Airforce Group X

70 Questions

Que. 1 The correct relationship between the angular velocity (ω) and linear velocity (V) of an object is-
1. V = ωr
2. ω = Vr
3. r = ωV
4. V = ω/r

Solution Correct Option - **1**

Que. 2 What will be the weight of a given body in the center of the earth?
1. Slightly more outside the equator
2. Slightly less than the weight of the equator
3. zero
4. Infinite

Solution Correct Option - **3**

Que. 3 The process in which the low frequency message signal is superimposed on a high frequency wave is called:
1. Amplification
2. Modulation
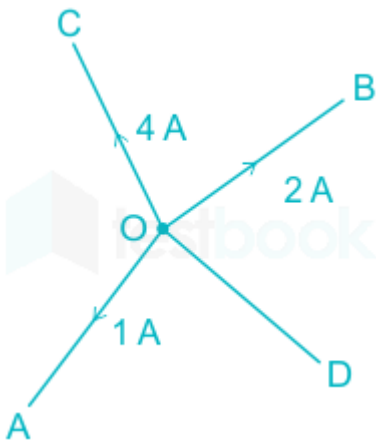3. Attenuation
4. None of these

Solution Correct Option - **2**

Que. 4 For which colour of light the critical angle is minimum?
1. Red
2. Blue
3. Violet
4. Green

Solution Correct Option - **3**

Que. 5 Below figure is a part of an electric circuit. Find the value of electric current and direction in OD part.

1. 7 A and towards D
2. 6 A and towards O
3. 7 A and towards O
4. 6 A and towards D

Solution   Correct Option - **3**

Que. 6 Two charges +1μC and +5μC are placed at 2 cm apart, then the ratio of the force exerted on charge +1μC and +5μC will be:

1. 1 : 1
2. 4 : 1
3. 1 : 4
4. 16 : 1

Solution   Correct Option - **1**

Que. 7 A body of mass 1 kg undergoes a change in velocity from 2 m/s to 3 m/s in 2 seconds, when a force is applied to it. The rate of change of linear momentum will be?

1. 0.05 N
2. 0.05 kg/s
3. 0.5 N
4. 5 N

Solution   Correct Option - **3**

Que. 8 Lenz's law is based on conservation of:

1. mass
2. charge
3. energy
4. momentum

Solution   Correct Option - **3**

Que. 9 The propagation of electromagnetic waves is along the direction of

1. dot product of electric field and magnetic field
2. axis parallel to electric field
3. cross product of electric field and magnetic field

4. axis parallel to magnetic field

Solution Correct Option - **3**

Que. 10 Which of the following is a unit less and dimensionless quantity?

1. Angle
2. Solid angle
3. Refractive index
4. All of the above

Solution Correct Option - **3**

Que. 11 Out of solid, liquid and gas which has maximum elasticity ?

1. Solid
2. Gas
3. Liquid
4. Cannot be compared

Solution Correct Option - **1**

Que. 12 Refractive index of a material is greatest for-

1. Red light
2. Green light
3. Violet light
4. Same for all colours

Solution Correct Option - **3**

Que. 13 The temperature at which any ferromagnetic substance converts into paramagnetic substance

1. Critical temperature
2. Curie temperature
3. Triple point
4. Absolute zero temperature

Solution Correct Option - **2**

Que. 14 The angular frequency of the charged particle in a cyclotron is

1. inversely proportional to its mass
2. directly proportional to mass
3. directly propotional to its speed
4. inversely proportional to its speed

Solution Correct Option - **1**

Que. 15 A water drop is divided into 27 equal droplets. The pressure difference between the inner and outer side of the big drop will be:

1. Same as that for smaller droplet
2. 1/3 of that for smaller droplet

3.   1/6 of that for smaller droplet

4.   Twice of that for smaller droplet

Solution Correct Option - **2**

Que. 16 Dispersion produced by a prism depends on

1.   Its refracting index

2.   Size of the prism

3.   Height of the prism

4.   One of the angles at the base of the prism

Solution   Correct Option - **1**

Que. 17 If a liquid wets the glass surface, the free surface of liquid in the glass capillary will be -

1.   Plane

2.   Convex

3.   Concave

4.   Any of these

Solution   Correct Option - **3**

Que. 18 If the radius of a circular current carrying coil is doubled then the magnetic field at the center of the coil becomes- (all other factors remains same)

1.   two times

2.   half

3.   four times

4.   remains same

Solution   Correct Option - **2**

Que. 19 The Young's modulus of a rod of length L and radius R is Y. The rod is cut into two parts of equal length L/2, then Young's modulus of each part will be

1.   Y

2.   Y/2

3.   Y/4

4.   4Y

Solution   Correct Option - **1**

Que. 20 A wire of resistance 'R' is cut into 'n' equal parts. These parts are then connected into parallel. The equivalent resistance value will be _____.

1.   nR

2. n/R^2

3.   R/n

4. R/n^2

Solution   Correct Option - **4**

Que. 21 The difference between the source and the sink temperature for the Carnot engine is 200°K. If the efficiency of that engine is 50% then the source temperature is:

1. 300 K
2. 400 K
3. 200 K
4. 500 K

Solution   Correct Option - **2**

Que. 22 A heat engine takes in 750J of heat from a hot reservoir and produces 450J of work in each cycle. What is its efficiency?

1. 0.75
2. 0.3
3. 0.5
4. 0.6

Solution   Correct Option - **4**

Que. 23 The work done in a thermodynamic process is 40 J and the 50 J of heat is given to the system. Find the internal energy change of the system.

1. 90 J
2. -10 J
3. 10 J
4. -90 J

Solution   Correct Option - **3**

Que. 24 First law of thermodynamics applied to an Isothermal Process is given by- (ΔQ is heat exchanged, ΔU is Internal energy change, P is pressure and ΔV is volume)

1. $\Delta Q = P\Delta V$
2. $\Delta Q = \Delta U + P\Delta V$
3. $\Delta Q = \Delta U - P\Delta V$
4. None of the above

Solution   Correct Option - **1**

Que. 25 What is the height at which acceleration due to gravity becomes $1/4^{th}$ the acceleration due to gravity on the surface of the earth in terms of 'R,' radius of the earth?

1. 3R
2. R / 3
3. 2R
4. R

Solution   Correct Option - **4**

Que. 26 What is $\lim\limits_{x \to 0} \frac{5^x - 1}{x}$ equal to?

1. $\log_e 5$

2. $\log_5 e$

3. 5

4. 1

Solution Correct Option **- 1**

Que. 27 (tan 34° cot 56°) × (cot 34° tan 56°) is equal to

1. $\tan^4 56°$

2. 0

3. 1

4. $\cot^4 34°$

Solution   Correct Option **- 3**

Que. 28 $\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \sin^2 x \, dx = ?$

1. 1

2. $\frac{\pi}{3} - \frac{\sqrt{3}}{4}$

3. $\frac{\pi}{2} - \frac{1}{4}$

4. 0

Solution   Correct Option **- 2**

Que. 29 If $y = b \sin^3 t$ and $x = a \cos^3 t$, then find the value of $\frac{dy}{dx}$

1. $- \frac{b}{a} \tan t$

2. $\frac{b}{a} \tan t$

3. $\frac{a}{b} \cot t$

4. $- \frac{a}{b} \cot t$

Solution   Correct Option **- 1**

Que. 30 A coin is tossed three times. What is the probability of getting head and tail alternately?

1. $\frac{1}{8}$

2. $\frac{1}{4}$

3. $\frac{1}{2}$

4. $\frac{3}{4}$

Solution   Correct Option **- 2**

Que. 31 C (n, r – 1) + 2C (n, r – 2) + C (n, r – 3) = ?

1. C (n + 1, r)

2. C (n + 2, r)

3. C (n + 2, r – 1)

4. C (n + 1 , r – 1)

Solution Correct Option - **3**

Que. 32 What is the degree of the equation $\left[\frac{d^2y}{dx^2}\right] = \left[y + \left(\frac{dy}{dx}\right)^2\right]^{1/4}$?

1. 1
2. 2
3. 3
4. 4

Solution   Correct Option - **4**

Que. 33 What is the area of the region bounded by the parabolas $y^2 = 6\,(x - 1)$ and $y^2 = 3x$?

1. $\frac{\sqrt{6}}{3}$
2. $\frac{2\sqrt{6}}{3}$
3. $\frac{4\sqrt{6}}{3}$
4. $\frac{5\sqrt{6}}{3}$

Solution   Correct Option - **3**

Que. 34 Under which of the following conditions does a general second-degree equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ ($a \neq 0$) represent a circle?

1. h = g, a = b
2. h = g = f, a = b
3. h = 0, a = b
4. h = 0, $g^2 + f^2$ - c = a + b

Solution   Correct Option - **3**

Que. 35 Let a, b and c be the distinct non-negative numbers. If the vectors $a\hat{\imath} + a\hat{\jmath} + c\hat{k}$, $\hat{\imath} + \hat{k}$, $c\hat{\imath} + c\hat{\jmath} + b\hat{k}$ lie on a plane, then which one of the following is correct?

1. c is the arithmetic mean of a and b
2. c is the geometric mean of a and b
3. c is the harmonic mean of a and b
4. c is equal to zero

Solution   Correct Option - **2**

Que. 36 Find the modulus of $\frac{2-i}{1-3i}$

1. $\sqrt{2}$
2. $\frac{1}{\sqrt{2}}$
3. 1
4. 2

Solution Correct Option - **2**

Que. 37 If $A = \begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$, then A^2 is equal to

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

2. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

3. $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$

4. $\begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$

Solution   Correct Option - **2**

Que. 38 At what point the line $y = x + 1$ is a tangent to the curve $y^2 = 4x$?

1. (1, -2)
2. (1, -2), (1, 2)
3. (1, 2)
4. None of these

Solution   Correct Option - **3**

Que. 39 What is the value of cos 18° - sin 18° ?

1. $\sqrt{2}$ sin27°
2. $\frac{1}{\sqrt{2}}$ sin27°
3. $\sqrt{2}$ cos27°
4. $\frac{1}{\sqrt{2}}$ cos27°

Solution   Correct Option - **1**

Que. 40 Find the number of arrangements of the letters of the word, INDEPENDENCE

1. 1660000
2. 1326600
3. 1663200
4. 1324600

Solution   Correct Option - **3**

Que. 41 Find the equation of a circle touching both the x-axis and y-axis and has centre at (-2, -2)

1. $x^2 + y^2 + 4x + 4y - 4 = 0$
2. $x^2 + y^2 + 4x - 4y + 4 = 0$
3. $x^2 + y^2 + 4x - 4y - 4 = 0$
4. $x^2 + y^2 + 4x + 4y + 4 = 0$

Solution Correct Option - **4**

Que. 42 Find the sum of 32 terms of an AP whose third term is 1 and 6th term is - 11?

1.   - 2368
2. 2368
3. - 1696
4. 1696

Solution   Correct Option - **3**

Que. 43 Evaluate $\int \frac{1}{1-\sin^4 x}dx$.

1. $\tan x + \frac{1}{\sqrt{2}} \tan^{-1}\left(\sqrt{2}\tan x\right) + C$

2. $\frac{1}{2}\left[\tan x - \frac{1}{\sqrt{2}} \tan^{-1}\left(\sqrt{2}\tan x\right)\right] + C$

3. $\frac{1}{2}\left[\tan x + \frac{1}{\sqrt{2}} \tan^{-1}\left(\sqrt{2}\tan x\right)\right] + C$

4. None of these.

Solution   Correct Option - **3**

Que. 44 For what value of x is the matrix $A = \begin{bmatrix} 3 - 2x & x + 1 \\ 2 & 4 \end{bmatrix}$ is singular ?

1. 1
2. 5
3. 3
4. 7

Solution   Correct Option - **1**

Que. 45 Derivative of $\csc^{-1} x^2$ with respect to x is:

1. $\frac{-1}{x\sqrt{x^2-1}}$

2. $\frac{-2}{x\sqrt{x^4-1}}$

3. $\frac{-2x}{\sqrt{x^4-1}}$

4. None of these.

Solution   Correct Option - **2**

Que. 46 If A and B are the domain and range respectively for the relation R such that R = {(x, x + 5) : x ∈ {0, 1, 2, 3, 4, 5}} then which of the following option is true ?

1. A = {0, 1, 2, 3, 4, 5} and B = {5, 6, 7, 8, 9, 10}
2. A = {1, 2, 3, 4, 5} and B = {6, 7, 8, 9, 10}
3. A = {0, 1, 2, 3, 4} and B = {5, 6, 7, 8, 9}
4. None of these

Solution   Correct Option - **1**

Que. 47 The following observations are arranged in ascending order. 11, x, 22, x + 9, 34, 37, 48. The median of the data is 28 find the value of x.

1. 22
2. 19
3. 20
4. 21

Solution Correct Option - **2**

Que. 48 Find the value of x for which $\log_3 (25 - x^2) = 2$?

1. - 2 and 2
2. - 3 and 3
3. -4 and 4
4. - 1 and 1

Solution Correct Option - **3**

Que. 49 If $(1-p)$ is a root of quadratic equation $x^2 + px + (1-p) = 0$, then the roots are equal to

1. 2, -1
2. 2, -2
3. 1, −1
4. 0, −1

Solution Correct Option - **4**

Que. 50 The local maximum value of the function $f(x) = 3x^4 + 4x^3 - 12x^2 + 12$ is at x = :

1. 1
2. 2
3. -2
4. 0

Solution Correct Option - **4**

Que. 51 Select the most appropriate antonym of the given word.
VIGILANT

1. visible
2. elusive
3. careless
4. careful

Solution Correct Option - **3**

Que. 52 **Direction: Find the correct synonym of the given word**
Afraid

1. brave

2. scared
3. calm
4. happy

Solution Correct Option - **2**

Que. 53 | **Out of all the alternatives given, select the word which closely fits the given definition**

Place where leather is produced and processed

1. Studio
2. Tannery
3. Treasury
4. Wardrobe

Solution Correct Option - **2**

Que. 54 | **Choose the one word which can be substituted for given group of words:**

A person who studies the influence of heavenly bodies on human beings.

1. Astronomer
2. Astrologer
3. Ambassador
4. Chauffeur

Solution Correct Option - **2**

Que. 55 | **Direction: Choose the correctly spelt word from the given option.**

1. Uneccessary
2. Unneccesary
3. Unnacessary
4. Unnecessary

Solution Correct Option - **4**

Que. 56 | **Direction: Choose the correctly spelt word.**

1. Pleasent
2. Pliesant
3. Plisaent
4. Pleasant

Solution Correct Option - **4**

Que. 57 | **Direction: Given below is a short passage followed by some items based on the passage. First, read the passage and answer the items based on it. You are required to select your answers based on the contents of the passage and the opinion of the author only.**

Nearly every night of our lives, we undergo a startling metamorphosis. Our brain profoundly alters its behavior and purpose, dimming our consciousness. For a while, we become almost entirely paralyzed. We can't even **shiver**. Our eyes, however, periodically dart about behind closed lids as if seeing, and the tiny muscles in our middle ear, even in silence, move as though hearing. We are stimulated, men and women both, repeatedly. We sometimes believe we can fly. We approach the frontiers of death. We sleep. Around 350 B.C., Aristotle wrote an

essay, "On Sleep and Sleeplessness," wondering just what we were doing and why. For the next 2,300 years, no one had a good answer. In 1924 German psychiatrist Hans Berger invented the electroencephalograph, which records electrical activity in the brain, and the study of sleep shifted from philosophy to science.

How does our brain dim our consciousness?

1. by sleeping
2. by exercising alot
3. by extremely changing its behaviour
4. by using modern techniques

Solution Correct Option - **3**

Que. 58 What was/were recorded by electroencephalograph?

1. all the magnetic activities in our brain
2. shivering of our body
3. all the electrical activities in our brain
4. sensitivity of our body

Solution Correct Option - **3**

Que. 59 The most suitable title of the passage would be:

1. Your body's asleep, but your Mind is wide awake
2. Types of dreams
3. What decides the nature of our dream
4. How to overcome sleeplessness

Solution Correct Option - **1**

Que. 60 Which of the following words could replace the word **'shiver'** as used in the passage?

1. shake
2. cross
3. shift
4. finish

Solution Correct Option - **1**

Que. 61 <u>Direction</u>**: In the following question, parts of a sentence have been jumbled and labelled as P, Q, R, and S. You are required to rearrange the jumbled parts of the sentence and mark your response accordingly by selecting the correct option.**

P. The American Electric Power plant In Conesville, Ohio
Q. Burned its last ton
R. Of coal in April 2020
S. After helping to keep lights on in Ohio for 63 years

1. PRQS
2. PSQR
3. PQRS
4. PQSR

Solution Correct Option - **3**

Que. 62 He was accused _____ theft.
1. with
2. of
3. for
4. at

Solution Correct Option - **2**

Que. 63 **In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If a sentence is free from error, select No Error.**

A lot of (1) students was (2) absent today. (3) No error (4)
1. 1
2. 2
3. 3
4. 4

Solution Correct Option - **2**

Que. 64 He was _____ me in the queue.
(Choose the correct preposition)
1. behind
2. inside
3. about
4. from

Solution Correct Option - **1**

Que. 65 **Direction: Fill in the blanks with the correct word from the given options.**

I have been waiting for you _____ seven o'clock.
1. at
2. for
3. on
4. since

Solution Correct Option - **4**

Que. 66 **Direction: In the following sentences, four words or phrases have been underlined. One of them is incorrect. Choose the incorrect word or phrase from the options.**

He is one of the great men who has helped him.
1. He is
2. one of the
3. who has
4. helped him

Solution Correct Option - **3**

Que. 67 | **Direction: Change the Voice -**

He was arrested by the detective.

1. The detective was arrested him.
2. The detective arrested by him.
3. The detective arrested him.
4. The detective arrest him.

Solution　　　　Correct Option - **3**

Que. 68 | **Direction: Choose the correct spelling of the word among the following:**

1. Necessitey
2. Neccessity
3. Necessity
4. None of these

Solution　　　　Correct Option - **3**

Que. 69 | **Direction: Change the Narration-**

Amrita says, "I have already seen this movie."

1. Amrita says that she has already seen that movie.
2. Amrita says that she had already seen that movie.
3. Amrita says that she has already seen this movie.
4. Amrita said that she has already seen that movie.

Solution　　　　Correct Option - **1**

Que. 70 | **Direction: Choose the most appropriate answer and fill in the blanks.**

The adjective form of **'Attention'** is _____.

1. Attended
2. Attending
3. Attentive
4. None of these

Solution　　　　Correct Option - **3**