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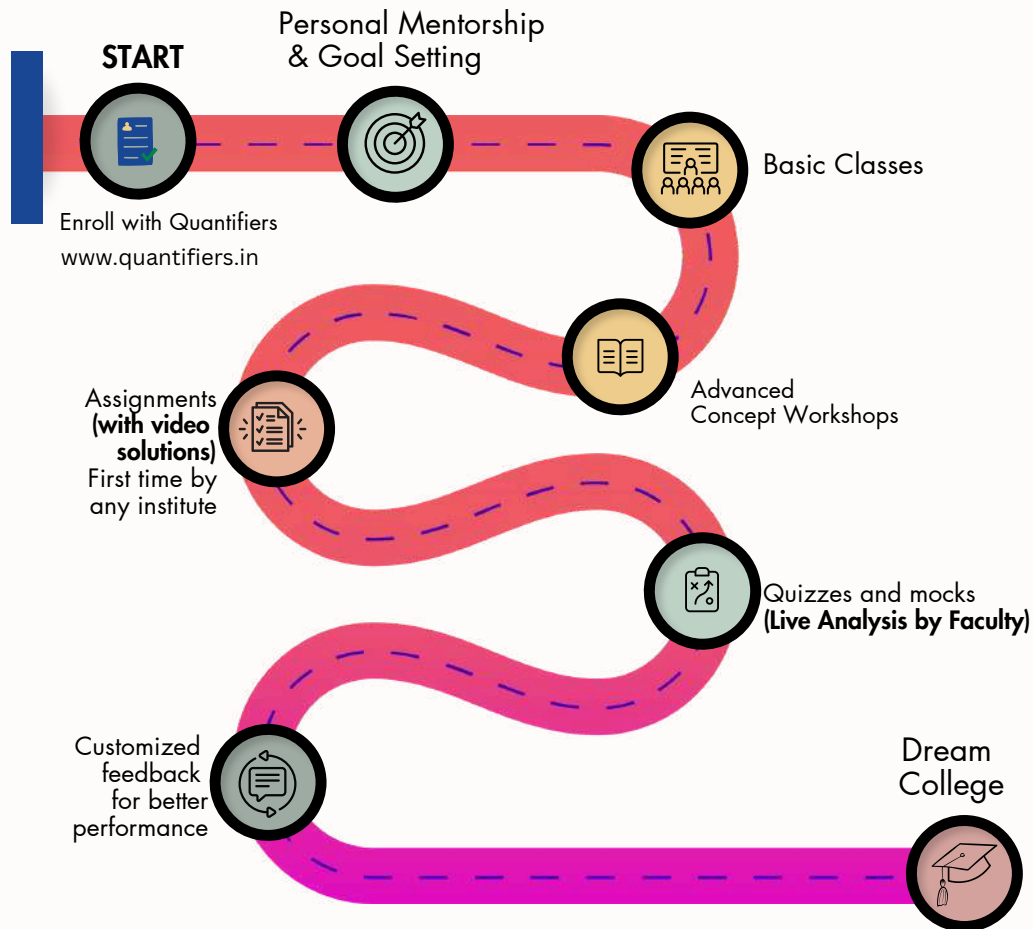
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CAT 2010 VARC

DIRECTIONS (Q.1-3) : Analyse the passage given and provide an appropriate answer for questions.

Much as an electrical lamp transforms electrical energy into heat and light, the visual ‘apparatus’ of a human being acts as a transformer of light into sight. Light projected from a source or reflected by an object enters the cornea and lens of the eyeball. The energy is transmitted to the retina of the eye whose rods and cones are activated. The stimuli are transferred by nerve cells to the optic nerve and then to the brain, man is a binocular animal, and the impressions from his two eyes are translated into sight—a rapid, compound analysis of the shape, form, colour, size, position, and motion of the things he sees. Photometry is the science of measuring light. The illuminating engineer and designer employ photometric data constantly in their work. In all fields of application of light and lighting, they predicate their choice of equipment, lamps, wall finishes, colours of light and backgrounds, and other factors affecting the luminous and environmental pattern to be secured, in great part from data supplied originally by photometric laboratory. Today extensive tables and charts of photometric data are used widely, constituting the basis for many details of design. Although the lighting designer may not be called upon to the detailed work of making measurements or plotting data in the form of photometric curves and analyzing them, an understanding of the terms used and their derivation form valuable background knowledge. The perception of colour is a complex visual sensation, intimately related to light. The apparent colour of an object depends primarily upon four factors: its ability to reflect various colours of light, the nature of the light by which it is seen, the colour of its surroundings, and the characteristics and state of adaptation of the eye. In most discussions of colour, a distinction is made between white and coloured objects. White is the colour name most usually applied to a material that diffusely transmits a high percentage of all the hues of light. Colours that have no hue are termed neutral or achromatic colours. They include white, off-white, all shades of gray, down to black. All coloured objects selectively absorb certain wavelengths of light and reflect or transmit others in varying degrees. Inorganic materials, chiefly metals such as copper and brass, reflect light from their surfaces. Hence, we have the term “surface” or “metallic” colours, as contrasted with “body” or “pigment” colours. In the former, the light reflected from the surface is often tinted. Most paints, on the other hand, have body or pigment colours. In these, light is reflected from the surface without much colour change, but the body material absorbs some colours and reflects others; hence, the diffuse reflection from the body of the material is coloured but often appears to be overlaid and diluted with a “white” reflection from the glossy surface of the paint film. In paints and enamels, the pigment particles, which are usually opaque, are suspended in a vehicle such as oil or plastic. The particles of a dye, on the other hand, are considerably finer and may be described as colouring matter in solution. The dye particles are more often transparent or translucent.

1. According to the passage, lighting engineers need not

- (a) Plot photometric curves
- (b) Utilize photometric data
- (c) Understand Photometric techniques
- (d) Have mathematical expertise

2. The colour black is an example of

- (a) A surface colour
- (b) An achromatic colour

- (c) An organic colour
- (d) A diffuse colour

3. Paint is an example of a substance containing

- (a) Inorganic material
- (b) Body colours
- (c) Surface colours
- (d) Metallic colours

DIRECTIONS (Qs.4-6): Analyse the passage given and provide an appropriate answer for questions.

Deborah Mayo is a philosopher of science who has attempted to capture the implications of the new experimentalism in a philosophically rigorous way. Mayo focuses on the detailed way in which claims are validated by experiment, and is concerned with identifying just what claims are borne out and how. A key idea underlying her treatment is that a claim can only be said to be supported by experiment if the various ways in which the claim could be at fault have been investigated and eliminated. A claim can only be said to be borne out by experiment, and a severe test of a claim, as usefully construed by Mayo, must be such that the claim would be unlikely to pass it if it were false.

Her idea can be explained by some simple examples. Suppose Snell's law of refraction of light is tested by some very rough experiments in which very large margins of error are attributed to the measurements of angles of incidence and refraction, and suppose that the results are shown to be compatible with the law within those margins of error. Has the law been supported by experiments that have severely tested it? From Mayo's perspective the answer is "no", because, owing to the roughness of the measurements, the law of refraction would be quite likely to pass this test even if it were false and some other law differing not too much from Snell's law true. An exercise I carried out in my school-teaching days serves to drive this point home. My students had conducted some not very careful experiments to test Snell's law. I there presented them with some alternative laws of refraction that had been suggested in antiquity and mediaeval times, prior to the discovery of Snell's law, and invited the students to test them with the measurements they had used, to test Snell's law; because of the wide margins of error they had attributed to their measurements, all of these alternative laws pass the test. This clearly brings out the point that the experiments in question did not constitute a severe test of Snell's law. The law would have passed the test even if it were false and one of the historical alternatives true.

4. Which of the following conclusion can be drawn from the passage?

- (a) Precise measurement is a sufficient condition to ensure validity of conclusions resulting from an experiment.
- (b) Experimental data might support multiple theoretical explanations same time, hence validity of theories needs to be tested further.
- (c) Precise measurement is both a necessary and sufficient condition to ensure validity of conclusions resulting from an experiment.
- (d) Precise measurement along with experimenter's knowledge of the theory underpinning the experiment is sufficient to ensure the validity of conclusions drawn from experiments.

5. As per Mayo's perspective, which of the following best defines the phrase "scientific explanation"?

- (a) One which is most detailed in its explanation of natural phenomena.

- (b) One which survives examinations better than other explanations.
- (c) One which has been thoroughly tested by scientific experts.
- (d) One which refutes other explanations convincingly,

6. The author's use of Snell's law of refraction to illustrate Mayo's perspective can best said to be

- (a) Contrived
- (b) Premediated
- (c) Superfluous
- (d) Illustrative

DIRECTIONS (Q 7-9) : Analyse the passage given and provide an appropriate answer for questions.

An expert group has sounded a timely warning on what 'environmentally destructive tourism' will mean to national parks and wildlife sanctuaries and the objectives they are supposed to serve. Given the unique and rare wildlife the country has been endowed with, the rationale for using the resources for attracting tourists from abroad is unassailable. This necessarily postulates that the flora and the fauna should be protected and conserved. As a matter of fact, much of the government's interest in wildlife preservation has to do with the tremendous prospect of tourist traffic on that account. Yet the risk of the revenue-earning motivation overrunning the conservation imperatives is very real, the lure of the coveted foreign exchange that goes with this business only, is serving to enhancing it several folds. Even with the tourist inflow far below the potential, the pressure of visitors is said to have been already felt on the tiger reserves. With the Government of India's declared intent to boost tourism quite justified for its own reasons, the need for eliminating the risk assumes a greater sense of urgency. The study team has noted that most of the 41 national parks and 165 wildlife sanctuaries surveyed are open to the tourists. The less frequented among them may not require special attention immediately in this respect as much as the ones that are major tourists attraction do. These include the Sanjay Gandhi National Park in Maharashtra, Nandankanan in Orissa and Bannerghatta in Kamataka. Over a year ago, the Indian Board for Wildlife expressed concern over the looming danger, and decided that the core areas of national parks and sanctuaries should be kept totally free from biotic disturbances, and the vistor be permitted to view the wildlife only from the areas marked out for the purpose. And now, the expert group has come up with the suggestion that a case by case evaluation be done of the "capacity" as well as the 'limitations' of all the national parks and wildlife sanctuaries and based on such assessment an area-specific plan for tourist promotion within the "safety" norms be charted. That this is the most scientific way of going about the job, and that there is no time to lose can be readily conceded.

7. Biotic disturbances in the context means

- (a) Attacks from other living things, animals, etc.
- (b) The disturbances caused by the natives on seeing the strange foreigners.
- (c) The political disturbances causing the closedown of the parks.
- (d) Disturbances caused by the wild animals on seeing the tourists.

8. By using the expression "environmentally destructive tourism" the author means

- (a) The preservation of the wild beasts.
- (b) Destruction of the wildlife and sanctuaries.
- (c) Destroying the attractive sources of wild animals and birds.

(d) The maintenance of the flora and fauna of the country.

9. To implement the most scientific ways of tourism, we should

- (a) Get industries and talented persons trained in the field.
- (b) Form a commission and plan out how to implement the suggestions.
- (c) Send a group of scientists abroad to learn more about tourism.
- (d) Spend as much finance as possible to better the suggestions made.

DIRECTIONS (Q. 10-11): Select the most appropriate word(s) from the given choice to fill in the blank(s).

10. Justice Minister Bola Ige, confronted with the general incivility of local police, placed a _____ on the cops. Said the Hon. Bola Ige, "I pray that God will make big holes in their pockets."

- (a) malediction
- (b) sanction
- (c) proscription
- (d) plea

11. During the heated discussion, the leader of the group _____ refuted all the claims brought by his opponents. Later everybody acknowledged that he survived by most _____ luck.

- (a) ingeniously, incredible
- (b) ingeniously, incredulous
- (c) ingenuously, incredible
- (d) ingenuously, incredulous

12. Choose the option that points out sentences) with grammatical error(s).

I. I love the man dancing on the table.

II. I love the man's dancing on the table.

III. In 1986 Elie Wiesel was named the Nobel Peace Prize recipient, an honour established by Alfred Nobel.

IV. Neither of the recommendations works as well as we thought they would.

V. Either the Minister or the Minister's wife will have to excuse themselves from the reception to speak to the caterer

- (a) III and V
- (b) I and IV
- (c) II and V
- (d) III and IV

DIRECTIONS (Q.13-14): For the word given at the top of each table, match the dictionary definitions on the left (A, B, C, D) with their corresponding usage on the right (E, F, G, H). Out of the four possibilities given in the boxes below the table, select the one that has all the definitions and their usages correctly matched.

13. **Infer**

Dictionary definition	Usage
A. To derive by reasoning or implication	E. We see smoke and infer fire
B. To surmise	F. Given some utterances a listener may infer from it all sorts of things which neither the utterance nor the utterer implied

C. To point out	G. I waited all day to meet him. From this you can infer my zeal to see him.
D. To hint	H. She did not take part in the debate except to ask a question inferring that she was not interested in the debate.

- (a) A-G; B-E; C-H; D-F
 (b) A-F; B-H; C-E; D-G
 (c) A-H; B-G; C-F; D-E
 (d) A-E; B-F; C-G; D-H

14. Catch

Dictionary definition	Usage
A. Capture	E. All her friends agreed that Prasad was a good catch.
B. Grasp with senses or mind	F. The proposal sounds very good but where is the catch.
C. Deception	G. Hussain tries to catch the spirit of India in this painting.
D. Thing or person with worth trapping	H. Sorry, I couldn't catch you.

- (a) A-H; B-F; C-E; D-G
 (b) A-F; B-G; C-E; D-H
 (c) A-G; B-F; C-E; D-H
 (d) A-G; B-H; C-F; D-E

DIRECTIONS (Qs. 15-16) : Please choose the correct alternative that can go into the sentence in the blank space to make a coherent sentence:

15. The _____ of the country should take a greater interest in promoting the indigenous works that are rooted in the deep traditions of scholarship across the world.

- (a) LITERATI (b) LITERATE
 (c) LITERATURE (d) LITERAL

16. _____ of different categories of problems often leads to design of improper solutions that fail to address the complexities of the problem.

- (a) CONFABULATION (b) CONFLATION
 (c) CONFLICT (d) CONFESSION

DIRECTIONS (Qs. 17-18) : Mark the correct option, which puts the parts of the sentence in right order :

17. I. But she gained courage as she went on
 II. She was a little nervous about it just at first
 III. and opened their eyes and mouths so very wide
 IV. the two creatures got so close to her, one on each side.

- (a) IV,III,II,I (b) II,IV,III,I
 (c) I,III,II,IV (d) None of the above

18. I. It would perhaps be possible for him to be of some use to this brave girl
 II. he said to himself, vaguely at first, that
 III. without neglecting anything of what was due to his important mission.
 IV. and this idea pleased him

(a) II,III,I,IV (b) III,II,I,IV
 (c) I,III,II,IV (d) None of the above

DIRECTIONS (Qs 19-20) : Below are the words followed by prepositions. Find out which set(s) is/are incorrect.

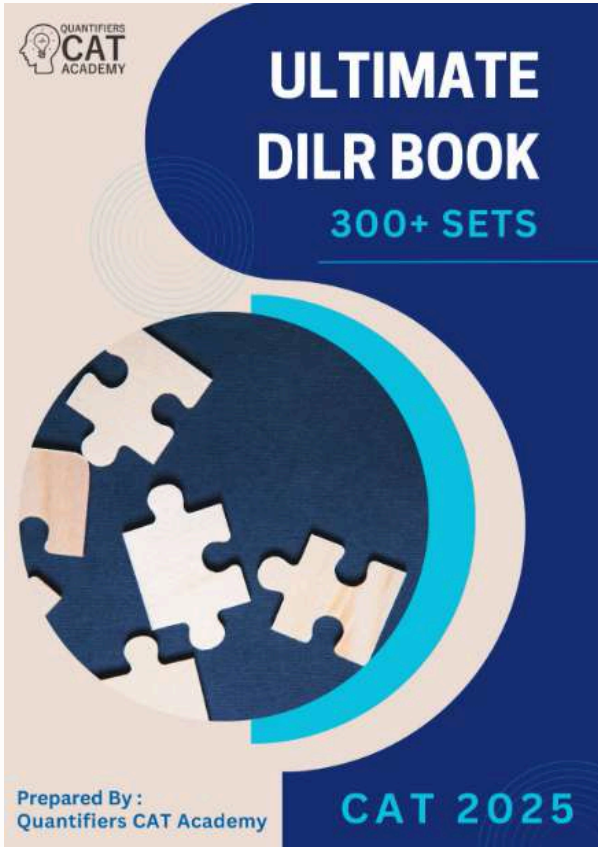
19. I. Indict to II. Intrigue on III. Endow with IV. Trample on

(a) I and IV (b) I and III
 (c) I, III and IV (d) None of the above

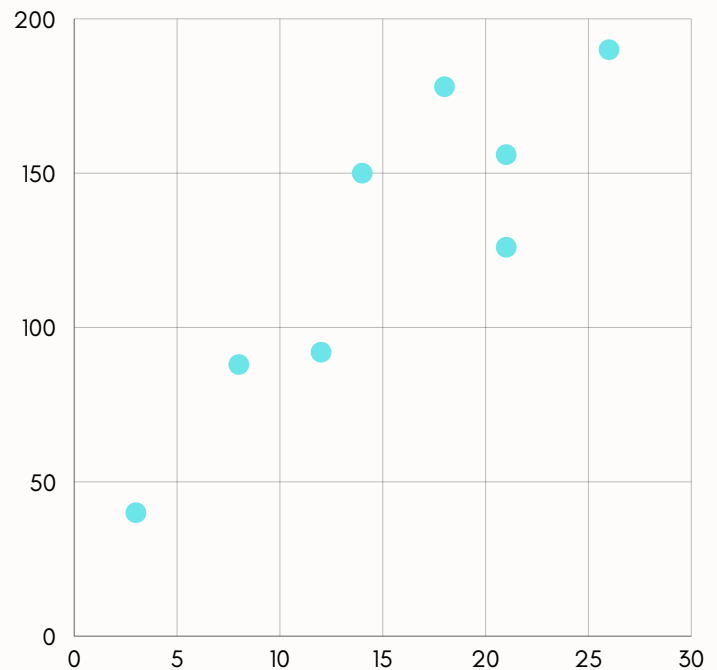
20. I. Trace to II. Sparing of III. Replete with IV. Wonder at

(a) I and III (b) I, II and III
 (c) II, III and IV (d) None of the above





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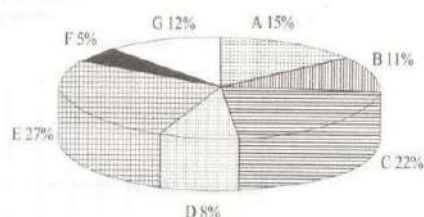
DIRECTIONS (Qs. 1-5) : The data given below pertains to seven different industry sector with respect to income, expenditure, Profits.

Particulars	chemical	Diversified	Electricity	Food	Machinery	Services	Textiles
1 Sales	498,476	128,125		82,808			56,401
2 Other Income	7,303		2,374		2,887	6,097	1,705
3 Total Income=(1+2)		130,830			128,733		58,106
4 Raw material cost	338,683	78,237	31,060	48,188	54,994	81,600	33,738
5 Power & fuel expenses	18,467		4,865	2,003	1,973		
6 Salaries and wages	13,791	4,412		4,284	20,038	44,371	4,361
7 Depreciation	11,065	4,807	6,311		5,026	22,854	3,013
8 Interest payments	11,135	2,923	5,756			133,619	5,259
9 Other expenses		24,706	5,604	23,570	34,271	97,092	10,368
10 Total expenses =(4+5+6+7+8+9)		119,316	58,769	80,750	120,557	385,694	
11 Profit before tax =(3-10)		11,514		3,814	8,176	50,484	
12 Tax paid	7,467		2,394				0
13 Profit after tax =(11-12)	19,861	8,887	8,501	2,538	5,001	32,698	-2,874

- Which of the following statements is wrong?
 - Depreciation expense is the lowest for food industry
 - Power and fuel expenses are 5th largest item in the expenditure of diversified industries.
 - Electricity industry earns more of other income as a percentage of total income compared to other industries.
 - Raw material cost is the largest item of expense in all industry sectors
- Depreciation as a percentage of total expenses is maximum in which industry sector?
 - Chemical
 - Diversified
 - Electricity
 - Machinery
- Which industry sector has 'salaries and wages' as 3rd largest tem in its expenses?
 - Food
 - Services
 - Textiles & Food
 - Food & Machinery
- If the industry sectors are ranked on the basis of "Tax paid as a proportion of sales" in the ascending order, then which industry will be placed at rank 3?
 - Machinery
 - Electricity
 - Food
 - Diversified
- If the ranking is based on Profit Before Tax in the descending order, subject to the condition that "other expenses" of all the industry sectors equals zero, then which of following statements is wrong?
 - Rank of Chemical industry does not change
 - Rank of electricity industry declines
 - Diversified industry rank changes from 3rd to 4th
 - Rank of food industry changes from 5th to 6th

DIRECTIONS (Qs. 6-10): Seven companies A, B, C, D, E, F and G are engaged in production of two items I and II. The comparative data about production of these items by the seven companies is given in the following Graph and Table. Study them carefully to answer the questions that follow.

PERCENTAGE OF THE TOTAL PRODUCTION PRODUCED BY THE SEVEN COMPANIES



Cost of the total production (both items together) by seven companies = ₹ 25 crores

RATIO OF PRODUCTION BETWEEN ITEMS I AND II AND THE PERCENT PROFIT EARNED FOR THE TWO ITEMS

Company	Ratio of Production		Percent Profit Earned	
	Item I	Item II	Item I	Item II
A	2	3	25	20
B	3	2	32	35
C	4	1	20	22
D	3	5	15	25
E	5	3	28	30
F	1	4	35	25
G	1	2	30	24

6. Cost of production of item I by company F is what percent of the cost of production of item II by company D?

- (a) 16% (b) 33.33%
(c) 66.67% (d) None of these

7. What is the total profit earned by company G for items I and II together?

- (a) ₹ 78 lakh (b) ₹ 1.62 crore
(c) ₹ 7.8 crore (d) ₹ 16.2 lakh

8. What is the ratio of the cost of production of item I by company A to the cost of production of item I by company D?

- (a) 3:5 (b) 1:2
(c) 2:1 (d) 2:3

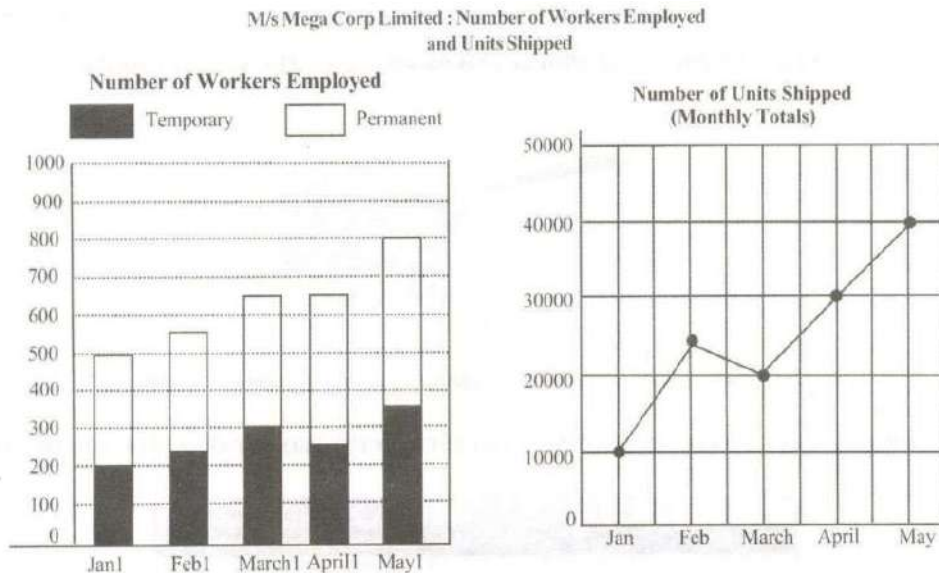
9. The cost of production of both items together by company E is equal to the total cost of production of both items together by which of the two companies?

- (a) C and D (b) B and G
(c) A and D (d) C and F

10. What is the total of the cost of production of item I by company A and the cost of production of item II by company B?

- (a) ₹ 2.6 crore (b) ₹ 26 lakh
(c) ₹ 3.35 crore (d) ₹ 33.65 lakh

DIRECTIONS (Qs. 11 - 14): Study the following bar graph and line graph giving details of 'Number of Workers Employed' and "Number of Units Shipped" respectively of M/s Mega Corp Limited to answer these questions.



11. By what per cent did the number of temporary workers employed by M/s Mega Corp Limited increase from April 1 to May 1?
 (a) 40% (b) 25%
 (c) 20% (d) 12%
12. What was the difference, if any, between the number of permanent workers employed by M/s Mega Corp Limited on March 1 and the number of permanent workers employed on April 1?
 (a) 0 (b) 50
 (c) 100 (d) 150
13. What was the total number of units shipped by M/s Mega Corp Limited for the months of January, February and March (approximately)?
 (a) 40,000 (b) 55,000
 (c) 60,000 (d) 70,000
14. If on May 1, 60% of the permanent workers and 40% of the temporary workers employed by M/s Mega Corp Limited were women, how many of the workers employed by M/s Mega Corp Limited at that time were women?
 (a) 200 (b) 120
 (c) 410 (d) 260

DIRECTIONS (Qs. 15-16) : These questions are based on the following information.

IT School of Management is a management institute involved in teaching training and research. Currently it has 37 faculty members. They are involved in three jobs: teaching, training and

research. Each faculty member working with IT School of Management has to be involved in at least one of the three jobs mentioned above:

- A maximum number of faculty members are involved in training. Among them, a number of faculty members are having additional involvement in the research.
- The number of faculty members in research alone is double the number of faculty members involved in all the three jobs.
- 17 faculty members are involved in teaching. The number of faculty members involved in teaching alone is less than the number of faculty members involved in research alone.
- Ten faculty members involved in the teaching are also involved in at least one more job.

15. After sometime, the faculty members who were involved in all the three tasks were asked to withdraw from one task. As a result, one of the faculty members each opted out of teaching and research, while remaining ones involved in all the three tasks opted out of training. Which one of the following statements, then necessarily follows:

- (a) The least number of faculty members is now involved in teaching.
- (b) More faculty members are now associated with training as compared to research.
- (c) More faculty members are now involved in teaching as compared to research.
- (d) None of the above

16. Based on the information given above, the minimum number of faculty members involved in both training and teaching, but not in research is:

- (a) 1
- (b) 3
- (c) 4
- (d) 5

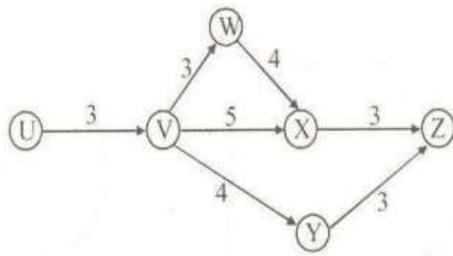
17. Read the following directions carefully and answer the question. You should tick

- (a) If any one of the statements alone is sufficient to answer the question
- (b) If both statements individually are sufficient to answer the question
- (c) If both statements together are required to answer the question
- (d) If both statements are not sufficient to answer the question

There are four racks numbered 1,2,3,4 and four books numbered 1,2,3,4. If an even rack has to contain an odd numbered book and an odd rack contains an even numbered book then what is the position of book 4?

- (I) Second book has been put in third rack
- (II) Third book has been put in second rack

Directions (Qs. 18-19) : The following network gives details about the various activities carried out in a bottling firm for their latest project and the time required for each activity. The average cost incurred in each activity is 5 times the square of the duration of the activity. If the organisation wants to reduce the duration of any particular activity, in addition to the average cost it will have to incur an amount equal to 15 times the cube of the new duration of the activity.



18. The completion of one cycle of the network results in one bottle ready to be sold in the market. The project involves a total of 800 bottles. What is the average cost of the entire project?

- (a) Rs.74400 (b) Rs.372000
(c) Rs.15000 (d) Rs.18500

19. If profit is defined as the difference between the selling price and the average cost, and each bottle is sold for Rs. 510, what is the approximate percent profit earned by the firm?

- (a) 5% (b) 10%
(c) 15% (d) 175%

20. Among Anil, Bibek, Charu, Debu and Eswar, Eswar is taller than Debu but not as fat as Debu. Charu is taller than Anil but shorter than Bibek. Anil is fatter than Debu but not as fat as Bibek. Eswar is thinner than Charu, who is thinner than Debu. Eswar is shorter than Anil. Who is the thinnest person?

- (a) Bibek (b) Charu
(c) Debu (d) Eswar

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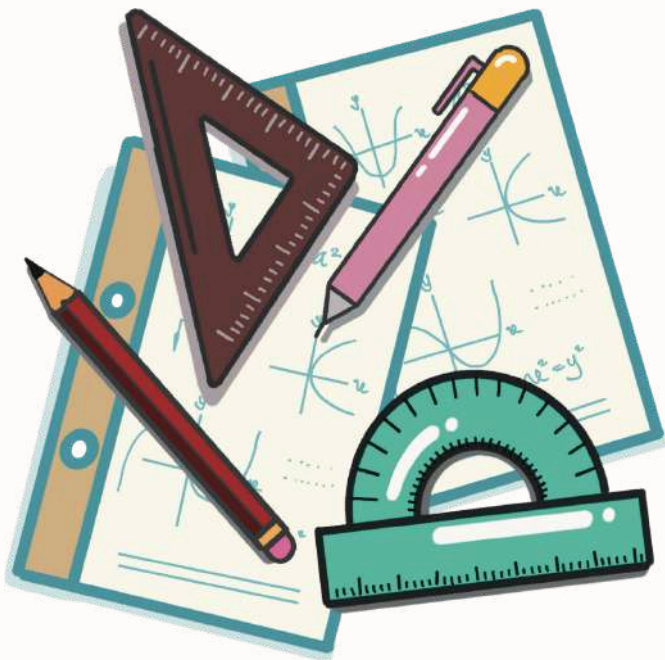
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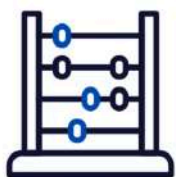
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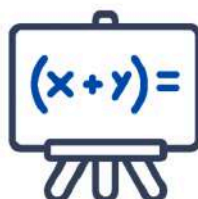
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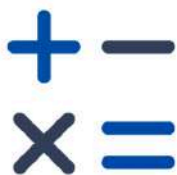


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CAT 2010 (Memory Based Paper)

Quant

1. If r, s and t are consecutive odd integers with $r < s < t$, which of the following must be true?

- (a) $rs = t$ (b) $r+1 = 2t-s$
(c) $r+s = t-2$ (d) $r+1 = 2s$

2. Let S be the set of rational numbers with the following properties:

I. $\frac{1}{2} \in S$;

II. If $x \in S$, then both $\frac{1}{x+1} \in S$ and $\frac{x}{x+1} \in S$

Which of the following is true?

- (a) S contains all rational numbers in the interval $0 < x < 1$.
(b) S contains all rational numbers in the interval $-1 < x < 1$.
(c) S contains all rational numbers in the interval $-1 < x < 0$.
(d) S contains all rational numbers in the interval $|x| < \infty$.

3. P, Q and R are three consecutive odd numbers in ascending order. If the value of three times P is three less than two times R , find the value of R .

- (a) 5 (b) 7
(c) 9 (d) 11

4. Consider the following statements :

When two straight lines intersect, then :

- (I) adjacent angles are complementary
(II) adjacent angles are supplementary
(III) opposite angles are equal
(IV) opposite angles are supplementary

Of these statements:

- (a) (I) and (III) are correct
(b) (II) and (III) are correct
(c) (I) and (IV) are correct
(d) (II) and (IV) are correct

5. A pole has to be erected on the boundary of a circular park of diameter 13 metres in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. The distance of the pole from one of the gates is:

- (a) 8 metres (b) 8.25 metres
(c) 5 metres (d) None these

6. From a square piece of card-board measuring $2a$ on each side of a box with no top is to be formed by cutting out from each corner a square with sides b and bending up the flaps. The value of b for which the box has the greatest volume is

- (a) $b = \frac{a}{5}$ (b) $b = \frac{a}{4}$
(c) $b = \frac{2a}{3}$ (d) $b = \frac{a}{2}$

7. The sum of the areas of two circles which touch each other externally is 153π . If the sum of their radii is 15, find the ratio of the larger to the smaller radius

- (a) 4 (b) 2
(c) 3 (d) None of these

8. Consider the following statements:

- I. If $a^x = b$, $b^y = c$, $c^z = a$, then $xyz = 1$
II. If $p = a^x$, $q = a^y$, $(p^y q^y)^z = a^2$, then $xyz = 1$
III. If $a^b = y^b = z^c$ and $ab + bc + ca = 0$ then $xyz = 1$

Of these statements:

- (a) I and II are correct
(b) II and III are correct
(c) Only I is correct
(d) All I, II and III are correct

9. If a , b and c are three real numbers, then which of the following is not true?

- (a) $|a+b| \leq |a|+|b|$
(b) $|a-b| \leq |a|+|b|$
(c) $|a-b| \leq |a|-|b|$
(d) $|a-c| \leq |a-b|+|b-c|$

10. Let S denote the infinite sum

$2 + 5x + 9x^2 + 14x^3 + 20x^4 + \dots$, where $|x| < 1$ and the coefficient of x^{n-1} is $\frac{1}{2}n(n+3)$, ($n=1,2,\dots$)

. Then S equals

- (a) $\frac{2-x}{(1-x)^3}$ (b) $\frac{2-x}{(1+x)^3}$
(c) $\frac{2-x}{(1-x)^3}$ (d) $\frac{2-x}{(1-x)^3}$

11. ABCD is a rectangle. The points P and Q lie on AD and AB respectively. If the triangles PAQ, QBC and PCD all have the same areas and $BQ=2$, then $AQ =$

- (a) $1+\sqrt{5}$ (b) $1-\sqrt{5}$
(c) $\sqrt{7}$ (d) $2\sqrt{7}$

12. For which value of k does the following pair of equations yield a unique solution for x such that the solution is positive?

$$x^2 - y^2 = 0$$

$$(x-k)^2 + y^2 = 1$$

- (a) 2 (b) 0
(c) $\sqrt{2}$ (d) $-\sqrt{2}$

13. In an examination, the average marks obtained by students who passed was $x\%$, while the average of those who failed was $y\%$. The average marks of all students taking the exam was $z\%$. Find in terms of x , y and z , the percentage of students taking the exam who failed.

- (a) $(z-x)/(y-x)$ (b) $(x-z)/(y-z)$
(c) $(y-x)/(z-y)$ (d) $(y-z)/(x-z)$

14. If $a = b^2 = c^3 = d^4$ then the value of $\log_a(abcd)$ would be :

- (a) $\log_a 1 + \log_a 2 + \log_a 3 + \log_a 4$ (b) $\log_a 24$

(c) $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$

(d) $1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!}$

15. If three positive real numbers a , b and $(c > a)$ are in Harmonic Progression, then $\log(a+c) + \log(a-2b+c)$ is equal to:

(a) $2\log(c-b)$

(b) $2\log(a-c)$

(c) $2\log(c-a)$

(d) $\log a + \log b + \log c$

16. Let f be an injective map with domain $\{x, y, z\}$ and range $\{1, 2, 3\}$ such that exactly one of the following statements is correct and the remaining are false. $f(x) = 1, f(y) \neq 1, f(z) \neq 2$. The value of $f^{-1}(1)$ is

(a) x

(b) y

(c) z

(d) None of the above

17. For constructing the working class consumer price index number of a particular town, the following weights corresponding to different group of items were assigned : Food-55, Fuel-15, Clothing -10, Rent -8 and Miscellaneous-12.

It is known that the rise in food prices is double that of fuel and the rise in miscellaneous group prices is double that of rent. In October 2006, the increased D.A. by a factory of that town by 182% fully compensated for the rise in prices of food and rent but did not compensate for anything else. Another factory of the same locality increased D.A. by 46.5%, which compensated for the rise in fuel and miscellaneous groups.

Which is the correct combination of the rise in prices of food, fuel, rent and miscellaneous groups?

(a) 320.14, 159.57, 95.64, 166.82

(b) 317.14, 158.57, 94.64, 189.28

(c) 311.14, 159.57, 90.64, 198.28

(d) 321.14, 162.57, 84.46, 175.38

18. In a factory making radioactive substances, it was considered that the three cubes of uranium together are hazardous. So the company authorities decided to have the stack of uranium interspersed with lead cubes. But there is a new worker in a company who does not know the rule. So he arranges the uranium stack the way he wanted. What is the number of hazardous combinations of uranium in a stack of 5?

(a) 3

(b) 7

(c) 8

(d) 10

DIRECTIONS (Q.19-20) : Each of the questions is followed by two statements I and II. Give answer

(a) if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

(b) if the question can be answered by either statement alone.

(c) if the question can be answered by using both statements together, but cannot be answered using either statement alone.

(d) if the question cannot be answered even by using both the statements together.

19. A line graph on a graph sheet shows the revenue for each year from 1990 through 1998 by points and joins the successive points by straight line segments. The point for revenue of 1990 is labeled A, that for 1991 as B, and that for 1992 as C. What is the ratio of growth in revenue between 1991-92 and 1990-91?

Statement I: The angle between AB and X-axis when measured with a protractor is 40 degrees, and the angle between CB and x-axis is 80 degrees.

Statement 11: The scale of y-axis is 1 cm = '1000.

20. Geetanjali Express, which is 250 metre long when moving from Howrah to Tatanagar crosses Subarnarekha bridge in 30 seconds. What is the speed of Geetanjali Express?

Statement I: Bombay Mail, which runs at 60 km/hour crosses the Subarnarekha bridge in 30 seconds.

Statement 11: Bombay Mail when running at 90 km/hour crosses a lamp post in 10 seconds.





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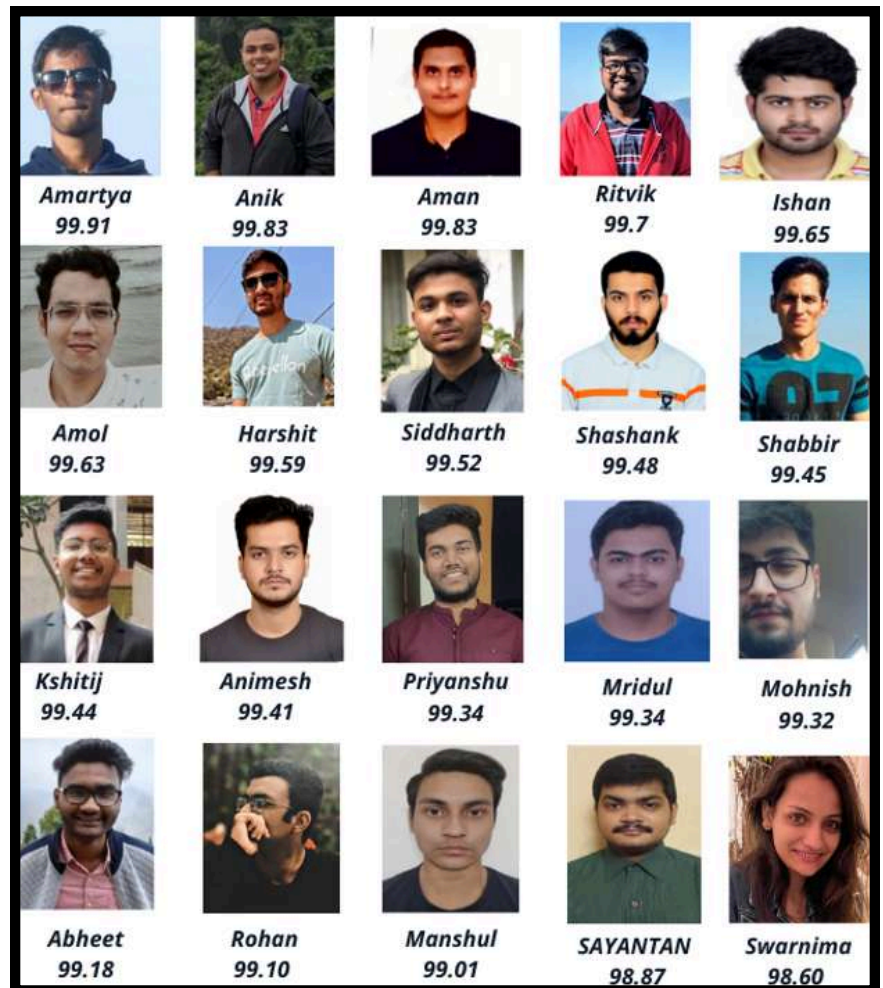


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SOLUTIONS

Quant

1. Correct Answer – D

Explanation: Let r, s, t be 1, 3, 5 respectively

Checking by options,

$r + 1 = 2s$ satisfies

2. Correct Answer – A

Explanation: From II, we can see that if we add $1/(x+1)$ and $x/(x+1)$ we get 1

\Rightarrow if we have 0.1, its corresponding

$1 - 0.1 = 0.9$ will also be there.

3. Correct Answer – C

Explanation: Let the numbers P, Q, R be $2n+1$, $2n+3$ and $2n+5$ respectively

$$3(2n+1) + 3 = 2(2n+5)$$

$$\Rightarrow 6n+6=4n+10$$

$$\Rightarrow 2M=4$$

$$\therefore R = 4+5 = 9$$

4. Correct Answer – B

Explanation: Supplementary angles mean sum is 180 degrees.

II & III are correct

5. Correct Answer – C

Explanation: Diameter = 13

The triangle formed inside the circle is a right angled triangle with Hyp = 13 and sides = a, a+7

Using Pythagoras, $a^2 + (a+7)^2 = 13^2$

$$\Rightarrow a^2 + 7a - 60 = 0$$

$$(a+12)(a-5) = 0$$

$$\Rightarrow a = 5$$

6. Correct Answer – C

Explanation: Height of box = b

Length, Breadth = $2(a - b)$ each

$$\text{Volume of box} = V = b \times 2(a-b) \times 2(a-b) = 4b(a-b)^2$$

For $b = 2a/3$, value of V is maximum

7. Correct Answer – A

Explanation: Let radius be r, $15-r$

$$\text{Sum of areas} = \pi r^2 + \pi(15-r)^2 = 153\pi$$

$$\Rightarrow 2r^2 - 30r + 225 = 153$$

$$\Rightarrow 2r^2 - 30r + 72 = 0$$

$$\Rightarrow r^2 - 15r + 36 = 0 \Rightarrow (r - 12)(r - 3) = 0$$

Ratios $12:3 = 4:1$

8. Correct Answer – D

Explanation: I — Take log both sides

$$\Rightarrow x \log a = \log b; y \log b = \log c; z \log c = \log a$$

On multiplying x, y, z we get $xyz = 1$
 Similarly take log for other 2 statements as well
 All are true

9. Correct Answer – C

Explanation: Option C is not true. The sign should be opposite (Standard properties)

10. Correct Answer – A

Explanation: Let $S = 2 + 5x + 9x^2 + \dots$

$$S \cdot x = 2x + 5x^2 + 9x^3 + \dots$$

Subtracting,

$$S(1-x) = 2 + 3x + 4x^2 + \dots$$

$$S(1-x) \cdot x = 2x + 3x^2 + 4x^3 + \dots$$

Subtracting above 2 eqns,

$$\Rightarrow S(1-x)(1-x) = 2 + x + x^2 + \dots = 2 + x/(1-x)$$

$$\Rightarrow 8 = (2-x)/(1-x)^3$$

11. Correct Answer – A

Explanation: Let $AB = CD = L$ & $AD = BC = B$

$$QB = 2, AQ = L - 2$$

$$\text{If } PD = K \text{ (let)} \Rightarrow PA = B - K$$

All the 3 triangles have equal areas

Using area formula and equating the areas of the 3

$$\Rightarrow (L-2)(B-K) = 2B = KL$$

$$\Rightarrow K = 2B/L$$

$$\text{Inequality } \Rightarrow (L-2)(B - 2B/L) = 2B$$

$$\Rightarrow (L-2)B(L-2)/L = 2B$$

$$\Rightarrow L^2 - 6L + 4 = 0$$

On solving for L, we get $L = 3 \pm \sqrt{5}$

$$AQ = AB - 2 = 1 + \sqrt{5}$$

12. Correct Answer – C

Explanation: From 1st eqn, $x^2 = y^2$

$$\text{Substitute in 2nd eqn } \Rightarrow 2x^2 - 2xk + (K^2 - 1) = 0$$

$D = 0$ for unique solution

$$D = 4k^2 - 4 \cdot 2(k^2 - 1) = 0$$

$$\Rightarrow k = \sqrt{2}$$

13. Correct Answer – A

Explanation: Shortcut: Let there be 2 students, 1 passed with marks = x , other failed with marks

$$= y \text{ And } z = (x+y)/2$$

50% students failed.

$$\text{Option A} = (z - x)/(y - x) = \{(x+y)/2 = x\}/(y - x) = 1/2 = 50\%$$

This satisfies.

14. Correct Answer – C

Explanation:

$$\text{Let } a = b^2 = c^3 = d^4 = k$$

$$\Rightarrow a = k; b = k^{1/2}; c = k^{1/3}; d = k^{1/4}$$

$$\log_a abcd = (1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}) \log_k k$$

15. Correct Answer – C

Explanation: Shortcut : 3, 4, 6 is a triplet in HP

$$\therefore \log(3+6) + \log(3-2.4+6) = \log 9 + \log 1 = \log 9 = 2 \log 3 = 2 \log (c - a)$$

16. Correct Answer – B

Explanation: If $f(x) = 1$ is true \Rightarrow remaining 2 are false

$$\therefore f(y) = 1$$

$f(x), f(y)$ both are $= 1 \therefore f$ is not injective

$$\text{If } f(y) \neq 1 \Rightarrow f(x) = 1$$

This makes 2 statements true

\therefore Not possible

$$\text{If } f(z) \neq 2 \Rightarrow f(x) \neq 1 \text{ \& } f(y) = 1$$

$$\therefore f(z) = 3, f(x) = 2$$

\Rightarrow Correct case

$$\therefore f^{-1}(1) = y$$

17. Correct Answer – B

Explanation: Rise in Food $= 2 \times$ (Rise in Food)

This condition is satisfied by option B only.

18. Correct Answer – C

Explanation: For a stack of 5 cubes to be hazardous, at least 3 U cubes have to be there.
3 cases.

Case 1: 3 U cubes, 2 Lead Cubes.

\Rightarrow Both Lead cubes on either left or right of 3 U cubes or 1 on left and 1 on right

3 Ways

Case 2: 4 U cubes, 1 Lead cube 4 ways

Case 3: 5 U cubes a 1 way

$$\text{Total ways} = 3+4+1 = 8$$

19. Correct Answer – A

Explanation: Growth = Change in value on y-axis/ Change in value on x-axis = Tangent of angle made by the line with x-axis

In statement 1, we know both angles. So, it is sufficient.

Statement 2 isn't sufficient.

20. Correct Answer – C

Explanation: We can find spd of Geetanjali Express (GE) if we know the length of the bridge.

From II we can find the speed of Bombay Mail as the horizontal length of post is negligible.

After this, from I we can find the length of bridge. Hence, spd of GE

VARC

1. Correct Answer – A

Explanation: Refer to the sentence ‘Although the lighting designer..... derivation from the valuable background knowledge’ So, he is not required to plot photometric curves.

2. Correct Answer – B

Explanation: Colours that have no hue are termed neutral or achromatic colours. They include white, off-white, all shades of gray, down to black.

3. Correct Answer – B

Explanation: Most paints have body or pigment colours.

4. Correct Answer – C

Explanation: The conclusion that can be drawn from the passage is - “Precise measurement is both a necessary and sufficient condition to ensure validity of conclusions resulting from an experiment”. The clue regarding this lies in the following lines of the passage — “because of the wide margins of error they had attributed to their measurements, all of these alternative laws pass the test”.

5. Correct Answer – B

Explanation: As per Mayo's perspective the phrase scientific explanation means one which survives examinations better than other explanations.

6. Correct Answer – D

Explanation: The author's use of Snell's law of refraction to illustrate Mayo's perspective can best said to be illustrative. The clue regarding this lies in the line — her idea can be explained by some simple example.

7. Correct Answer – D

Explanation: “Biotic disturbances’ in the context of the passage means the disturbances caused by the wild animals on seeing the tourists.

8. Correct Answer – C

Explanation: “Environmentally destructive tourism’ means the destruction of the attractive sources of birds and animals due to increasing inflow of tourists

9. Correct Answer – B

Explanation: As per the last paragraph of the passage, B is the most appropriate option

10. Correct Answer – A

Explanation: Inference can be made that the Justice is annoyed by the local cops and wishes that they suffer.

Plea means to request. Sanction means to place a penalty. Proscription means to prohibit. Malediction is a term used to indicate a curse. This is the best option.

11. Correct Answer – A

Explanation: Ingeniously means in a clever manner. Ingenuous means innocent. Incredulous means unwilling/unable to believe something.

12. Correct Answer – D

Explanation: In IV, the verb ‘works’ will be replaced by ‘work’ because the subject ‘recommendations’ is in the plural.

13. Correct Answer – D

Explanation: The result of the fire is derived by implication on seeing the smoke.

Surmise means to guess. So, there need not be any real connection between the statement and conclusion drawn. The girl not taking part in the debate hints at her lack of interest

14. Correct Answer – D

Explanation: ‘Good catch used in E is usage of D. Only one such matching option i.e, Option D.

15. Correct Answer – A

Explanation: Literati means well-educated people who are interested in literature. This fits well.

16. Correct Answer – B

Explanation: Conflation means the merging of two or more sets of information, texts, ideas, etc. into one. This fits perfectly into the context.

17. Correct Answer – B

Explanation: Clearly II is the opening sentence, followed by IV & III which tells why she was nervous. I ends the sentence.

18. Correct Answer – A

Explanation: II is the starting sentence, which is continued into III, followed by I and IV

19. Correct Answer – D

Explanation: Indict should be followed by ‘for’ & intrigue by ‘with/against’

20. Correct Answer – D

Explanation: All the correct

DILR

1. Correct Answer – D

Explanation: By simply observing Raw material cost compared to other expenses, we can conclude option D is correct.

2. Correct Answer – C

Explanation:

Fill in the missing data in the table with the help of the already given data.

Particular	Chemical	Diversified	Electricity	Food	Machinery	Service	Textiles
1 Sales	498,476	128,125	67290	82,808	125846	430081	56,401
2 Other Income	7,303	2705	2,374	1756	2,887	6,097	1,705
3 Total Income	505,779	130,830	69664	84564	128,733	436178	58,406
4 Raw material cost	338,683	78,237	31,060	48,188	54,994	81,600	33,738
5 Power & Fuel expenses	18,467	4231	4,865	2,003	1,973	6158	4241
6 Salaries and wages	13,791	4,412	5173	4,284	20,038	44,371	4,361
7 Depreciation	11,065	4,807	6,311	2,705	5,026	22,854	3,013
8 Interest payments	11,135	2,923	5,756	2,705	4,255	133,619	5,259
9 Other expenses	85310	24,706	5,604	23,570	34,271	97,092	10,368
10 Total expenses	478451	119,316	58,769	80,750	120,557	385,694	60980
11 Profit before tax	27328	11,514	10895	3,814	8,176	50,485	-2874
12 Tax paid	7,467	2627	2,394	1276	3175	17,786	0
13 Profit after tax	19,861	8,887	8,501	2,538	5,001	32,698	-2,874

Depreciation as a % of total expenses:

For Chemical à Roughly $(11/478) \times 100 = 2.3\%$

For Diversified à $(4.8/119) \times 100 = 4\%$

Electricity à $(6.3/58) \times 100 = 11\%$

Machinery à $(5/120) \times 100 = 4\%$

Maximum for electricity

3. Correct Answer – D

Explanation: By observing the table in the above question, Option D is correct

4. Correct Answer – C

Explanation: Textile (0) < Chemicals < Food

5. Correct Answer – 5

Explanation: Option D is wrong, hence our answer.

6. Correct Answer – D

Explanation:

F à 5% of 25 = 1.25 cr

Now, since ratio of prod of the two items by F is 1:4

=> Item I, Company F à $1/5 \times 1.25 = 0.25$ cr

D à 8% of 25 = 2 cr

Item II à $5/8 \times 2 = 1.25$ cr

∴ 20% => Option D

7. Correct Answer – A

Explanation: G's share = 12% of 25 = 3 cr

Item I -1 cr, item II -2 cr

30% on 1 cr and 24% on 2 cr = $0.3 + 0.48 = 78$ lakhs profit

8. Correct Answer – C

Explanation:

$$A(I) \rightarrow (2/5) \times (15\% \text{ of } 25) = 1.5 \text{ cr}$$

$$D(I) \rightarrow (3/8) \times 2 \text{ cr} = 0.75 \text{ cr}$$

9. Correct Answer – D

Explanation: Cost of prod of both items by E = 27% of 25 = $27/4 = 6.75$ cr

C & F

$$22/4 + 5/4 = 6.75 \text{ cr}$$

10. Correct Answer – A

Explanation: A(I) = 1.5 cr

B(II) = $2/5 \times 11/4 = 1.1$ cr

Total = 2.6 cr.

11. Correct Answer – A

Explanation: From graph, Workers April 1 \rightarrow 250

May 1 \rightarrow 350

$$\text{Increase} = 100/250 \times 100 = 40\%$$

12. Correct Answer – B

Explanation: Diff in permanent workers b/w

March 1 \rightarrow 350

April 1 \rightarrow 400

Diff = 50

13. Correct Answer – B

Explanation: $10000 + 25000 + 20000 = 55000$

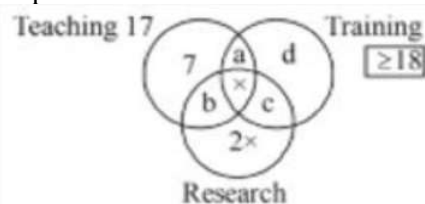
14. Correct Answer – C

Explanation: On May1 \rightarrow TW = 350; PW = 450

$$\text{Women} = 0.6 \times 450 + 0.4 \times 350 = 410$$

15. Correct Answer – D

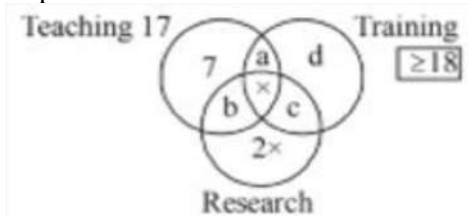
Explanation:



Can be solved hereon with the help of data given and Venn diagram.

16. Correct Answer – A

Explanation:



Can be solved hereon with the help of data given and Venn diagram.

17. Correct Answer – A

Explanation:

From I →
Shelf | Book
1
2
3 2 => Book 4 will be in Shelf 1 (only odd shelf remaining)
4
From II →
After keeping 3rd book in 2nd rack, position of 4th book can't be determined as it can be in either of 1st or 3rd shelf.

18. Correct Answer – B

Explanation: $5 (9+9+25+16 + 16 + 9 + 9) \times 800 = 465 \times 800 = 372000$

19. Correct Answer – B

Explanation: SP = 510

Avg cost = 465

%Profit = $\{(510-465)/465\} \times 100 \sim 10\%$

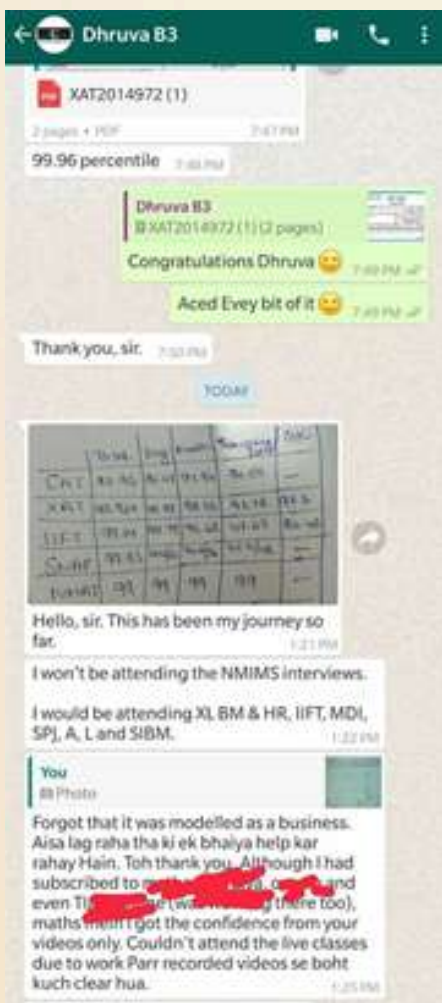
20. Correct Answer – D

Explanation:

Weight
D > E
A > D
B > A
C > E
D > C
From above → B > A > D > C > E
=> E is the thinnest



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