Topic:- DU_J18_MSC_INFO

1) A black body at high temperature T K radiates energy at the rate of E W/m^2. When the temperature falls to (T/2)K, the radiated energy will be

[Question ID = 52815]

1. 2E [Option ID = 91254]
2. E/16 [Option ID = 91255]
3. E/2 [Option ID = 91252]
4. E/4 [Option ID = 91253]

Correct Answer :-

- E/16 [Option ID = 91255]

2) The internal resistance of a photo diode: [Question ID = 52846]

1. increases with light intensity when forward-biased [Option ID = 91378]
2. decreases with light intensity when reverse-biased [Option ID = 91377]
3. decreases with light intensity when forward-biased [Option ID = 91379]
4. increases with light intensity when reverse-biased [Option ID = 91376]

Correct Answer :-

- decreases with light intensity when reverse-biased [Option ID = 91377]

3) In each of the following questions , different alphabets stand for various symbols as indicated below:

Addition: O	Subtraction:M	Multiplication: A
Division: Q	Equal to : X	Greater than : Y
Less than : Z		

Out of the four alternatives given in these questions , only one is correct according to the above letter symbols. Identify the correct answer.

[Question ID = 52803]

1. 2 Z 2 A 4 O 1 A 4 M 8 [Option ID = 91204]
2. 10 X 2 O 2 A 4 O 1 M 2 [Option ID = 91206]
3. 12 X 4 O 2 Q 1 A 4 A 2 [Option ID = 91207]
4. 8 Y 2 A 3 A 4 Q 2 A 4 [Option ID = 91205]

Correct Answer :-

- 2 Z 2 A 4 O 1 A 4 M 8 [Option ID = 91204]

4) In each of the following questions , different alphabets stand for various symbols as indicated below:

Addition: R	Subtraction:S	Multiplication: T
Division: U	Equal to : V	Greater than : W
Less than : X		

Out of the four alternatives given in these questions , only one is correct according to the above letter symbols. Identify the correct answer.

[Question ID = 52806]

1. 20 T 4 U 4 U 2 X 3 [Option ID = 91218]
2. 20 R 4 U 4 S 2 W 3 [Option ID = 91219]
3. 20 U 4 R 4 X 2 T 3 [Option ID = 91216]
4. 20 S 4 U 4 V 2 T 3 [Option ID = 91217]

Correct Answer :-

- 20 R 4 U 4 S 2 W 3 [Option ID = 91219]

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5) **In each of the following questions , different alphabets stand for various symbols as indicated below:**

Addition: R   **Subtraction:S**   **Multiplication: T**

Division: U   **Equal to : V**   **Greater than : W**

Less than : X

Out of the four alternatives given in these questions , only one is correct according to the above letter symbols. Identify the correct answer.

[Question ID = 52807]

1. 24 R 3 S 2 X 2 T 8 [Option ID = 91222]
2. 24 S 3 X 2 T 2 U 8 [Option ID = 91221]
3. 24 U 3 T 2 V 2 T 8 [Option ID = 91223]
4. 24 U 3 R 2 S 2 W 8 [Option ID = 91220]

Correct Answer :-

- 24 U 3 T 2 V 2 T 8 [Option ID = 91223]

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6) **In each of the following questions , different alphabets stand for various symbols as indicated below:**

Addition: O   **Subtraction:M**   **Multiplication: A**
Division: Q   **Equal to : X**   **Greater than : Y**
Less than : Z

Out of the four alternatives given in these questions , only one is correct according to the above letter symbols. Identify the correct answer.

[Question ID = 52805]

1. 2 O 3 M 4 Q 2 Z 1 A 2 [Option ID = 91215]
2. 8 O 2 A 12 Q 10 X 18 Q 9 [Option ID = 91213]
3. 6 Q 2 O 1 O 1 X 16 A 1 [Option ID = 91214]
4. 8 Q 4 A 1 M 2 X 16 M 16 [Option ID = 91212]

Correct Answer :-

- 8 Q 4 A 1 M 2 X 16 M 16 [Option ID = 91212]

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7) **In each of the following questions , different alphabets stand for various symbols as indicated below:**

Addition: O   **Subtraction:M**   **Multiplication: A**
Division: Q   **Equal to : X**   **Greater than : Y**
Less than : Z

Out of the four alternatives given in these questions , only one is correct according to the above letter symbols. Identify the correct answer.

[Question ID = 52804]

1. 10 A 2 Y 2 Q 1 A 10 Q 2 [Option ID = 91211]
2. 10 A 2 Z 2 Q 2 A 10 Q 2 [Option ID = 91210]
3. 3 O 2 X 2 Q 1 A 3 O 1 [Option ID = 91208]
4. 6 M 2 Y 10 Q 2 A 3 O 1 [Option ID = 91209]

Correct Answer :-

- 10 A 2 Y 2 Q 1 A 10 Q 2 [Option ID = 91211]

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8) **A card is drawn from a packet of 52 cards. Find the probability of getting a king or a heart or a red card. [Question ID = 52887]**

1. $\frac{7}{13}$ [Option ID = 91542]

2. $\frac{1}{4}$ [Option ID = 91540]

3. $\frac{5}{13}$ [Option ID = 91543]

4. $\frac{1}{13}$ [Option ID = 91541]

Correct Answer :-

- $\frac{7}{13}$ [Option ID = 91542]

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9) Pick out the word opposite or nearly so in the meaning of the given word.

Dastard

[Question ID = 52799]

1. hero [Option ID = 91189]
2. idol [Option ID = 91190]
3. presence [Option ID = 91191]
4. warmth [Option ID = 91188]

Correct Answer :-

- hero [Option ID = 91189]

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10) Pick out the word opposite or nearly so in the meaning of the given word.

Analogous

[Question ID = 52797]

1. showy [Option ID = 91181]
2. dissimilar [Option ID = 91180]
3. haughty [Option ID = 91182]
4. senile [Option ID = 91183]

Correct Answer :-

- dissimilar [Option ID = 91180]

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11) Pick out the word opposite or nearly so in the meaning of the given word.

Candid

[Question ID = 52798]

1. shallow [Option ID = 91187]
2. anxious [Option ID = 91184]
3. secretive [Option ID = 91186]
4. vague [Option ID = 91185]

Correct Answer :-

- secretive [Option ID = 91186]

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12) The minimum number of resistors required in a 4-bit D/A network of weighted-resistor type is: [Question ID = 52844]

1. 15 [Option ID = 91370]
2. 8 [Option ID = 91369]
3. 16 [Option ID = 91371]
4. 4 [Option ID = 91368]

Correct Answer :-

- 4 [Option ID = 91368]

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13) The minimum number of bits required to represent negative numbers in the range of -1 to -9 using 2's complement representation is [Question ID = 52855]

1. 2 [Option ID = 91412]
2. 5 [Option ID = 91415]
3. 3 [Option ID = 91413]
4. 4 [Option ID = 91414]

Correct Answer :-

- 5 [Option ID = 91415]

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14) After the execution of CMP A instruction [Question ID = 52862]

1. ZF is reset and CY is set [Option ID = 91442]
2. ZF is reset and CY is unchanged [Option ID = 91443]
3. ZF is set and CY is reset [Option ID = 91440]
4. ZF is set and CY is unchanged [Option ID = 91441]

Correct Answer :-

- ZF is set and CY is reset [Option ID = 91440]

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15) To increase the resolving and magnifying power of a telescope [Question ID = 52828]

1. Only the focal length of the objective has to be increased [Option ID = 91305]
2. Only the aperture of the objective has to be increased [Option ID = 91306]
3. The wavelength of light have to be decreased [Option ID = 91307]
4. Both the focal length and aperture of the objective have to be increased [Option ID = 91304]

Correct Answer :-

- Both the focal length and aperture of the objective have to be increased [Option ID = 91304]

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16) In a transformer, the number of turns in the primary coil are 140 and that in the secondary coil is 280. If the current in primary coil is 4A, then that in the secondary coil is

[Question ID = 52824]

1. 2A [Option ID = 91290]
2. 4A [Option ID = 91288]
3. 10A [Option ID = 91289]
4. 6A [Option ID = 91291]

Correct Answer :-

- 2A [Option ID = 91290]

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17) The most commonly used amplifier in sample and hold circuit is [Question ID = 52856]

1. an inverting amplifier with a gain of 10 [Option ID = 91418]
2. a unity gain inverting amplifier [Option ID = 91416]
3. an inverting amplifier with a gain of 100 [Option ID = 91419]
4. a unity gain non inverting amplifier [Option ID = 91417]

Correct Answer :-

- a unity gain non inverting amplifier [Option ID = 91417]

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18) He did not register a ————— to the proposal. [Question ID = 52789]

1. dissent [Option ID = 91148]
2. divergence [Option ID = 91150]
3. deviation [Option ID = 91151]
4. disfavour [Option ID = 91149]

Correct Answer :-

- dissent [Option ID = 91148]

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19) A silicon PN junction at a temperature of 200∘C has a reverse saturation current of 10pA. The reverse saturation current at 400∘C for the same bias is approximately.

[Question ID = 52854]

1. 80pA [Option ID = 91411]
2. 20pA [Option ID = 91408]
3. 40pA [Option ID = 91410]
4. 30pA [Option ID = 91409]

Correct Answer :-

- 40pA [Option ID = 91410]

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20) 1_g of H_2O changes from liquid to vapour phase at constant pressure at 1atm. The volume increases from 1cc to1671cc. The heat of vaporisation at this pressure is 540cal/g. The increase in internal energy of water is

[Question ID = 52816]

1. 992J [Option ID = 91258]
2. 2125J [Option ID = 91259]
3. 1099J [Option ID = 91257]
4. 2099J [Option ID = 91256]

Correct Answer :-

- 2099J [Option ID = 91256]

21) Light of frequency 4.45 times the threshold frequency is incident on photosensitive material. If the frequency is halved and intensity is doubled, then the photocurrent becomes [Question ID = 52831]

1. Quadrupled [Option ID = 91318]
2. doubled [Option ID = 91317]
3. zero [Option ID = 91319]
4. Halved [Option ID = 91316]

Correct Answer :-

- Halved [Option ID = 91316]

22) The potential energy of an electron in the fifth orbit of hydrogen atom is [Question ID = 52834]

1. $0.54eV$ [Option ID = 91328]
2. $1.08eV$ [Option ID = 91330]
3. $-0.54eV$ [Option ID = 91329]
4. $-1.08eV$ [Option ID = 91331]

Correct Answer :-

- $-1.08eV$ [Option ID = 91331]

23) Diffraction pattern is obtained using a beam of blue light . What happens if red light is used in place of blue light? [Question ID = 52829]

1. Bands become narrower and crowded [Option ID = 91309]
2. Bands disappears [Option ID = 91311]
3. Bands become broader and farther apart [Option ID = 91308]
4. No change [Option ID = 91310]

Correct Answer :-

- Bands become broader and farther apart [Option ID = 91308]

24) A proton moving in a perpendilcular magnetic field possesses energy E. The magnetic fieldisincreased 8 times. But the proton is constrained to move in the path of same radius. The kinetic energy will increase

[Question ID = 52821]

1. 1/8 times [Option ID = 91276]
2. 64 times [Option ID = 91277]
3. 32 times [Option ID = 91278]
4. 16 times [Option ID = 91279]

Correct Answer :-

- 64 times [Option ID = 91277]

25) Infrared LED is usually fabricated using [Question ID = 52842]

1. GaAs [Option ID = 91362]
2. GaAsP [Option ID = 91363]
3. Si [Option ID = 91361]
4. Ge [Option ID = 91360]

Correct Answer :-

- GaAsP [Option ID = 91363]

26) The festival is always of a very high order because there are a large number of ———— before any performance [Question ID = 52790]

1. exercise [Option ID = 91153]
2. practices [Option ID = 91152]
3. repitions [Option ID = 91155]
4. rehearsals [Option ID = 91154]

Correct Answer :-

- rehearsals [Option ID = 91154]

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27) A zener diode has a breakdown of 9.1V with maximum power distribution of 364mW. What is the maximum current that the diode can withstand? [Question ID = 52839]

1. 4.0A [Option ID = 91350]
2. 0.4A [Option ID = 91349]
3. 40A [Option ID = 91351]
4. 0.04A [Option ID = 91348]

Correct Answer :-

- 0.04A [Option ID = 91348]

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28) An ideal op-amp is an ideal [Question ID = 52857]

1. voltage controlled current source [Option ID = 91420]
2. current controlled current source [Option ID = 91422]
3. current controlled voltage source [Option ID = 91423]
4. voltage controlled voltage source [Option ID = 91421]

Correct Answer :-

- voltage controlled voltage source [Option ID = 91421]

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29) Out of the given alternatives, choose the one which can be substituted for the given words or sentence

Government by one man

[Question ID = 52792]

1. monarchy [Option ID = 91161]
2. autocracy [Option ID = 91162]
3. democracy [Option ID = 91163]
4. anarchy [Option ID = 91160]

Correct Answer :-

- autocracy [Option ID = 91162]

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30) Out of the given alternatives, choose the one which can be substituted for the given words or sentence

One who collects postage stamps

[Question ID = 52793]

1. lexicographer [Option ID = 91167]
2. philatelist [Option ID = 91164]
3. vendor [Option ID = 91166]
4. stamp collector [Option ID = 91165]

Correct Answer :-

- philatelist [Option ID = 91164]

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31) Out of the given alternatives, choose the one which can be substituted for the given words or sentence

One who believes in God.

[Question ID = 52791]

1. theist [Option ID = 91157]
2. devote [Option ID = 91158]
3. secularist [Option ID = 91159]
4. agnostic [Option ID = 91156]

Correct Answer :-

- theist [Option ID = 91157]

32) The critical angle for a ray of light suffering total internal reflection will be smallest for light travelling from [Question ID = 52827]

1. Glass to water [Option ID = 91300]
2. Water to air [Option ID = 91302]
3. Glass to air [Option ID = 91301]
4. Water to glass [Option ID = 91303]

Correct Answer :-

- Glass to air [Option ID = 91301]

33) Choose the most appropriate preposition.

My voice reverberated ———————- the walls of the castle

[Question ID = 52796]

1. with [Option ID = 91176]
2. from [Option ID = 91177]
3. in [Option ID = 91178]
4. on [Option ID = 91179]

Correct Answer :-

- from [Option ID = 91177]

34) Choose the most appropriate preposition.

It is dangerous to intrude ———— the enemy's camp

[Question ID = 52794]

1. into [Option ID = 91169]
2. through [Option ID = 91171]
3. in [Option ID = 91168]
4. on [Option ID = 91170]

Correct Answer :-

- on [Option ID = 91170]

35) Choose the most appropriate preposition.

My uncle was afflicted ———— a serious illness and was almost confined ———— bed ———— more than two months.

[Question ID = 52795]

1. with ; to ; for [Option ID = 91174]
2. to ; to ; since [Option ID = 91175]
3. by ; on ; since [Option ID = 91173]
4. by ; on; for [Option ID = 91172]

Correct Answer :-

- with ; to ; for [Option ID = 91174]

36) Number of flip-flops needed to divide the input frequency by 32 is: [Question ID = 52843]

1. 2 [Option ID = 91364]
2. 5 [Option ID = 91366]
3. 8 [Option ID = 91367]
4. 4 [Option ID = 91365]

Correct Answer :-

- 5 [Option ID = 91366]

37) In each of these questions,jumbled letters of a meaningful word are given. Rearrange these letters and select from the given alternatives the word which is almost opposite in meaning to the rearranged word

A R T Y D

[Question ID = 52801]

1. Quick [Option ID = 91198]
2. Dirty [Option ID = 91196]
3. Quiet [Option ID = 91197]
4. Quack [Option ID = 91199]

Correct Answer :-

- Quick [Option ID = 91198]

---

38) In each of these questions,jumbled letters of a meaningful word are given. Rearrange these letters and select from the given alternatives the word which is almost opposite in meaning to the rearranged word

P C L L U B E A

[Question ID = 52802]

1. Docile [Option ID = 91201]
2. Repair [Option ID = 91202]
3. Excusable [Option ID = 91200]
4. Renew [Option ID = 91203]

Correct Answer :-

- Excusable [Option ID = 91200]

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39) In each of these questions,jumbled letters of a meaningful word are given. Rearrange these letters and select from the given alternatives the word which is almost opposite in meaning to the rearranged word

Y P C U I A T

[Question ID = 52800]

1. Scarcity [Option ID = 91193]
2. Richness [Option ID = 91195]
3. Surplus [Option ID = 91192]
4. Presence [Option ID = 91194]

Correct Answer :-

- Surplus [Option ID = 91192]

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40) X-rays are not used for radar purposes, because they are not [Question ID = 52825]

1. Electromagnetic waves [Option ID = 91295]
2. Partly absorbed by target [Option ID = 91293]
3. Reflected by target [Option ID = 91292]
4. Completely absorbed by target [Option ID = 91294]

Correct Answer :-

- Reflected by target [Option ID = 91292]

---

41) Evaluate the integral $\int_c [\sin y\, dx + x(1 + \cos y)dy]$, where C is the closed path given by $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

[Question ID = 52879]

1. $\pi/(ab)$ [Option ID = 91511]
2. πa [Option ID = 91508]
3. πab [Option ID = 91510]
4. πb [Option ID = 91509]

Correct Answer :-

- πab [Option ID = 91510]

42)

Determine the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 5 \\ 1 & 5 & 5 & 7 \\ 8 & 1 & 14 & 17 \end{bmatrix}$

[Question ID = 52864]

1. 2 [Option ID = 91449]
2. 1 [Option ID = 91448]
3. 3 [Option ID = 91450]
4. 4 [Option ID = 91451]

Correct Answer :-

- 2 [Option ID = 91449]

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43) Compute the work done by the force $\vec{F} = (2y+3)\hat{i} + xz\hat{j} + (yz-x)\hat{k}$ when it moves a particle from the point $(0,0,0)$ to the point $(2,1,1)$ along the curve $x = 2t^2$, $y = t$, $z = t^3$.

[Question ID = 52878]

1. $8\frac{7}{35}$ [Option ID = 91504]

2. $8\frac{3}{35}$ [Option ID = 91505]

3. $8\frac{8}{35}$ [Option ID = 91506]

4. $8\frac{9}{35}$ [Option ID = 91507]

Correct Answer :-

- $8\frac{8}{35}$ [Option ID = 91506]

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44) Find the points on the surface $z^2 = xy + 1$ nearest to the origin.

[Question ID = 52871]

1. (1,0,0) [Option ID = 91477]
2. (0,0,1) [Option ID = 91476]
3. (±1,0,1) [Option ID = 91479]
4. (0,0,±1) [Option ID = 91478]

Correct Answer :-

- (0,0,±1) [Option ID = 91478]

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45) A nucleus of mass $\mu + \Delta m$ is at rest and decays into two daughter nuclei of equal mass $M/2$ each. Speed of light is c. The binding energy per nucleon for the parent nucleus is E_1 and that for the dughter nuclei is E_2. Then

[Question ID = 52836]

1. E1 < E2 [Option ID = 91337]
2. E1 > E2 [Option ID = 91336]
3. E1 = 2E [Option ID = 91339]
4. E1 = E2 [Option ID = 91338]

Correct Answer :-

- E1 < E2 [Option ID = 91337]

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46) The moment of inertia of an annular disc of mass M with inner radius r_1 and outer radius r_2 about an axis of the disc is

[Question ID = 52813]

1. $\frac{1}{2}M(r_2^2 - r_1^2)$ [Option ID = 91244]

2. $\frac{1}{2}M(r_2^2 + r_1^2)$ [Option ID = 91245]

3. $\frac{1}{12}M(r_2^2 - r_1^2)$ [Option ID = 91246]

4. $\frac{1}{12}M(r_2^2 + r_1^2)$ [Option ID = 91247]

Correct Answer :-

- $\frac{1}{2}M(r_2^2 + r_1^2)$ [Option ID = 91245]

---

47) The equation of a particle executing simple harmonic motion is given by

$$x = (2cm)\sin\left[(10\pi s^{-1})\,t + \frac{\pi}{6}\right]$$

The maximum speed is

[Question ID = 52818]

1. $10\pi\,(cm/s)$ [Option ID = 91265]

2. $5\pi\,(cm/s)$ [Option ID = 91264]

3. $20\pi\,(cm/s)$ [Option ID = 91266]

4. $6\pi\,(cm/s)$ [Option ID = 91267]

Correct Answer :-

- $20\pi\,(cm/s)$ [Option ID = 91266]

---

48) Find the Laplace tranform of the function

$$f(t) = \left[\frac{\cos at - \cos bt}{t}\right]$$

[Question ID = 52884]

1. $\ln\left[\frac{s^2+b^2}{s^2+a^2}\right]$ [Option ID = 91528]

2. $\ln\left[\frac{s^2+a^2}{s^2+b^2}\right]$ [Option ID = 91529]

3. $\ln\left[\frac{s^2+a^2}{s^2+b^2}\right]^{1/2}$ [Option ID = 91531]

4. $\ln\left[\frac{s^2+b^2}{s^2+a^2}\right]^{1/2}$ [Option ID = 91530]

Correct Answer :-

- $\ln\left[\frac{s^2+b^2}{s^2+a^2}\right]^{1/2}$ [Option ID = 91530]

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49) A CE amplifier has voltage gain of 50, an input impedance of 1000Ω and an output impedance of 200Ω. The power gain of the amplifier will be:

[Question ID = 52841]

1. 12500dB [Option ID = 91359]
2. 250dB [Option ID = 91358]
3. 24dB [Option ID = 91356]
4. 41dB [Option ID = 91357]

50)

If $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$, find A^3.

[Question ID = 52863]

1. I [Option ID = 91444]
2. 2I [Option ID = 91445]
3. 3I [Option ID = 91446]
4. nilpotent [Option ID = 91447]

Correct Answer :-
- nilpotent [Option ID = 91447]

51)   A radiowave has a maximum electric field intensity of $10^{-4} Vm^{-1}$ on arrival at a reciving antenna. The maximum magnetic flux density of such a wave is

[Question ID = 52826]

1. 3 x 10^{-13} T [Option ID = 91296]
2. $3 \times 10^4 T$ [Option ID = 91297]
3. $1.0 \times 10^{-19} T$ [Option ID = 91299]
4. $5.8 \times 10^{-9} T$ [Option ID = 91298]

Correct Answer :-
- 3 x 10^{-13} T [Option ID = 91296]

52)   How many photons of a radiation of wavelength $\lambda = 5 \times 10^{-7} m$ must fall per second on a blackeened plate in order to produce a force of $6.62 \times 10^{-5} N$?

[Question ID = 52830]

1. 5×10^{18} [Option ID = 91312]
2. 5×10^{20} [Option ID = 91314]
3. 5×10^{21} [Option ID = 91315]
4. 5×10^{19} [Option ID = 91313]

Correct Answer :-
- 5×10^{21} [Option ID = 91315]

53)   Find the values of λ for which the equations $3x + y - \lambda z = 0$, $4x - 2y - 3z = 0$ and $2\lambda x + 4y + \lambda z = 0$ possess a non-trivial solution.

[Question ID = 52865]

1. 1,9 [Option ID = 91453]
2. 1,−9 [Option ID = 91452]
3. 1,3 [Option ID = 91455]
4. 1,−3 [Option ID = 91454]

Correct Answer :-
- 1,−9 [Option ID = 91452]

54)

Find the particular integral of the equation

$$(D^2 + 4)y = \sin 2x$$

[Question ID = 52883]

1. $\frac{x}{4}\cos 2x$ [Option ID = 91524]

2. $\frac{x}{4}\sin 2x$ [Option ID = 91525]

3. $-\frac{x}{4}\sin 2x$ [Option ID = 91527]

4. $-\frac{x}{4}\cos 2x$ [Option ID = 91526]

Correct Answer :-

- $-\frac{x}{4}\cos 2x$ [Option ID = 91526]

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55) Solve the differential equation

$$x^2\frac{dy}{dx} = 1 + y$$

[Question ID = 52880]

1. $y = -1 + ce^{1/x}, \quad c = const.$ [Option ID = 91514]

2. $y = -1 + ce^{-2/x}, \quad c = const.$ [Option ID = 91513]

3. $y = -1 + ce^{-1/x}, \quad c = const.$ [Option ID = 91512]

4. $y = -1 + ce^{2/x}, \quad c = const.$ [Option ID = 91515]

Correct Answer :-

- $y = -1 + ce^{-1/x}, \quad c = const.$ [Option ID = 91512]

---

56) An electron and a proton are accelerated through a potential V. If p_e and p_p be their momenta, then p_p/p_e is approximately

[Question ID = 52833]

1. 55 [Option ID = 91326]
2. 43 [Option ID = 91324]
3. 21 [Option ID = 91325]
4. 81 [Option ID = 91327]

Correct Answer :-

- 43 [Option ID = 91324]

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57) Find the area of the region in the first quadrant that is bounded above by $y = \sqrt{x}$ and below by the x-axis and the line $y = x - 2$.

[Question ID = 52872]

1. 3/10 [Option ID = 91481]
2. 7/10 [Option ID = 91482]
3. 10/7 [Option ID = 91483]
4. 10/3 [Option ID = 91480]

Correct Answer :-

- 10/3 [Option ID = 91480]

---

58) In a common base amplifier circuit, calculate the change in base current if that in the emitter current is 2mA and $\alpha = 0.98$

59) Obtain the symmetric matrix for the quadratic form $Q = x_1^2 + 3x_2^2 + 2x_3^2 + 2x_1x_2 + 6x_2x_3$.

[Question ID = 52867]

1. $C = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 3 & 3 \\ 2 & 3 & 2 \end{bmatrix}$ [Option ID = 91463]

2. $C = \begin{bmatrix} 1 & 1 & 0 \\ 2 & 3 & 3 \\ 0 & 3 & 2 \end{bmatrix}$ [Option ID = 91462]

3. $C = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 3 & 3 \\ 0 & 3 & 2 \end{bmatrix}$ [Option ID = 91461]

4. $C = \begin{bmatrix} 1 & 2 & 0 \\ 1 & 3 & 3 \\ 0 & 3 & 2 \end{bmatrix}$ [Option ID = 91460]

Correct Answer :-

- $C = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 3 & 3 \\ 0 & 3 & 2 \end{bmatrix}$ [Option ID = 91461]

60) Evaluate $\lim_{x \to 0} \left(\frac{\tan x}{x}\right)^{1/x^2}$.

[Question ID = 52868]

1. e^3 [Option ID = 91465]

2. $e^{1/3}$ [Option ID = 91466]

3. 1 [Option ID = 91464]

4. e [Option ID = 91467]

Correct Answer :-

- $e^{1/3}$ [Option ID = 91466]

61) Solve the following differential equation

$$(1+y^2)dx = (\tan^{-1}y - x)dy$$

[Question ID = 52882]

1. $x = \tan^{-1}y - 2 + ce^{-\tan^{-1}y}, \quad c = const.$ [Option ID = 91523]

2. $x = \tan^{-1}y + 2 + ce^{-\tan^{-1}y}, \quad c = const.$ [Option ID = 91522]

3. $x = \tan^{-1}y + 1 + ce^{-\tan^{-1}y}, \quad c = const.$ [Option ID = 91520]

4. $x = \tan^{-1} y - 1 + ce^{-\tan^{-1} y}, \quad c = const.$ [Option ID = 91521]

Correct Answer :-

- $x = \tan^{-1} y - 1 + ce^{-\tan^{-1} y}, \quad c = const.$ [Option ID = 91521]

62) If $\vec{a}$ and $\vec{b}$ are constant vectors , then find $\nabla \times \left\{ \vec{a} \times (\vec{b} \times \vec{r}) \right\}$

[Question ID = 53044]

1. $\vec{a} \times \vec{b}$ [Option ID = 92168]
2. $\vec{a} + \vec{b}$ [Option ID = 92169]
3. $\vec{a}.\vec{b}$ [Option ID = 92170]
4. $\vec{a} - \vec{b}$ [Option ID = 92171]

Correct Answer :-

- $\vec{a} \times \vec{b}$ [Option ID = 92168]

63) If $\vec{r}(t) = 5t^2\hat{i} + t\hat{j} - t^3\hat{k}$, then evaluate $\int_0^1 \left[\vec{r}.\frac{d\vec{r}}{dt} \right] dt$

[Question ID = 52877]

1. 2/27 [Option ID = 91500]
2. 25/3 [Option ID = 91503]
3. 27/2 [Option ID = 91501]
4. 3/25 [Option ID = 91502]

Correct Answer :-

- 27/2 [Option ID = 91501]

64) Find the eigenvectors of the matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

[Question ID = 52866]

1. $[1, 0, 0]^T, [0, 1, 0], [0, 0, 1]^T$ [Option ID = 91458]
2. $[1, 0, 0]^T$ [Option ID = 91456]
3. $[0, 0, 1]^T, [0, 1, 0]^T$ [Option ID = 91457]
4. I [Option ID = 91459]

Correct Answer :-

- $[1, 0, 0]^T, [0, 1, 0], [0, 0, 1]^T$ [Option ID = 91458]

65) What should be the clock frequency of a 6-bit A/D converter so that its maximum conversion time is $32\mu s$?

[Question ID = 52848]

1. 1MHz [Option ID = 91384]
2. 4MHz [Option ID = 91387]
3. 2MHz [Option ID = 91385]
4. 0.5MHz [Option ID = 91386]

Correct Answer :-

- 2MHz [Option ID = 91385]

66) Find the missing number in the following table:

Table 2

18	24	32
12	14	16
3	?	4
72	112	128

[Question ID = 53042]

1. 2 [Option ID = 92160]
2. 5 [Option ID = 92163]
3. 3 [Option ID = 92161]
4. 4 [Option ID = 92162]

Correct Answer :-

- 3 [Option ID = 92161]

67) Find the general solution of the following differential equation

$$(xy - x^2)dy = y^2dx$$

[Question ID = 52881]

1. $y = 1/ce^{y/x}, \quad c = const.$ [Option ID = 91517]

2. $y = ce^{x/y}, \quad c = const.$ [Option ID = 91518]

3. $y = 1/ce^{x/y}, \quad c = const.$ [Option ID = 91519]

4. $y = ce^{y/x}, \quad c = const.$ [Option ID = 91516]

Correct Answer :-

- $y = ce^{y/x}, \quad c = const.$ [Option ID = 91516]

68) The Boolean expression $Y = \overline{AB}CD + \overline{AB}CD + \overline{AB}\overline{C}D + \overline{A}BCD$ reduces to

[Question ID = 52851]

1. $\overline{A}$ [Option ID = 91398]

2. $\overline{A}B$ [Option ID = 91396]

3. $\overline{A}D$ [Option ID = 91399]

4. D [Option ID = 91397]

Correct Answer :-

- $\overline{A}$ [Option ID = 91398]

69) Find the missing number in the following table:

Table 1

1	2	3
4	5	6
7	8	9
27	38	?

[Question ID = 52808]

1. 49 [Option ID = 91224]
2. 50 [Option ID = 91225]
3. 52 [Option ID = 91227]
4. 51 [Option ID = 91226]

Correct Answer :-

- 51 [Option ID = 91226]

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70) A carnot engine takes $3 \times 10^6 Cal$ of heat from a reservoir at $627°C$ and give it to sink at $27°C$. The work done by the engine is

[Question ID = 52817]

1. $zero$ [Option ID = 91260]
2. $4.2 \times 10^6 J$ [Option ID = 91263]
3. $16.8 \times 10^6 J$ [Option ID = 91261]
4. $8.4 \times 10^6 J$ [Option ID = 91262]

Correct Answer :-

- $8.4 \times 10^6 J$ [Option ID = 91262]

---

71) A transistor operating in a common base configuration has a forward current gain factor $\alpha = 0.99$. If the emitter current is changed by 1mA, then the change in the base current will be:

[Question ID = 52840]

1. $99mA$ [Option ID = 91355]
2. $0.01mA$ [Option ID = 91353]
3. $0.99mA$ [Option ID = 91354]
4. $100\mu A$ [Option ID = 91352]

Correct Answer :-

- $99mA$ [Option ID = 91355]

---

72) Evaluate the $\lim_{(x,y) \to (0,0)} \frac{x^2 - xy}{\sqrt{x} - \sqrt{y}}$

[Question ID = 52870]

1. 0.25 [Option ID = 91475]
2. 0 [Option ID = 91472]
3. 0.5 [Option ID = 91474]
4. 1 [Option ID = 91473]

Correct Answer :-

- 0 [Option ID = 91472]

---

73) The dimensions of a block are $1cm \times 1cm \times 100cm$. If the specific resistance of its material is $3 \times 10^{-7}\Omega/m$, then the resistance between opposite rectangular faces is

[Question ID = 52820]

1. $3 \times 10^{-6}\Omega$ [Option ID = 91274]
2. $3 \times 10^{-3}\Omega$ [Option ID = 91275]
3. $3 \times 10^{-7}\Omega$ [Option ID = 91272]
4. $3 \times 10^{-9}\Omega$ [Option ID = 91273]

Correct Answer :-

- $3 \times 10^{-7} \Omega$ [Option ID = 91272]

---

74)   A source and an observer are located at the same point. The source starts moving away from the observer at $t = 0$ with a constant acceleration a. If the natural frequency of the source is n_0 and the speed of sound in air is ν, then the frequency received by the observer at time t will be

[Question ID = 52819]

1. equal to $\left(\frac{n_0\nu}{\nu+at}\right)$ [Option ID = 91268]

2. less than $\left(\frac{n_0\nu}{\nu+at}\right)$ [Option ID = 91271]

3. more than $\left(\frac{n_0\nu}{\nu+at}\right)$ [Option ID = 91270]

4. equal to $\left(\frac{n_0\nu}{\nu-at}\right)$ [Option ID = 91269]

Correct Answer :-

- more than $\left(\frac{n_0\nu}{\nu+at}\right)$ [Option ID = 91270]

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75)   Evaluate the integral

$$\int_c \frac{dz}{z(z+2)},$$

where C is any rectangle containing the points $z = 0$ and $z = -2$ inside it.

[Question ID = 52886]

1. $2\pi i$ [Option ID = 91537]

2. 0 [Option ID = 91538]

3. $4\pi i$ [Option ID = 91539]

4. πi [Option ID = 91536]

Correct Answer :-

- 0 [Option ID = 91538]

---

76)   The temperature of a point in space is given by $T(x,y,z) = x^2 + y^2 - z$. A mosquito located at $(1,1,2)$ desires to fly in such a direction that it will get warm as soon as possible. In what direction should it fly.

[Question ID = 53043]

1. $\frac{1}{3}(2\hat{i} - 2\hat{j} - \hat{k})$ [Option ID = 92165]

2. $\frac{1}{3}(-2\hat{i} + 2\hat{j} - \hat{k})$ [Option ID = 92167]

3. $\frac{1}{3}(2\hat{i} + 2\hat{j} - \hat{k})$ [Option ID = 92164]

4. $\frac{1}{3}(2\hat{i} + 2\hat{j} + \hat{k})$ [Option ID = 92166]

Correct Answer :-

- $\frac{1}{3}(2\hat{i} + 2\hat{j} - \hat{k})$ [Option ID = 92164]

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77)

Find the inverse Laplace transform of

$$\frac{s^3}{s^4 - a^4}$$

[Question ID = 52885]

1. $\frac{1}{2}\left[\cosh at - \cos at\right]$ [Option ID = 91532]

2. $\frac{1}{4}\left[\cosh at - \cos at\right]$ [Option ID = 91533]

3. $\frac{1}{4}\left[\cosh at + \cos at\right]$ [Option ID = 91534]

4. $\frac{1}{2}\left[\cosh at + \cos at\right]$ [Option ID = 91535]

Correct Answer :-

- $\frac{1}{2}\left[\cosh at + \cos at\right]$ [Option ID = 91535]

---

78) Find the curvature at the point $(3a/2, 3a/2)$ on the folium $x^3 + y^3 = 3axy$.

[Question ID = 52869]

1. $8\sqrt{2}/3a$ [Option ID = 91468]

2. $-8\sqrt{2}/3a$ [Option ID = 91470]

3. $5\sqrt{2}/3a$ [Option ID = 91469]

4. $-5\sqrt{2}/3a$ [Option ID = 91471]

Correct Answer :-

- $-8\sqrt{2}/3a$ [Option ID = 91470]

---

79) The barrier potential in a pn junction is 0.4V. The current required is 5mA. What is the emf of a cell which can be used in a circuit if a resistance of 300Ω is connected in series with the junction?

[Question ID = 52850]

1. 2.0V [Option ID = 91392]
2. 1.9V [Option ID = 91393]
3. 1.1V [Option ID = 91395]
4. 1.5V [Option ID = 91394]

Correct Answer :-

- 1.9V [Option ID = 91393]

---

80) Flux Φ (weber) in a closed circuit of resistance 10Ω varies with time t (in seconds) according to the equation

$$\Phi = 6t^2 - 5t + 1$$

What is the magnitude of the induced current at $t = \frac{1}{4}$s ?

[Question ID = 52823]

1. 0.2A [Option ID = 91284]
2. 1.2A [Option ID = 91285]
3. 1.4A [Option ID = 91287]
4. 0.4A [Option ID = 91286]

Correct Answer :-

- 1.2A [Option ID = 91285]

81) In each of these questions, which character when placed at the sign of interrogation shall complete the matrix.

Table 3

A	D	H
F	I	M
?	N	R

[Question ID = 52810]

1. K [Option ID = 91232]
2. N [Option ID = 91233]
3. P [Option ID = 91235]
4. O [Option ID = 91234]

Correct Answer :-

- K [Option ID = 91232]

---

82) An electron in Bohr's hydrogen atom has an energy of $-3.4eV$. What is the angular momentum of the electron?

[Question ID = 52832]

1. $\frac{h}{\pi}$ [Option ID = 91321]

2. $\frac{\pi}{h}$ [Option ID = 91323]

3. $\frac{2h}{\pi}$ [Option ID = 91320]

4. $\frac{2\pi}{h}$ [Option ID = 91322]

Correct Answer :-

- $\frac{h}{\pi}$ [Option ID = 91321]

---

83) Evaluate $\int_0^\infty \int_0^x xe^{x^2/y}dydx$.

[Question ID = 52873]

1. 2 [Option ID = 91484]
2. 1/4 [Option ID = 91487]
3. 1/2 [Option ID = 91485]
4. 4 [Option ID = 91486]

Correct Answer :-

- 1/2 [Option ID = 91485]

---

84) Consider an 8085-based system operating with the following specifications:

Crystal	frequency	-	6	MHz
ROM	map-0000	through		07FF
RAM	map-1000	through		17FF
ROM	requires	1	wait	state
RAM	requires	no	wait	state
Assume	the	content	of	PC	is	0200.

The instruction cycle time needed for the instruction ORI A, 22 is

[Question ID = 52860]

1. 11 [Option ID = 91435]
2. 9 [Option ID = 91433]
3. 10 [Option ID = 91434]

4. 8 [Option ID = 91432]

Correct Answer :-

- 9 [Option ID = 91433]

85) A nucleus $_zX^A$ emits an α particle. The resultant nucleus emits β^+ particle. The respective atomic and mass number of the final nucleus will be

[Question ID = 52835]

1. Z −3, A−4 [Option ID = 91332]
2. Z −1, A−4 [Option ID = 91333]
3. Z, A−2 [Option ID = 91334]
4. Z −2, A−4 [Option ID = 91335]

Correct Answer :-

- Z −3, A−4 [Option ID = 91332]

86) While on a routine flight, the aircraft was hit by a missile and ———— into flames. [Question ID = 52788]

1. caught [Option ID = 91147]
2. burst [Option ID = 91145]
3. blew [Option ID = 91146]
4. shot [Option ID = 91144]

Correct Answer :-

- burst [Option ID = 91145]

87) For a 12 bit A/D converter, the range of input signal is 0 to +10V.The voltage corresponding to 1 LSB will be:

[Question ID = 52845]

1. 0.833V [Option ID = 91375]
2. 0.0012V [Option ID = 91373]
3. 0.0024V [Option ID = 91374]
4. 0V [Option ID = 91372]

Correct Answer :-

- 0.0024V [Option ID = 91374]

88) Pure silicon is simultaneously doped with boron to a concentration of 10^{20} atoms per cubic centimetre and with phosphorus to a concentration of 7×10^{19} atoms per cubic centimetre. The number of holes per unit volume of silicon will be approximately

[Question ID = 52838]

1. 10^{20} [Option ID = 91344]
2. 7×10^{19} [Option ID = 91346]
3. 3×10^{19} [Option ID = 91347]
4. 17×10^{19} [Option ID = 91345]

Correct Answer :-

- 10^{20} [Option ID = 91344]

89) Which of the following is minimum error code? [Question ID = 52858]

1. Octal code [Option ID = 91424]
2. Excess 3 code [Option ID = 91427]
3. Grey code [Option ID = 91425]
4. Binary code [Option ID = 91426]

Correct Answer :-

- Grey code [Option ID = 91425]

90) To have an earth satellite synchronous with the rotation of the Earth, it must be launched at the proper height moving [Question ID = 52814]

1. from west to east in an equatorial plane [Option ID = 91248]

2. from south to north in an equatorial plane [Option ID = 91251]
3. from east to west in an equatorial plane [Option ID = 91250]
4. from north to south in an equatorial plane [Option ID = 91249]

Correct Answer :-

- from west to east in an equatorial plane [Option ID = 91248]

---

91) If a current passes through a spring , then the spring will [Question ID = 52822]

1. remain same [Option ID = 91282]
2. break [Option ID = 91283]
3. expand [Option ID = 91280]
4. compress [Option ID = 91281]

Correct Answer :-

- compress [Option ID = 91281]

---

92) The first operation performed in INTEL 8085 after RESET is [Question ID = 52861]

1. memory read from location 0000H [Option ID = 91437]
2. stack initialization [Option ID = 91439]
3. instruction fetch from location 8000H [Option ID = 91438]
4. instruction fetch from location 0000H [Option ID = 91436]

Correct Answer :-

- stack initialization [Option ID = 91439]

---

93) A person going eastwards with a velocity of 4km per hour, observes that the wind appears to blow directly from the north. He doubles his speed and the wind appears to come from northeast. Find the actual velocity of the wind.

[Question ID = 52874]

1. $4\sqrt{2}$ [Option ID = 91490]

2. $2\sqrt{3}$ [Option ID = 91491]

3. $4\sqrt{3}$ [Option ID = 91488]

4. $4\sqrt{5}$ [Option ID = 91489]

Correct Answer :-

- $4\sqrt{2}$ [Option ID = 91490]

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94) The TRAP interrupt mechanism of the 8085 microprocessor [Question ID = 52859]

1. executes a NOP [Option ID = 91431]
2. executes an instruction from memory location 20H [Option ID = 91430]
3. executes an RST by hardware [Option ID = 91428]
4. executes the instruction supplied by external device through the INTA signal [Option ID = 91429]

Correct Answer :-

- executes an RST by hardware [Option ID = 91428]

---

95) The band gap of silicon at 300K is

[Question ID = 52853]

1. 0.80eV [Option ID = 91406]
2. 0.67eV [Option ID = 91407]
3. 1.36eV [Option ID = 91404]
4. 1.10eV [Option ID = 91405]

Correct Answer :-

- 1.10eV [Option ID = 91405]

---

96) The drift velocity of electrons in silicon

1. is independent of the electric field [Option ID = 91401]
2. is proportional to the electric field for all values of electric field [Option ID = 91400]
3. increases at low values of electric field and decreases at high values of electric field exhibiting negative differential resistance [Option ID = 91402]
4. increases linearly with electric field and gradually saturates at higher values of electric field [Option ID = 91403]

Correct Answer :-

- increases linearly with electric field and gradually saturates at higher values of electric field [Option ID = 91403]

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97) The minimum conversion interval of an ADC using an eight stage counter with a clock frequency of 2MH$_z$ is:

[Question ID = 52847]

1. $64\mu S$ [Option ID = 91381]
2. $128\mu S$ [Option ID = 91382]
3. $0.5\mu S$ [Option ID = 91380]
4. 127μS [Option ID = 91383]

Correct Answer :-

- $128\mu S$ [Option ID = 91382]

---

98) The half life of radium is 1620yrs and its atomic weight is 226. The number of atoms that will decay from 1g sample per second will be

[Question ID = 52837]

1. 3.6×10^{10} [Option ID = 91340]
2. 3.6×10^{12} [Option ID = 91342]
3. 3.6×10^{11} [Option ID = 91341]
4. 3.6×10^{13} [Option ID = 91343]

Correct Answer :-

- 3.6×10^{10} [Option ID = 91340]

---

99) The following questions are based on the information given below:
Dataon 450 candidates,who took an examination in Social science, Mathematics and Sciences is given below:
Passed in all the subjects : 167
Failed in all the subjects : 60
Failed in Social Sciences : 175
Failed in Mathematics : 199
Failed in Science : 191
Passed in Social Sciences only : 62
Passed in Mathematics only : 48
Passed in Science only : 52

How many failed in Social Sciences only?

[Question ID = 52811]

1. 42 [Option ID = 91239]
2. 15 [Option ID = 91236]
3. 21 [Option ID = 91237]
4. 30 [Option ID = 91238]

Correct Answer :-

- 15 [Option ID = 91236]

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100) The following questions are based on the information given below:
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Failed in Social Sciences : 175

Failed in Mathematics : 199
Failed in Science : 191
Passed in Social Sciences only : 62
Passed in Mathematics only : 48
Passed in Science only : 52

How many failed in one subject only?

[Question ID = 52812]

1. 56 [Option ID = 91243]
2. 152 [Option ID = 91240]
3. 144 [Option ID = 91241]
4. 61 [Option ID = 91242]

Correct Answer :-

- 61 [Option ID = 91242]