



PGDBA 2016

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Instructions

In each of the questions a word has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate

Question 1

Loose

- A The dog got loose and ran out of the yard
- B She carefully worked the sandal loose and slipped into the back seat.
- C She did not want to loose that game because it would be the last one she would play that season
- D The line was silent for a few moments and then Mary let loose with a heavy sigh.

Answer: C

Explanation:

The words lose and loose are homophones.

Lose means to be deprived of something or to be defeated.

Whereas, "loose" means not firm or detached.

Here the word "loose" is used correctly in all the options except option C.

In option C the term is used in the context of being defeated in a game. The correct word is "lose".

Therefore the right option is C.

Question 2

Advise

- A If only Mom were here to advise her!
- B I would like to seek your advise on this matter.
- C I advise you, as a father would, to cease all communication with that person.
- D "I included the whiskey, though I advise you to stop drinking soon," he said with brotherly firmness.

Answer: B

Explanation:

"Advise" is a verb that means to give suggestion or counsel to.

In all of the options except B, the usage of the word is correct.

In B, the term "advise" does not fit as the person is seeking guidance.

People often get confused between the words advise and advice. These are homophones and the word "advice" is a noun that means suggestion or guidance.

Instructions

For the following questions answer them individually

Question 3

Arrange the sentences in the most logical order to form a coherent paragraph. From the given options choose the most appropriate option.

- i. The last thing airline pilots need is an additional hazard caused by Unmanned Aerial Vehicles (UAVs) weighing as much or more than a Canadian goose.
- ii. In 2009 a collision with a flock of migratory Canadian geese caused a US Airways flight to suffer complete loss of power after take-off from LaGuardia airport, New York.
- iii. The bird strike could have easily ended in disaster but for the skill of the pilot. Captain Chesley Sullenberger, who famously brought the stricken Airbus A320 down for a splash landing in the Hudson River without loss of life.
- iv. One of the most feared birds encountered by aircrafts is the common Canadian goose, weighing anything up to 6 kg.

- A iv, ii, iii, i
- B i, iii, iv, ii
- C i, ii, iii, iv
- D iv, ii, i, iii

Answer: A

Explanation:

Sentence (iv) puts forward the fact that the Canadian goose is a hazard for aeroplanes. Sentence (ii) gives an example of how a flock of common Canadian geese caused a mishap in 2009 and sentence (iii) describes how the pilot averted any loss of life. In sentence (i) an additional statement is made saying that Unmanned Aerial Vehicles, which can be heavier than geese, are the last thing airline pilots need in the air.

Hence, the correct order of (iv)(ii)(iii)(i).

Question 4

Arrange the sentences in the most logical order to form a coherent paragraph. From given options choose the most appropriate option.

- i. Collecting antiquities was also popular with the aristocracy during the Renaissance, and became even more so when young upper-class European men started to do the Grand Tour in the late 17th century.**
- ii. In ancient Rome the elite sought out Greek bronzes, sculptures and vases; some cunning merchants tried to make new ones look older and boost their price.**
- iii. Antique furniture went mainstream in Europe in the second half of the 19th century, as the bourgeoisie found themselves with more disposable income and developed a desire to invest in their homes.**
- iv. The desire to live in the presence of history has ebbed and flowed.**

- A iv, ii, i, iii
- B iv, iii, ii, i
- C i, iv, ii, iii
- D iii, i, ii, iv

Answer: A

Explanation:

Sentence (iv) is an opening statement that puts forward the idea of collecting pieces of history as a fad has gradually moved from place to place and faded.

In this question, the options follow a timeline, so it is easy to arrange the other three sentences.

Starting with the sentence dealing with the most ancient time, sentence (ii) talks about collecting antiques in ancient Rome.

Sentence (i) advances to the Renaissance period and the 17th century.

(iii) talks about an even more modern period, the 19th century.

So the correct order is (iv)(ii)(i)(iii).

Question 5

Consider the following phrases:

- i. dominated by such brutal forces**
- ii. there certainly may be times when one's own culture, society and tradition are so reified**
- iii. When debate and conversation are so dried up or simply made impossible that the social critic**
- iv. becomes the social exile**

To form a complete sentence, the correct order of the phrases above is:

- A ii, i, iii, iv
- B ii, iv, i, iii

C ii, iii, i, iv

D iii, ii, i, iv

Answer: C

Explanation:

(ii) talks about a situation where one's own culture, society and tradition are made to seem unquestionably real. (iii) carries the sentence forward stating the consequences of such a situation. The idea of it affecting the social critique due to the lack of debate and conversation is introduced. (i) reemphasises that it is the result of brutal forces that such a situation has happened. (iv) states what exactly happens to social critiques in such a case.

Hence the correct order is (ii)(iii)(i)(iv)

Therefore the correct answer is C.

Instructions

Read the passage and answer the questions that follow:

Passage I

Constructivist, constructivism, interpretivist, and interpretivism are terms that routinely appear in the lexicon of social science methodologists and philosophers. Yet, their particular meanings are shaped by the intent of their users. As general descriptors for a loosely coupled family of methodological and philosophical persuasions, these terms are best regarded as sensitizing concepts. They steer the interested reader in the general direction of where instances of a particular kind of inquiry can be found. However, they 'merely suggest directions along which to look' rather than 'provide descriptions of what to see'.

Proponents of these persuasions share the goal of understanding the complex world of lived experience from the point of view of those who live it. This goal is variously spoken of as an abiding concern for the life world, for the emic point of view, for understanding meaning, for grasping the actor's definition of a situation, for Verstehen. The world of lived reality and situation-specific meanings that constitute the general object of investigation is thought to be constructed by social actors. That, particular actors, in particular places, at particular times, fashion meaning out of events and phenomena through prolonged, complex processes of social interaction involving history, language, and action.

The constructivist or interpretivist believes that to understand this world of meaning one must interpret it. The inquirer must elucidate the process of meaning construction and clarify what and how meanings are embodied in the language and actions of social actors. To prepare an interpretation is itself to construct a reading of these meanings; it is to offer the reader the inquirer's construction of the constructions of the actors one studies.

Although they share this general framework for human inquiry, constructivist and interpretivist persuasions are unique in the manner in which each answers these questions: What is the purpose and aim of human inquiry (as distinct from inquiry into the physical world)? How can we know about the world of human action?

Question 6

The terms constructivism and interpretivism refer to.

A paradigms of inquiry

B methods of analysis

C schools of thought

D sensitizing concepts

Answer: A

Explanation:

The terms constructivism and interpretivism refer to the various patterns.

In other words, they are examples of a unique type of human inquiry.

Hence they are paradigms of inquiry.

Therefore the correct option is A.

Question 7

According to the author, a constructivist or an interpretivist is

A likely to be biased.

- B likely to be rooted in her/ his context.
- C likely to be objective.
- D likely to be actors.

Answer: B

Explanation:

According to the author, a constructivist explore and discover the world of meanings hence they will be rooted on the context in which they made their discovery.

Therefore the correct option is B.

Question 8

According to the author, constructivists and interpretivists are

- A explorers and discoverers.
- B diagnosers and predictors.
- C analyzers and decision makers.
- D actors and proponents.

Answer: A

Explanation:

In the passage, the author mentions that constructivists believe that to understand the world of meanings, one should interpret it. They do not create anything new, they explore the world for the meanings and discover how meanings are embodied in the language and actions of social actors.

Hence the correct choice is option A.

Question 9

According to the passage, the term Verstehen refers to

- A complex processes of social interaction involving history, language, and action.
- B understanding the complex world of lived experience.
- C creating meaning out of events and phenomena.
- D grasping the actor's definition of a situation.

Answer: D

Explanation:

The word verstehen refers to the empathetic understanding of human behaviour. In the context of the passage, it is the grasping of the actor's definition of a situation.

Hence the correct option is D.

Instructions

Read the passage and answer the questions that follow:

Passage II

Reverence is a dirty word at the Almeida Theatre in Islington, North London. Rupert Goold, the artistic director, and Robert Icke, his associate, are resolved to take dusty, distant cultural artefacts of drama and shake them hard. So that they will entertain modern audiences, especially those with no previous knowledge of the plays. Mr Icke holds that to save the classics from withering, a director must be willing even to reinterpret the original author's intentions.

This summer Messrs Goold and Icke have directed freshly translated versions of the oldest of all "dusty theatrical artefacts": the ancient Greek tragedies of Aeschylus and Euripides. These versions ruthlessly rewrite texts and alter plots. In Euripides's "Medea", the last of the season of three plays which opened on 1st October directed by Mr Goold. Medea murders her two children as revenge on her unfaithful husband. Not at the Almeida: in this version, her sons die—or perhaps do not—by eating sleeping pills.

Mr Icke's version of "Oresteia" by Aeschylus is described as "a new adaptation", but classics scholars insist that it is much more than that. The masked male chorus which propels all Greek tragedy, so memorable in Sir Peter Hall's production at the National Theatre in 1981, is jettisoned. Mr Icke's Oresteia starts with 46 pages of text (out of 113 in all) that are a dramatisation of the long choral ode in Aeschylus's "Agamemnon". It deals with his decision to sacrifice his daughter Iphigenia to ensure his ships a fair wind for Troy. Mr Icke believes that, without this prelude, it is hard to appreciate fully the ensuing, awe-inspiring family tragedy in which his wife Clytemnestra kills Agamemnon to avenge their daughter's death, and then is murdered in turn by their son Orestes. The extra material makes for a long evening, but it speeds by. Only the "Bakkhai", the second of the Almeida's three plays, conforms to the traditional Greek unities of time and place, and as in ancient Greece, has all the speaking roles played by three actors, backed by a chorus (though of Bacchic ladies rather than masked men).

The Greek season defines the Almeida's style of work. Mr Goold has unearthed a rich new seam of modern theatre by reviving and generally energising work by authors such as Luigi Pirandello and Bret Easton Ellis. His delightful version of "The Merchant of Venice" - set in Las Vegas, was played largely for laughs, with the verse adapting easily to a singsong southern American accent. Even his failures, such as a "King Lear and Puccini at the English National Opera, had moments that linger in the memory.

Actors like working there. Since small theatres like the Almeida cannot pay well, actors choose the work over the money. In this Greek season, the two most memorable performances are by Lia Williams as Clytemnestra and Kate Fleetwood, who is Mr Goold's wife, as Medea. Each exhibits an emotional range that holds the action together. The rage, temper and insult of the dialogue between Medea and her husband Jason, here conducted on their mobile phones, reveal a direct linguistic link from ancient Greece to contemporary soap opera.

Whatever quibbles there might be about the editing, cutting and rewriting of the texts, surely the significant question about this ambitious project is whether the audience is gripped by the performances. Enthusiastic word-of-mouth suggests the answer is yes.

Question 10

In this passage, the word "reverence" can be interpreted as

- A a gesture indicative of deep respect; a bow or curtsy.
- B honour in recognition of qualities of holiness, excellence, wisdom.
- C regard with great awe and devotion.
- D something that is considered hallowed or exalted to the extent that no reinterpretation is allowed.

Answer: D

Explanation:

In the passage, the idea being conveyed is that the Greek plays are being interpreted in a way such that the modern audience can appreciate them. About these plays, the author mentions that reverence is not appreciated at the Almeida Theatre. So we can understand that "reverence" is a word used to convey the idea of something which cannot be altered or adapted. Hence the correct option is D.

Question 11

The Almeida Theatre is unique because

- A of its location in Islington.
- B it concentrates on reinterpreting ancient Greek Theatre.
- C it completely reinterprets old classics to lend them a modern feel.
- D it employs only family members of the Directors as actors.

Answer: C

Explanation:

From the passage, we can understand that the Almeida Theatre is unique because they reinterpret classics in a way that they will entertain modern audiences, especially those with no previous knowledge of the plays. Hence the correct option is C.

Question 12

The author does not agree that Mr Icke's version of Oresteia by Aeschylus is a "a new adaptation" because

- A the masked male chorus is jettisoned.
- B Medea's sons die of eating sleeping pills.
- C over 40% of the play is about the sacrifice of Iphigenia.
- D it recasts the play by providing a backdrop to better appreciate the reasons behind the deaths of Agamemnon followed by Klytemnestra.

Answer: D

Explanation:

The idea of a new adaptation is to modify or make changes in an existing version merely. But the scholars argue it is much more than that because rather than just making changes, the play is recast in a manner that people can better appreciate the backdrop. Hence the correct option is D.

Question 13

The author uses the term "artefact" in the text to mean

- A an object made by a human being, typically one of cultural or historical interest.
- B something observed in a scientific investigation or experiment that is not naturally present but occurs as a result of the preparative or investigative procedure.
- C a creative literary text that is of historical and cultural interest.
- D any feature that is not naturally present but is a product of an extrinsic agent.

Answer: C

Explanation:

The word artefact means an object made by a human being, typically one of cultural or historical interest. But in this context, the author is using it to refer to something more relevant to literature. Hence the better choice would be option C.

Question 14

A suitable title for this passage could be

- A Modernisation of Greek Theatre
- B Almeida Theatre through the Ages
- C Almeida Theatre: of Actors and Audiences
- D The Unique World of Almeida Theatre

Answer: D

Explanation:

In the passage, the discussion is about how Almeida Theatre is different and unique from other theatres. The main idea of the passage is the theatre and not the plays or actors, though they are integral parts of the passage. Hence the suitable option would be D.

Question 15

Some attempts to engage modern audiences by M/s Goold and Icke, as discussed in the passage include

- A the use of sleeping pills to eliminate Almeida's sons.
- B the dramatisation of the long choral ode in Aeschylus's Agamemnon in Oresteia

- C the dramatisation of conversations over mobile phones between Almeida and Jason.
- D the use of masked ladies for the chorus for Greek Plays.

Answer: E

Explanation:

In the passage, there are mentions of various attempts at modernisation

Options C & D are irrelevant as there is no mention of either option in the passage.

Option A is not given as an example of modernisation but rather as an example of ruthlessly rewritten texts and altered plots.

In the third paragraph, we see the idea mentioned in Option B, where various attempts are described as a new adaptation or in other words, modernisation.

Hence the answer is Option B.

Reasoning

Instructions

Read the paragraph and answer the questions that follow:

Question 16

Every passenger is either in the first class or in the tourist class of a cruise. Each passenger is in tourist class if and only if he is wealthy. Some passengers are wealthy. Not all passengers are wealthy. From the above statements which of the following statements can be certainly drawn.

- A All passengers are in first class.
- B All passengers are wealthy.
- C No passenger is wealthy.
- D Some passengers are in tourist class.

Answer: E

Question 17

Let F1 and F2 be sentences as stated below:

F1 : If the president does not want to take the responsibility and the rioters are not tired of rining, then riots will spread.

F2 : If the president does not have the appropriate authority or if he does not want to take the responsibility, then neither order will be restored nor will the riots stop spreading unless the rioters become tired of rioting and the local authorities begin to take conciliatory actions.

Then which of the following statements is true ?

- A F2 is a logical consequence of F1.
- B F1 is a logical consequence of F2.
- C Both F1 and F2 are logical consequences of each other.
- D Neither F1 nor F2 are logical consequences of each other.

Answer: E

Question 18

If Amisha works hard, then either Santosh or Ravi will enjoy themselves. If Santosh enjoys himself, then Amisha will not work hard. If Devika enjoys herself, then Ravi will not enjoy himself. Therefore, if Amisha works hard then which of the following statements follows ?

- A Ravi will not enjoy himself.
- B Santosh will enjoy himself.

- C Devika will enjoy herself.
- D Devika will not enjoy herself.

Answer: E

Question 19

If Praveen is Maninder's next door neighbour, then Praveen's annual income is more than Rs. one million. If Praveen's annual income is more than Rs. one million then Earth is square. Earth is not square. If Madhukar is Maninder's next door neighbour, then Madhukar flies from the hostel to the class. If Madhukar goes by cycle from the hostel to the class, he does not fly from the hostel to the class. Madhukar goes by cycle from the hostel to the class. If Praveen is not Maninder's next door neighbour then either Madhukar or Deepayan is Maninder's next door neighbour. Which of the following statements follows?

- A Praveen is Maninder's next door neighbour.
- B Madhukar is Maninder's next door neighbour.
- C Deepayan is Maninder's next door neighbour.
- D Praveen's annual income is more than Rs. one million.

Answer: E

Question 20

If Shashank goes to the meeting then a complete report will be made: but if Shashank does not go to the meeting, then a special election will be required. If a complete report is made then an investigation will be launched. If an investigation is launched then some members will have to face disciplinary action. But if no investigation is launched then the organization will disintegrate very rapidly. If a special election is not required then which of the following statements follows?

- A An investigation will not be launched.
- B A complete report will not be made.
- C The organization will disintegrate very rapidly.
- D Some members will face disciplinary action.

Answer: E

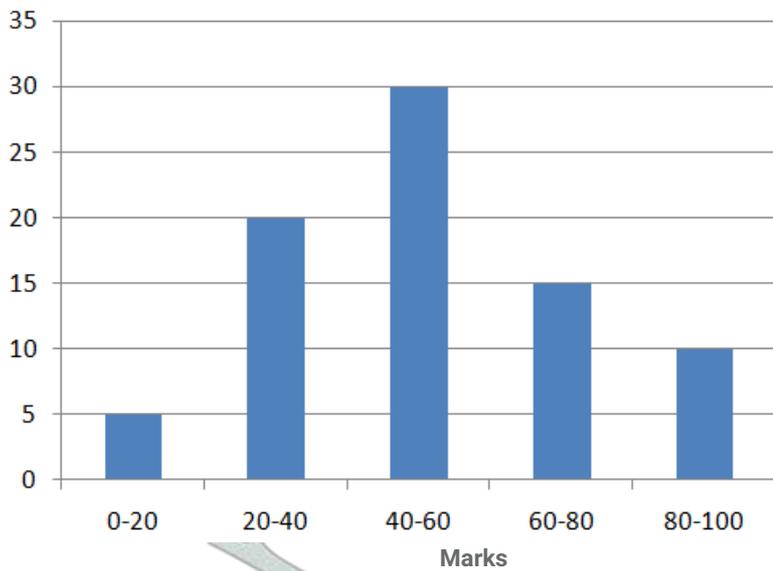
Quant

Instructions

Read the following graph and answer to the questions below.

The following histogram represents the frequency distribution of marks of 80 students in a class. Here the class interval $a-b$ includes all marks greater than or equal to a and less than b except for the interval $80-100$, where both the end points are included.

No.of Students



Question 21

The number of students scoring less than 60 marks is

- A 40
- B 45
- C 50
- D 55

Answer: D

Explanation:

The number of students scoring less than 60 = $5+20+30=55$

Question 22

The number of students scoring less than 80 marks but not less than 40 marks is

- A 45
- B 40
- C 35
- D 30

Answer: A

Explanation:

The number of students scoring less than 80 marks but not less than 40 marks = $30+15 = 45$

Question 23

The arithmetic mean of marks is

- A 50.25
- B 50.75
- C 51.25

D 53.75

Answer: E

Question 24

The number of students scoring at least 50 marks is

A less than 20%

B between 20% and 30%

C between 30% and 70%

D between 70% and 80%

Answer: C

Explanation:

let all the students in the group 40-60, score atleast 50,

Then the number off students who score atleast 50 = $30+15+10= 55$

Percentage = $(55/80)*100 = 68.75\%$

let all the students in the group 40-60, score less than 50,

Then the number off students who score atleast 50 = $15+10= 25$

Percentage = $(25/80)*100 = 31.25\%$

C is the correct answer.

Question 25

The number of students scoring less than 30 marks is

A less than 5%

B between 5% and 35%

C between 35% and 40%

D between 40% and 45%

Answer: B

Explanation:

Here we have to find the extreme cases

Let us consider all the students indicated by the graph 20-40 scored more than 30,

Then the number of students scored less than 30 = 5

Percentage of students scored less than 30 = $\frac{5}{80} = 6.25\%$

Let us consider all the students indicated by the graph 20-40 scored less than 30,

Then the number of students scored less than 30 = 25

Percentage of students scored less than 30 = $\frac{25}{80} = 31.25\%$

B is the correct answer.

Instructions

For the following questions answer them individually

Question 26

With eleven distinct consonants and five distinct vowels, how many distinct six letter words can be formed if middle two positions are occupied by vowels (may be repeated) and first two and last two positions are occupied by consonants (all distinct)?

- A 168000
- B 178000
- C 188000
- D 198000

Answer: D

Explanation:

Let the six-letter word be ABCDEF

Number of possibilities for A = 11, B = 10, C = 5, D=5, E = 9, F = 8

Required number of ways = $11 \times 10 \times 5 \times 5 \times 9 \times 8 = 198000$

Question 27

A positive integer is called a palindrome if it reads the same forward and backwards. The number of eight-digit palindromes divisible by 5 is

- A 1000
- B 2000
- C 4000
- D 10000

Answer: A

Explanation:

For the number to be divisible by 5, the last digit must be either 0 or 5

If 0 is the last digit then the first digit must also be 0, then it will be a 7 digit number.

So the last digit can only be 5.

If the last digit is 5, then the first digit is also 5.

We have select values of second, third, fourth digits only because fifth, sixth and seventh will be same as second, third, fourth digits.

Second, third and fourth digits can have 10 possibilities.

The required number of ways = $1 \times 10 \times 10 \times 10 = 1000$

A is the correct answer.

Question 28

The product of the real solutions x of the equation

$$x^2 + 4 | x | - 4 = 0 \text{ is}$$

- A 4
- B -4
- C $-4(\sqrt{2} - 1)^2$
- D $4(\sqrt{2} - 1)^2$

Answer: C

Explanation:

$$x^2 + 4 | x | - 4 = 0$$

Case 1:

$$x > 0$$

$$x^2 + 4x - 4 = 0$$

$$x = -2 + 2\sqrt{2}, -2 - 2\sqrt{2}$$

$$\text{Since } x > 0, x = -2 + 2\sqrt{2}$$

Case 2:

$$x < 0$$

$$x^2 - 4x - 4 = 0$$

$$x = 2 + 2\sqrt{2}, 2 - 2\sqrt{2}$$

$$\text{Since } x < 0, x = 2 - 2\sqrt{2}$$

Product of values of x

$$= -2 + 2\sqrt{2} * 2 - 2\sqrt{2}$$

$$= -12 + 8\sqrt{2}$$

$$= -4(\sqrt{2} - 1)^2$$

Question 29

If the coefficient of x^{12} in the expansion of $(x^3 + 1)^m$ is 210, then the coefficient of x^{15} is

A 252

B 272

C 282

D 292

Answer: E

Question 30

Consider an arithmetic progression of positive terms with the first term as α . Let S_n denote the sum of the first n terms of this arithmetic progression and let $\frac{S_m}{S_n} = \frac{m^2}{n^2}$ for $m \neq n$. Then the 50th term is

A 50α

B 99α

C 100α

D 250α

Answer: B

Explanation:

$$\frac{m * (2\alpha + (m-1)d)}{2} = \frac{n * (2\alpha + (n-1)d)}{2}$$

$$\frac{m}{n} = \frac{(2\alpha + (m-1)d)}{(2\alpha + (n-1)d)}$$

$$m(2\alpha + (n-1)d) = n(2\alpha + (m-1)d)$$

$$d = 2\alpha$$

$$50^{\text{th}} \text{ term} = \alpha + 49 \cdot 2\alpha = 992\alpha$$

Question 31

The first term of a series is unity. Every even term is thrice the term preceding it and every odd term is seven times the term preceding it. The sum of the first hundred terms is

A $\frac{1}{5}(21^{50} - 1)$

B $\frac{1}{12}(21^{50} - 1)$

C $\frac{1}{5}(21^{100} - 1)$

D $\frac{1}{20}(21^{100} - 1)$

Answer: A

Explanation:

The series is $1, 3 \cdot 1, 7 \cdot 3 \cdot 1, 3 \cdot 7 \cdot 3 \cdot 1, 7 \cdot 3 \cdot 7 \cdot 3 \cdot 1, 3 \cdot 7 \cdot 3 \cdot 7 \cdot 3 \cdot 1, \dots, 100$ terms

The series of the even terms = $3 \cdot 1, 3 \cdot 7 \cdot 3 \cdot 1, 3 \cdot 7 \cdot 3 \cdot 7 \cdot 3 \cdot 1, \dots$

$$\text{Sum of the first 50 even terms} = \frac{3(21^{50} - 1)}{20}$$

The series of the odd terms = $1, 7 \cdot 3 \cdot 1, 7 \cdot 3 \cdot 7 \cdot 3 \cdot 1, \dots$

$$\text{Sum of the first 50 odd terms} = \frac{1(21^{50} - 1)}{20}$$

$$\text{Required sum} = \frac{3(21^{50} - 1)}{20} + \frac{1(21^{50} - 1)}{20}$$

$$= 4 \cdot \frac{21^{50} - 1}{20}$$

$$= \frac{1}{5}(21^{50} - 1)$$

A is the correct answer.

Question 32

The sum of all solutions of the equation $4 \sin^2 x - 4 \cos x = 1$ in the interval $[0, 2\pi]$ is

A $\frac{\pi}{3}$

B $\frac{5\pi}{3}$

C π

D 2π

Answer: E

Question 33

Let QRS be a triangular park in xy-plane with side RS = 375 meters and angle QRS = 90° . A pole PQ vertical to the xy-plane is fixed at Q with height PQ = h. If $\tan \text{PRQ} = \frac{17}{25}$ and $\tan \text{PSQ} = \frac{8}{25}$ then the value of h (in meters) is

A 200

B 164

C 136

D 125

Answer: E

Question 34

The system of linear equations

$$x + y + kz = 1$$

$$x + ky + z = 1$$

$$kx + y + z = 1$$

has

A a unique solution for only one value of k

B a unique solution for infinitely many choices of k

C no solution for any value of k

D infinitely many solutions for any value of k

Answer: E

Question 35

The least value of $4^{\sin x} + 4^{\cos x}$ for $x \in R$, is

A $\frac{1}{2^{\sqrt{2}}}$

B $2^{1-\sqrt{2}}$

C 2

D 4

Answer: E

Explanation:

$$4^{\sin x} + 4^{\cos x}$$

Differentiate wrt x , and equate it to 0

$$4^{\sin x} * \cos x * \log 4 + 4^{\cos x} * -\sin x * \log 4 = 0$$

$$4^{\sin x} * \cos x = 4^{\cos x} * \sin x$$

$$4^{\sin x - \cos x} = \tan x$$

Question 36

The value of

$$\sum_{n=0}^{\infty} \frac{n^0 + n^1 + \dots + n^{C_n}}{n^{P_n}}$$

is

A $2e - 1$

B $e^2 - 1$

C $e^2 + 1$

D e^2

Answer: E

Question 37

Suppose

$$f(x) = \begin{vmatrix} \cos x & x & 1 \\ 2 \sin x & x^2 & 2x \\ \tan x & x & 2 \end{vmatrix}$$

, $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$. Then $\lim_{x \rightarrow 0} \frac{f(x)}{x^2}$

A is equal to 2

B is equal to -2

C is equal to 0

D does not exist

Answer: C

Explanation:

$$f(x) = \cos x(x^2 * 2 - x * 2x) - x(2 \sin x * 2 - 2x * \tan x) + 1(2 \sin x * x - \tan x * x^2)$$
$$= x^2 \tan x$$

$$\lim_{x \rightarrow 0} \frac{f(x)}{x^2} = \lim_{x \rightarrow 0} \frac{x^2 \tan x}{x^2}$$

$$= \lim_{x \rightarrow 0} \tan x$$

$$= 0$$

C is the correct answer.

Question 38

$$\text{Let } P = \begin{bmatrix} 2 & \alpha & 3 \\ -\alpha & 2 & 0 \\ 3 & -2 & \alpha \end{bmatrix}$$

, where α is a real number such that $\det(P) = \text{cofactor of second diagonal element of } P$. Then $\det(\text{adj}(P^{-1}))$ equals

A 49

B $\frac{1}{49}$

C $-\frac{1}{7}$

D -7

Answer: E

Question 39

Let

$$f(x) = \lim_{n \rightarrow \infty} \frac{x}{n} \left(\frac{1}{1+e^{-\frac{x}{n}}} + \frac{1}{1+e^{-\frac{2x}{n}}} + \dots + \frac{1}{1+e^{-x}} \right), x > 0. \text{ Then } \lim_{x \rightarrow 0} \left(\frac{2f(x)-x}{x^2} \right) \text{ is}$$

- A 0
- B $\frac{1}{8}$
- C $\frac{1}{4}$
- D $\frac{1}{2}$

Answer: E

Question 40

The curve $y = \sqrt[3]{x}$, $x \geq 0$; the x -axis; the lines $x - 1 = 0$ and $x - 4 = 0$ form a closed region R in the first quadrant. A straight line $y = mx$ divides the region R into two parts of equal area. Then the value of m is

- A $\frac{1}{3}$
- B $\frac{2}{5}$
- C $\frac{6}{17}$
- D $\frac{7}{15}$

Answer: E

Question 41

If $[a]$ denotes the greatest integer less than or equal to a for $a \in R$, then the value of the integral

$$\int_0^{1.7} [x^2] dx$$

is equal to

- A $2.4 + \sqrt{2}$
- B $2.4 - \sqrt{2}$
- C $2.4 + \frac{1}{\sqrt{2}}$
- D $2.4 - \frac{1}{\sqrt{2}}$

Answer: E

Question 42

Which of the following functions is differentiable at $x = 0$?

- A $e^{-|x|} - |x|$
- B $e^{|x|} + |x|$
- C $|x| - e^{|x|}$
- D $|x| - e^{-|x|}$

Answer: E

Question 43

Let the function f be given by $f(x) = \begin{cases} x + x^2 \sin\left(\frac{\pi}{x}\right); & x \neq 0 \\ 0; & x = 0 \end{cases}$

then $(f'(1) - f'(0))$ is

- A 0
- B 1
- C π
- D $-\pi$

Answer: E

Question 44

Let the function f be given by

$$f(x) = \begin{cases} -(x-1)^4; & x \leq 2 \\ (x-3)^3; & x > 2 \end{cases}$$

Then local extrema of f exist at

- A $x = 1$ and $x = 3$
- B $x = 1$ and $x = 2$
- C $x = 2$ and $x = 3$
- D $x = 1, x = 2$ and $x = 3$

Answer: E

Question 45

The points in the xy -plane, which satisfy the equation

$$\sqrt{(x-1)^2 + (y+2)^2} = \sqrt{(x+3)^2 + (y-2)^2}$$

- A a straight line
- B a circle
- C a parabola
- D an ellipse

Answer: E

Question 46

Two pairs of straight lines $x^2 - 7x + 6 = 0$ and $y^2 - 14y + 40 = 0$ intersect to form a rectangle. Let the diagonals of the rectangle intersect at the point W . A circle with center W and with tangents as lines $y^2 - 14y + 40 = 0$ intersects lines $x^2 - 7x + 6 = 0$ at points P, Q, R, S . The area of the rectangle PQRS is

- A $11\sqrt{15}$

B $5\sqrt{11}$

C $7\sqrt{11}$

D $3\sqrt{5}$

Answer: E

Question 47

Normals to the parabola $y^2 = 4x$ are drawn at two points P and Q on it. These normals intersect the parabola at the point R (9, -6). Then PQ equals

A $\sqrt{13}$

B $\sqrt{15}$

C $\sqrt{17}$

D $\sqrt{21}$

Answer: E

Question 48

If $f : R \rightarrow R$ be a continuous function satisfying $f(x) + f(3-x) = 4$, then $\int_0^3 f(x)dx$ is equal to

A 3

B 4

C 6

D 8

Answer: D

Explanation:

$$\int_0^3 f(x)dx$$

$$= f(0) + f(1) + f(2) + f(3) \quad (\text{Since } f(x) + f(3-x) = 4)$$

$$f(0) + f(3) = 4, f(1) + f(2) = 4$$

$$f(0) + f(1) + f(2) + f(3) = 4 + 4 = 8$$

Question 49

Let PQRS be a cycle quadrilateral. Let O be the centre of the circumcircle of the quadrilateral. Then which of the following statements is NOT true?

A $\angle PRQ = \angle POQ$

B $\angle POQ = 2\angle PSQ$

C $\angle OPS = \angle OSP$

D $\angle PRQ = \angle PSQ$

Answer: E

Question 50

Let P and Q be two distinct nonempty sets. Then $(P \cup Q)^c \cup (P^c \cap Q)$ equals

- A P^c
- B Q^c
- C $P^c \cup Q^c$
- D ϕ

Answer: A