Bucket
- Tea : Cup
- Flower : Vase
- Splinter : Wood

Question No.34

4.00

Bookmark

Miller indices for Octahedral plane in cubic crystal

- (100)
- (110)
- (111)
- None of the these

Question No.35

4.00

Bookmark

What is the generation time of Escherichia coli?

- 200 hours
- 20 hours
- 20 minutes
- 20 days

Question No.36

4.00

Bookmark

One of characteristic properties of polymer material _____ .

- High mechanical strength
- High elongation
- High temperature stability
- Low hardness

Question No.37

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Bookmark

Find the odd one out?

- Withdrawal
- Deduction
- Debit
- Deposit

Question No.38

4.00

Bookmark

In Photosynthesis, what is the source of electrons?

- NADH
- Carbohydrates
- CO₂
- Water

Question No.39

4.00

Bookmark

The angle between the lines $2x = 3y = -z$ and $6x = -y = -4z$

- 90°
- 30°
- 45°
- 60°

Question No.40

4.00

Bookmark

If fluid expands suddenly in to the vacuum through an orifice of large dimension, then such process is called as

- Adiabatic expansion
- Throttling
- Free expansion
- Hyperbolic expansion

Question No.41

4.00

Bookmark

The time-independent Schrödinger wave equation is $H\Psi = E\Psi$, where **H** is

- Hamiltonian operator
- Kronecker delta
- Ladder operator
- None of the above

Question No.42

4.00

Bookmark

The probability that the three cards, drawn from a pack of 52 cards, are all black is

- $\frac{2}{19}$
- $\frac{3}{17}$
- $\frac{1}{17}$
- $\frac{2}{17}$

Question No.43

4.00

Bookmark

Polymers are _____ in nature.

- Organic
- Inorganic
- Both (A) and (C)
- None of the these

Question No.44

4.00

Bookmark

If $f(x) = \cos(3x)$, then $f'(\frac{\pi}{9})$

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

Question No.45

4.00

Bookmark

Fermi energy level for intrinsic semiconductors lies

- At middle of the band gap
- Close to conduction band
- Close to valence band
- None of the these

Question No.46

4.00

Bookmark

Correct the error in the italicized part of the sentence by choosing the most appropriate options

Job was a tiny man, barely five feet tall, with *a spright walk*

- spright walk
- spright walkingly
- a sprightly walking
- a sprightly walk

Question No.47

4.00

Bookmark

In Uv-visible spectrum, absorbance changes with..

- Path length
- Concentration
- Absorptivity
- All of the above

Question No.48

4.00

Bookmark

Statement: Ten Candidates, who were on the waiting list could finally be admitted to the course.

Assumptions:

- I. A large number of candidates were on the waiting list.
- II. Wait listed candidates do not ordinarily get admission.

- Both I and II are implicit

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

Question No.49

4.00

Bookmark

Following equation is related to corrosion rate

- Nernst equation
- Faraday's equation
- Both A and B
- None of the these

Question No.50

4.00

Bookmark

The co-ordination number of cubic close packed (ccp) crystal structure is?

- 8
- 6
- 10
- 12

Question No.51

4.00

Bookmark

$f^{(0)}(x) = \sin(x)$, then $f^{(5)}(x) = ?$

- $\cos x$
- $\sin x$
- $-\cos x$
- $-\sin x$

Question No.52

4.00

Bookmark

The hydrogen bonds between peptide linkages of a protein molecules are interfered by

- Guanidine
- Salicylic acid
- Uric acid
- Oxalic acid

Question No.53

4.00

Bookmark

Porcelain is made for making crockery which is itself being prepared by

- Mud
- Silicon
- Soil
- Clay

Question No.54

4.00

Bookmark

An organism has an optimal growth rate when the hydrogen ion concentration is very high. This organism is

- Aerotolerant anaerobe
- Osmotolerant
- Neutrophile
- Acidophile

Question No.55

4.00

Bookmark

The chemical formula of hypo-phosphorous acid is...

- H_3PO_2

$\pi_{5f^3} \nu_{10}$

- $H_4P_2O_7$
- H_3PO_3
- H_3PO_2

Question No.56

4.00

Bookmark

The digestive enzymes of cellular compounds are confined to

- Ribosomes
- Polysomes
- Lysosomes
- Peroxisomes

Question No.57

4.00

Bookmark

The molecule which does not possess a permanent dipole moment is

- NF_3
- CH_2Cl_2
- BF_3
- NO_2

Question No.58

4.00

Bookmark

The correct order of basicity of lanthanide ion is

- $La^{3+} > Ce^{3+} > Eu^{3+} > Lu^{3+}$
- $La^{3+} > Lu^{3+} > Ce^{3+} > Eu^{3+}$
- $Ce^{3+} > Lu^{3+} > La^{3+} > Eu^{3+}$
- $Lu^{3+} > Ce^{3+} > Eu^{3+} > La^{3+}$

Question No.59

4.00

Bookmark

Buffering action of haemoglobin is mainly due to its

- Glutamine residues
- Lysine residues
- Histidine residues
- Arginine residues

Question No.60

4.00

Bookmark

Which of the following formulae can be used to determine the Debroglie wavelength?

- $\lambda = h/mv$
- $\lambda = hmv$
- $\lambda = mv/h$
- $\lambda = hm/v$

Question No.61

4.00

Bookmark

The structure of XeOF_4 molecule is...

- Square planar
- Square pyramidal
- distorted octahedral
- Pyramidal

Question No.62

4.00

Bookmark

Coordination number in simple cubic crystal structure

- 4
- 2
- 3
- 1

Question No.63

4.00

Bookmark

If $A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$, then $A^2 + 2A$ equals to

- A
- 4A
- 2A
- 3A

Question No.64

4.00

Bookmark

A 2nd order reflection was observed with the angle of 22.2° , when x-rays of wavelength 300 pm are allowed to fall on (111) plane of the crystal. Find edge length of unit cell. $\sin 22.2^\circ = 0.3778$

- 1543 pm
- 1443 pm
- 1643 pm
- 1343 pm

Question No.65

4.00

Bookmark

The pH of blood is 7.4 when the ratio between H_2CO_3 and NaHCO_3 is

- 1 : 25
- 1 : 30
- 1:10
- 1 : 20

Question No.66

4.00

In which of the following forms can Maxwell's equation not be represented

- Differential
- Harmonic
- Integral
- Static

Question No.67

4.00

Bookmark

If A and B are two scalars, then $\nabla(AB)$

- $\nabla A \cdot \nabla B$
- $B(\nabla B) + A(\nabla A)$
- $\nabla A + \nabla B$
- $A(\nabla B) + B(\nabla A)$

Question No.68

4.00

Bookmark

Which one of the following metabolites is not directly produced in the hexosemonophosphate pathway?

- Dihydroxy acetone phosphate
- Fructose-6-phosphate
- CO_2
- Erythrose-4-phosphat

Question No.69

4.00

Bookmark

The magnitude of adsorption of gas on solid surface is...

- increases with temperature
- Decreases with temperature
- Increases with pressure
- Both B&C

Question No.70

4.00

Bookmark

In many proteins the hydrogen bonding produces a regular coiled arrangement called

- α -helix
- β -helix
- Both (A) and (B)
- None of these

Question No.71

4.00

Bookmark

Being awarded the Best Singer in 2010 marked a _____ in her life.

- sign-post
- memorial
- milestone
- yardstick

Question No.72

4.00

Bookmark

Wavelength frequency range of N-H bond is?

IR stretching frequency range of N-H bond is :

- 2500 - 3300
- 3300 – 3500
- 2220 – 2260
- 1650 - 1780

Question No.73

4.00

Bookmark

In p-type semiconductors, number of holes _____ number of electrons.

- is double the
- Greater than
- is Equal to
- Less than

Question No.74

4.00

Bookmark

If A is 3 x 3 Non-singular matrix such that $AA^T = A^T A$ and $B = A^{-1}A^T$, then BB^T is equal to

- I + B
- I
- B^{-1}
- $(B^{-1})^T$

Question No.75

4.00

Bookmark

Example for piezo-electric material

- Rochelle salt
- Barium Titanium oxide
- Lead zirconate
- Potassium niobate

Question No.76

4.00

Bookmark

Faster among the waves and rays is

- Both have no speed
- Rays
- Both have same speed
- Waves

Question No.77

4.00

Bookmark

Using Newton-Raphson method, find a root correct to three

decimal places of the equation $x^3 - 3x - 5 = 0$

- 2.222
- 2.275
- 2.272
- 2.279

Question No.78

4.00

Bookmark

Choose the best synonym of the italicized word.

Dr. Elango is in the habit of using *obsolete* words.

- difficult
- outdated
- simple
- wrong

Question No.79

4.00

Bookmark

The most active site of protein synthesis is the

- Cell sap
- Ribosome
- Mitochondrion
- Nucleus

Question No.80

4.00

Bookmark

Assume that a particle of mass 'm' is confined to a cubic box and its energy is $14h^2/8ma^2$. What is the degeneracy of this level?

- 1
- 8
- 2
- 6

Question No.81

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 following information is not required for the above lecture arrangements?

- Only (i)
- Only (ii)
- Only (iii)
- All are required

Question No.82

4.00

Bookmark

Choose the best synonym of the italicized word.

Children of excessively indulgent parents often become very *recalcitrant*.

- dependent
- indolent
- insolent
- disobedient

Question No.83

4.00

Bookmark

Solenoid of length 15 cm has 300 turns. If current flowing through solenoid is 5A, magnetic field inside solenoid will be

- 1.3×10^2
- 2.3×10^2
- 2.3×10^3
- 1.3×10^3

Question No.84

4.00

Bookmark

Isoelectric pH is that pH at which protein is electrically:

- Neutral
- Anionic
- Cationic
- None of these

Question No.85

4.00

Bookmark

Units for electric field strength

- V/cm
- A/cm²
- cm²/V.s
- mho/meter

Question No.86

4.00

Bookmark

Calculate the entropy of mixing of 1 mole of oxygen gas and 2 moles of hydrogen gas, assuming that no chemical reaction occurs and the gas mixture behaves ideally.

- 14.8 JK⁻¹
- 17 JK⁻¹
- 15.8 JK⁻¹
- 16 JK⁻¹

Question No.87

4.00

Bookmark

Insulin is made up of

- A-chain having 21 and B-chain having 30 amino acid residues
- A single polypeptide chain having 51 amino acid residues
- A single polypeptide chain having 84 amino acid
- A-chain having 30 and B-chain having 21 amino acid residues

Question No.88

4.00

Bookmark

Metals can transmit these ____.

- x-rays
- Microwaves
- Visible light
- Radio waves

Question No.89

4.00

Bookmark

Study the following information carefully and answer the question below it

Lakshman passes through seven lanes to reach his school. He finds that 'Truth lane' is between his house and 'Lie

lane'. The third lane from his school is 'Karma lane'. 'Dharma lane' is immediately before the 'Yog lane'. He passes 'Salvation lane' at the end, 'Lie lane' is between 'Truth lane' and 'Dharma lane', the sixth lane from his house is 'Devotion lane'.

If Lakshman's house, each lane and his school are equidistant and he takes 2 minutes to pass one lane, then how long will he take to reach school from his house?

- 14 minutes
- 16 minutes
- 13 minutes
- 15 minutes

Question No.90

4.00

Bookmark

Given that, $E^0_{\text{Cu}^+/\text{Cu}} = 0.15 \text{ V}$; $E^0_{\text{Cu}^{2+}/\text{Cu}^+} = 0.50 \text{ V}$ find the value of

$E^0_{\text{Cu}^{2+}/\text{Cu}}$

- 0.215 V
- 0.215 V
- 0.325 V
- 0.325 V

Question No.91

4.00

Bookmark

Ceramics can conduct

- Conduct heat and electricity
- Heat
- do not conduct heat and electricity
- Electricity

Question No.92

4.00

Bookmark

When their father died, their elder brother sold the old house and _____ in a small flat in a far-off suburb

- set them up
- put them down
- set them down
- put them up

Question No.93

4.00

Bookmark

According to faraday's law "EMF" stands for

- Electromagnetic friction
- Electromotive force
- Electromagnetic field
- Electromagnetic force

Question No.94

4.00

Bookmark

The term obligate anaerobe refers to an organism that

- doesn't use oxygen but tolerates it
- is killed by oxygen
- uses oxygen when present or grows without oxygen when oxygen is absent
- prefers to grow without oxygen

Question No.95

4.00

Bookmark

$$(\partial U/\partial P)_S = ?$$

- $(\partial V/\partial S)_P$
- $-(\partial P/\partial T)_S$
- $-(\partial V/\partial S)_P$
- $(\partial P/\partial T)_S$

Question No.96

4.00

Bookmark

Which one of the following is ferro-electric material?

- Potassium niobate
- Quartz
- Lead titanate
- Lead zirconate

Question No.97

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.

What is the profession of Sunita?

- Teacher
- Principal
- Chartered Accountant
- Cannot be determined

Question No.98

4.00

Bookmark

Choose the best antonym of the italicized word.

The deliberate *suavity* of Olaf's behavior made the emotions of the audience volatile.

- politeness
- impetuosity
- pleasantness
- stupidity

Question No.99

4.00

Bookmark

Select the Pair that best represents the relationship that is given in the question:

Explore : Discover

- Think : Relate
- Tree : Wood
- Research : Learn
- Books : Knowledge

Question No.100

4.00

Bookmark

The transport number of cation is 0.45: calculate the transport number of anion.

- 0.45
- 0.55
- 0.45
- 0.55