

Paper Name: Post Graduate Diploma in Business Analytics (PGDBA)

All MCQs carry Three Marks (One Mark to be deducted for wrong answer)

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Q.1 to Q.15 on Verbal Ability

Q. The passage below is followed by five questions. Choose the **BEST** answer to each question.

The human brain's billions of neurons present a menagerie of cells that are among both the most highly specialized and variable ones in our bodies. Neurons convert electrical signals to chemical signals, and in humans, their lengths can be so tiny as to span just the tip of a sharpened pencil or, in some cases, even stretch the width of a doorway...Most animals depend on their allotment of neurons for survival. It might stand to reason, then, that the common ancestor of all of these animals also moved about the Earth millions of years ago under the guidance of electrochemical signals transmitted and received by networks of neurons. The idea that these pivotal cells evolved multiple times seems implausible because neurons are highly complex cells and they are also quite similar among animal lineages. But a series of recent evolutionary biology studies are straining the assumption that all animal neurons have a single origin.

The first such finding came from studying relationships among early animals, with a focus on two particular types of organisms: sponges (including sea sponges and freshwater varieties) and ctenophores, invertebrates often known as comb jellies, though they are unrelated to jellyfish. For roughly 15 years, evolutionary biologists have been divided over whether ctenophores or sponges were the first animals to branch from all other animals in the evolutionary tree. Hundreds of millions of years ago the common ancestor to all living animals branched into two species. On one side was the common ancestor of all groups of animals except for one. On the other side was that "one" - the "sister group" that was the first to diverge from all other animals. A persistent question has been whether the sister group was the sponges or ctenophores.

A compelling paper published last year lends strong support to the hypothesis that ctenophores are, in fact, the long-sought sister group. Ctenophores, the researchers found, branched off before sponges and are therefore the group most distantly related to all other animals. Yet despite the new evidence, what exactly happened in evolutionary history is still unsettled because of the puzzle it poses in explaining the evolution of neurons.

Neurons are absent in sponges and present in ctenophores and nearly every other animal on the planet. If ctenophores branched off before sponges in the tree of life, that suggests one of two scenarios for neuron evolution. In one scenario, the precursor to all animals, which lived nearly a billion years ago, had neurons, and every single animal species inherited them. That would mean that sponges must have lost their neurons at some point, because they no longer have the neurons that their ancestors inherited.

An alternative posits that the ancestor to all animals lacked neurons, which explains why early-diverging animals such as sponges have no neurons. Neurons in most animals, then, must have arisen later, after sponges diverged - except for neurons in ctenophores. If the common ancestor lacked neurons, and neurons in most animals arose after ctenophores and sponges had already branched off, then the neurons in ctenophores must have evolved independently. Neurons evolve twice in this scenario-once in ctenophores and then later in other animals - which calls a single origin of neurons into question.

Q.1 It was assumed that the common ancestors of all animals were guided by neurons because:

- (A) Neurons are made up of a menagerie of cells.
- (B) Neurons evolved multiple times
- (C) Most animals depend on their neurons for survival
- (D) Neurons of different animals are distinct from each other

Q.2 The “common ancestor of all groups of animals except for one” in the passage refers to

- (A) sponges
- (B) ctenophores
- (C) both sponges and ctenophores
- (D) comb-jellies

Q.3 The hypothesis that ctenophores were the long-sought sister group was based on evidence that

- (A) they are the group most distantly related to sponges
- (B) they are the group most distantly related to all animals
- (C) they branched off after sponges
- (D) jellyfish are ctenophores

Q.4 A hypothesis that the precursor to all animals, which lived nearly a billion years ago, had neurons would be strengthened if:

- (A) Sponges had neurons
- (B) Ctenophores did not have neurons
- (C) Neurons in ctenophores evolved independently

Q.5 The alternative hypothesis that neurons evolved twice was proposed because:

- (A) Sponges do not have neurons
- (B) Ctenophores and sponges have neurons
- (C) Ctenophore do not have neurons
- (D) Both sponges and ctenophores don't have neurons

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Q. **The passage below is followed by five questions. Choose the BEST answer to each question.** The dream of a planet of almost 8 billion people all living in material comfort will be unachievable if it is based on an economy powered by coal, oil and natural gas. The harms from the cumulative emissions of carbon dioxide would eventually pile up so rapidly that fossil-fuel-fired development would stall.

[N]owhere is this logic more pressing than in Asia. About 1.5 billion Asians live in the tropics. Hundreds of millions of them live near the coasts. For their economies to continue to grow, they will need ever more energy. If this comes in the fossil-fuelled manner of past decades they will have to bear the mounting costs of adapting to and living with floods, storms, heatwaves and droughts long before they get rich. As the world heats up, they will have to run faster just to stay in the same place. Zero-emissions technology could free them from this dismal bind: in principle, they can tap into a supply of development-promoting energy that is, in effect, unlimited.

In the long run, therefore, the only way to keep growing is by leaving fossil fuels behind. That requires Asian countries, in most of which emissions are still surging, to forgo much more by way of future emissions than the countries of the developed world, where emissions are already declining. India is vocal in pointing to the unfairness of this, so far refusing to embrace carbon neutrality. Let others with more responsibility for historical emissions do more, it says.

However just that may be, the problem for India-and for everyone else-is that the daunting cost of limiting emissions is falling on a few generations, most of whose members live in developing countries. All of them live in a fractious world where there is a dearth of leadership. America's government is not suddenly a reliable partner just because it has now rejoined the Paris agreement. Nor is China, the world's largest emitter. Though its capacity for action is great, its pledges thus far are more about posturing than substance. The multilateral institutions created to spread the cost between countries equitably are weak and hostage to procedures based on consensus and unanimity

As so often in climate change, the task is not choosing between options so much as finding how to press ahead with all of them at once. A commitment to large, fast reductions in methane emissions is vital. More money for developing-country decarbonisation, in which government investment can lower risks for the private sector, must flow alongside increased aid for adaptation. Innovation should be encouraged in various ways. America's 45-billion-dollar tax incentives for carbon capture could be expanded at home and copied by Europe.

Investment in fossil fuels has fallen faster than replacements have come on line, aggravating the dramatic recent price rises. In the long term it is necessary that fossil fuels become increasingly expensive, but peaks and volatility are destructive. Governments need to build more buffers into the current system as well as hasten the alternatives. When prices fall those still subsidizing fossil fuels will have an excellent opportunity to stop.

Q.6 Which of the following statements is NOT true according to the passage?

- (A) Fossil fuel fired development will lead to materiel comfort for all
- (B) Coal, oil and natural gas lead to the emissions of carbon dioxide
- (C) China is the world's largest emitter of carbon dioxide

Q.7 What would free Asian economies of the “dismal bind” of fossil fuel energy?

- (A) Zero emissions technology
- (B) Monetary support from America
- (C) Monetary support from India
- (D) Monetary support from China

Q.8 Which among the following has to forgo much more by way of future emissions?

- (A) Asian countries
- (B) European countries
- (C) Latin American countries
- (D) Developed world

Q.9 Which among the following is vocal in opposing the responsibility of carbon neutrality on the developing world?

- (A) NAFTA
- (B) EU
- (C) USA
- (D) India

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Q.10 Which of the following options pertaining to addressing climate change is NOT mentioned in the passage?

- (A) Reductions in methane emissions
- (B) Provision of funds for decarbonisation for developing countries
- (C) Subsidizing fossil fuels
- (D) Incremental aid for adaptation for developing countries

Q.11 **The four sentences (labelled 1, 2, 3 and 4) below, when properly sequenced would yield a coherent paragraph. Choose the option that would result in the most coherent paragraph.**

1. Since another effect of these drugs is to reduce inflammation, the suspicion has been that this where the protection is coming from.
2. Trials show that even people who do not have high cholesterol benefit from being prescribed cheap, cholesterol lowering drugs.
3. About half of heart attacks happen to those who have what are considered normal levels of cholesterol.
4. But the cholesterol lowering properties of statins have made it impossible to isolate the effect.

- (A) 2,1,3,4
- (B) 2,4,1,3
- (C) 3,2,1,4
- (D) 3,4,1,2

Q.12 The four sentences (labelled 1, 2, 3 and 4) below, when properly sequenced would yield a coherent paragraph. Choose the option that would result in the most coherent paragraph.

1. Filtration through beds of sand needs no membranes, but does need chemicals called flocculants to persuade pollutants to coagulate so that they can be caught by the filter.
2. Filtering water may be done through porous membranes, but that requires pressure, and thus needs costly pumps.
3. An alternative 'slow-sand' filtration employs the layers of algae and bacteria that develop on wet sand grains to remove pollutants and require fewer chemicals.
4. Also the membranes foul quickly, so require frequent replacement.

(A) 1,4,3,2

(B) 2,4,1,3

(C) 2,1,4,3

(D) 1,3,4,2

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Q.13 The four sentences (labelled 1, 2, 3 and 4) below, when properly sequenced would yield a coherent paragraph. Choose the option that would result in the most coherent paragraph.

1. So, a recent surge of attacks on the vessels in the Red Sea poses a grave threat to global trade.
2. For the world to prosper, ships must reach their ports.
3. They are most vulnerable when passing through narrow passages.
4. The Houthi militants in Yemen have fired over 100 drones and missiles at ships linked to more than 35 countries.

(A) 4,3,2,1

(B) 4,2,3,1

(C) 2,1,4,3

(D) 2,3,1,4

Q.14 Fill in the blank with the correct word/expression.

Cancer is a disease that _____ many who are chronic smokers.

(A) effects

(B) taunts

(C) afflicts

(D) gnaws

Q.15 **Fill in the blank with the correct word/expression.**

_____ I don't usually like spicy food, I enjoyed the food served at the restaurant.

- (A) Although
- (B) Lest
- (C) Because
- (D) And

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Q.16 to Q.20 on Logical Reasoning

The following information relates to all five questions on *Logical Reasoning*.

Q.16

There are six specializations SP1, SP2, SP3, SP4, SP5 and SP6 in a postgraduate degree programme of a university. Each specialization has five specified subjects out of ten subjects S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10. Specified subjects for specializations are given in the following table.

Specializations	Subjects
SP1	S1, S2, S3, S4 and S7
SP2	S1, S2, S3, S4 and S5
SP3	S1, S2, S5, S6 and S8
SP4	S1, S2, S5, S7 and S10
SP5	S1, S2, S5, S8 and S9

For each subject, there must be 4 hours of class per week (Monday to Friday). The class hours are 9-10, 10-11, 11-12, 12-13, 14-15, 15-16, 16-17. There is lunch break during 13-14 hours. There can be two consecutive classes for a subject. The class hours 12-13 and 14-15 are not considered consecutive. No subject can be taught on consecutive days in a week or for more than two hours in a day.

The class schedule for the 10 subjects has the following features. Classes of S1 are held from 9-11 on Mondays and Wednesdays. For Subject S2, there are consecutive classes during 9-11 on Fridays and consecutive classes during 11-13 on another day. For Subject S3, there are consecutive classes on Mondays and Thursdays, and the Thursday classes are not during 11-13. The classes of Subject S4 are held during 14-16 on two days of the week other than Tuesday. There are consecutive classes of Subject S5 on Mondays and Thursdays. The classes of Subject S6 are held during 9-11 on two days of the week. There are consecutive classes of Subject S7 on two days of the week. For Subject S8, two classes are from 11-13 on Wednesdays and the other classes need not be consecutive. Free class hours of SP3 coincide with those of SP5

and SP6.

Which subjects are taught on Tuesdays?

(A) S2, S6, S7 and S9

(B) S4, S8 and S10

The following information relates to all five questions on *Logical Reasoning*.

Q.17

There are six specializations SP1, SP2, SP3, SP4, SP5 and SP6 in a postgraduate degree programme of a university. Each specialization has five specified subjects out of ten subjects S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10. Specified subjects for specializations are given in the following table.

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Which subjects of SP2 are taught on Mondays?

- (A) S1, S3 and S5
- (B) S1, S4 and S7
- (C) S1 and S2
- (D) S1, S3 and S4

Q.18 The following information relates to all five questions on *Logical Reasoning*.

There are six specializations SP1, SP2, SP3, SP4, SP5 and SP6 in a postgraduate degree programme of a university. Each specialization has five specified subjects out of ten subjects S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10. Specified subjects for specializations are given in the following table.

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For each subject, there must be 4 hours of class per week (Monday to Friday). The class hours are 9-10, 10-11, 11-12, 12-13, 14-15, 15-16, 16-17. There is lunch break during 13-14 hours. There can be two consecutive classes for a subject. The class hours 12-13 and 14-15 are not considered consecutive. No subject can be taught on consecutive days in a week or for more than two hours in a day.

The class schedule for the 10 subjects has the following features. Classes of S1 are held from 9-11 on Mondays and Wednesdays. For Subject S2, there are consecutive classes during 9-11 on Fridays and consecutive classes during 11-13 on another day. For Subject S3, there are consecutive classes on Mondays and Thursdays, and the Thursday classes are not during 11-13. The classes of Subject S4 are held during 14-16 on two days of the week other than Tuesday. There are consecutive classes of Subject S5 on Mondays and Thursdays. The classes of Subject S6 are held during 9-11 on two days of the week. There are consecutive classes of Subject S7 on two days of the week. For Subject S8, two classes are from 11-13 on Wednesdays and the other classes need not be consecutive. Free class hours of SP3 coincide with those of SP5 and SP6.

The subject S4 is taught on

- (A) Mondays and Wednesdays
- (B) Mondays and Thursdays
- (C) Wednesdays and Fridays
- (D) Mondays and Fridays

The following information relates to all five questions on *Logical Reasoning*.

Q.19

There are six specializations SP1, SP2, SP3, SP4, SP5 and SP6 in a postgraduate degree programme of a university. Each specialization has five specified subjects out of ten subjects S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10. Specified subjects for specializations are given in the following table.

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Which day is an off day (no class) for some specialization?

- (A) Tuesday
- (B) Thursday
- (C) Friday
- (D) No off day for any specialization

The following information relates to all five questions on *Logical Reasoning*.

Q.20

There are six specializations SP1, SP2, SP3, SP4, SP5 and SP6 in a postgraduate degree programme of a university. Each specialization has five specified subjects out of ten subjects S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10. Specified subjects for specializations are given in the following table.

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SP4	S1, S2, S5, S7 and S10
SP5	S1, S2, S5, S8 and S9
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The number of different class schedules that fits the above description is

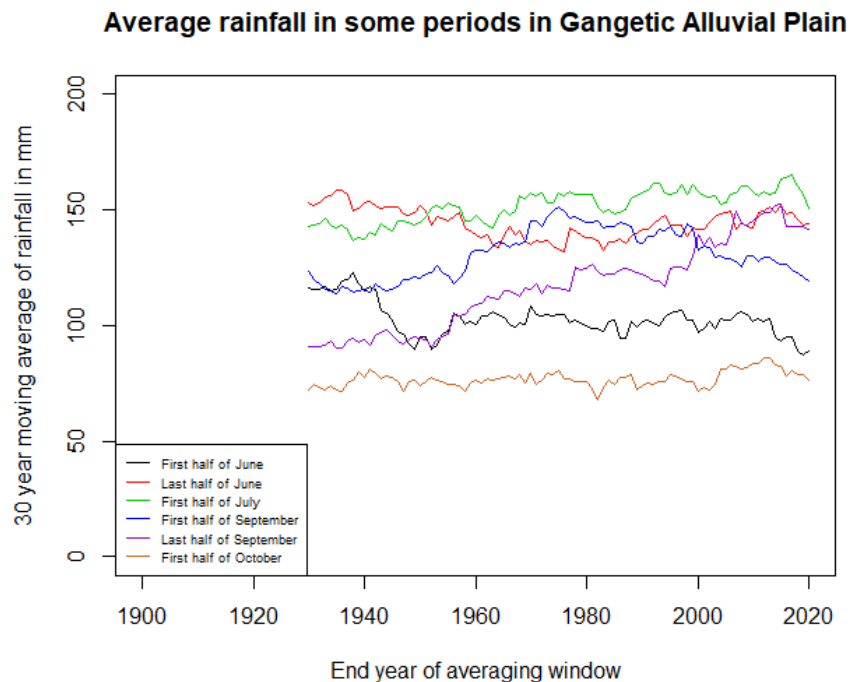
- (A) 16
- (B) 8
- (C) 4
- (D) 1

Q.21 to Q.25 on Data Interpretation and Data Visualization

Q.21 The accompanying line graphs show the 30 year moving average of rainfall (in mm) in the Gangetic Alluvial Plain of West Bengal from 1930 to 2022 during different periods of the year.

Identify which of the following statements about the line graphs, if any, is/are correct.

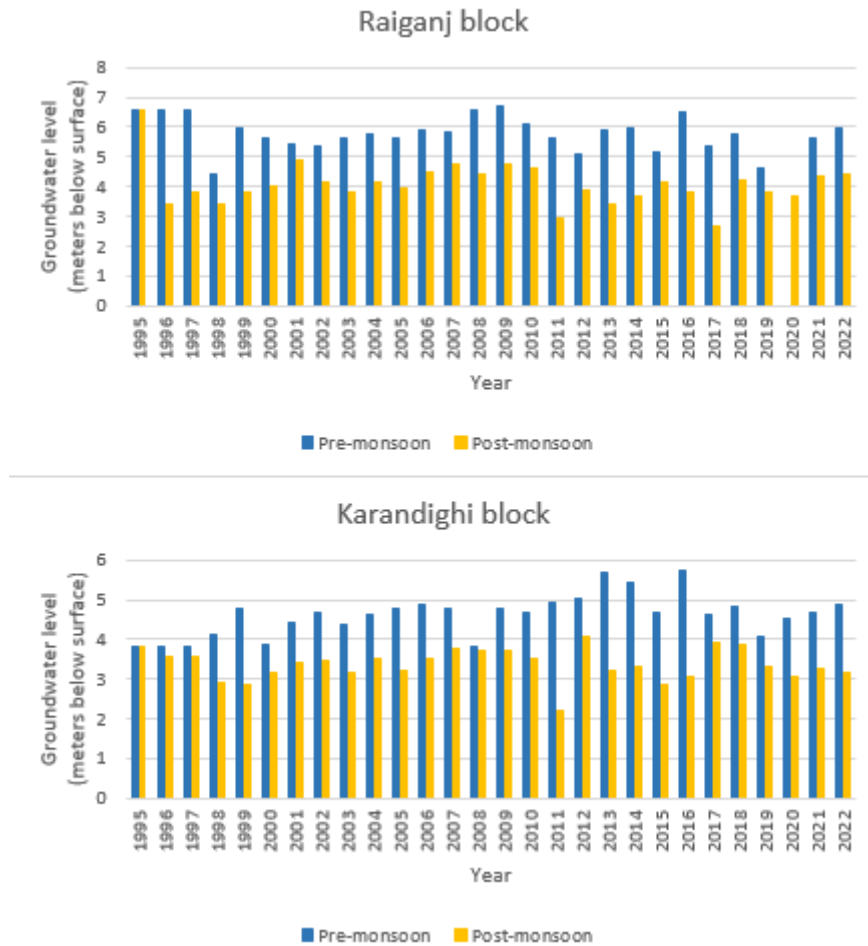
1. Going by 30 year moving average, the last half of June has had the most extreme decline in rainfall over the years of observation, in comparison with the other periods represented in the plot.
2. Going by 30 year moving average, the difference between the average rainfall in the first and the last halves of September has changed much more (over the years of observation) than the difference between the average rainfall in the first and the last halves of June.



- (A) Statement 1 is correct, but Statement 2 is incorrect.
- (B) Statement 2 is correct, but Statement 1 is incorrect.
- (C) Neither statement is correct.
- (D) Both the statements are correct.

Q.22 The following bar charts show the average pre-monsoon and post-monsoon groundwater levels (in meters below surface) in two blocks from 1995 to 2022.

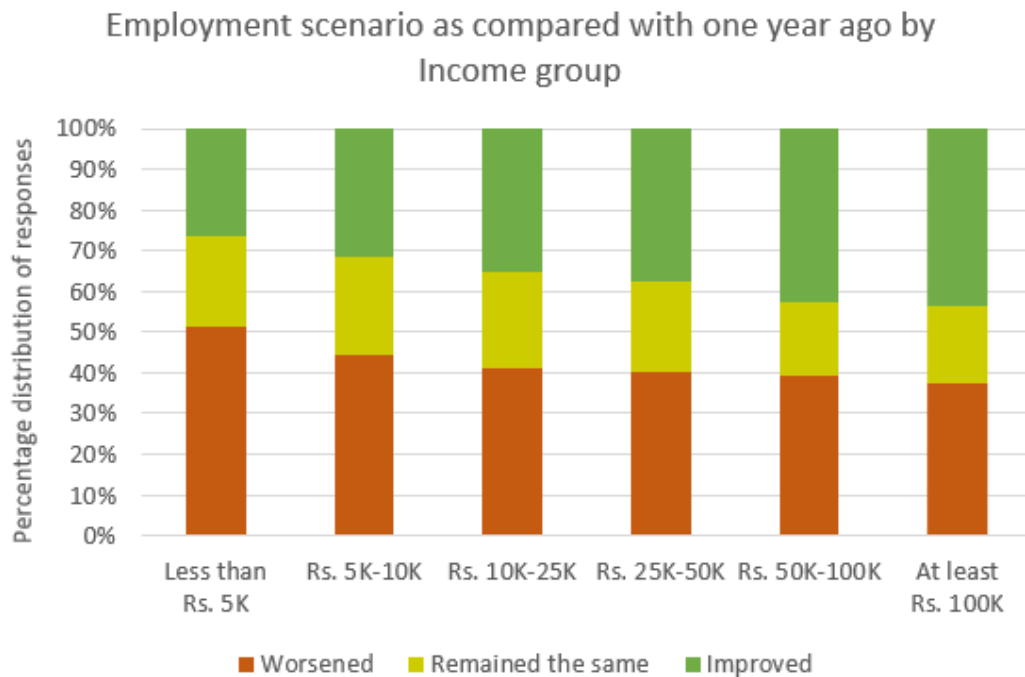
Identify the statement that can be correctly inferred from the two bar charts.



- (A) The level of groundwater generally falls from the pre-monsoon to the post-monsoon times of measurement.
- (B) The average pre-monsoon groundwater level at the Raiganj block was nearest to the surface in the year 2011.
- (C) The average post-monsoon groundwater level at the Karandighi block was farthest from the surface in the year 2012.
- (D) Between the years 1995 and 2000, the gap between the pre-monsoon and post-monsoon levels of groundwater in neither block was ever more than 2 meters.

Q.23 The composite bar graphs given below show the perceptions of respondents of various income groups in a rural survey regarding the employment scenario in the country at the time of the survey, as compared to a year ago. The responses belong to one of three categories: *Improved*, *Remained the same* and *Worsened*. The income categories were: Less than Rs. 5K per month, Greater than or equal to Rs. 5K per month but less than Rs. 10K per month, Greater than or equal to Rs. 10K per month but less than Rs. 25K per month, Greater than or equal to Rs. 25K per month but less than Rs. 50K per month, Greater than or equal to Rs. 50K per month but less than Rs. 100K per month, and Greater than or equal to Rs. 100K per month, where K stands for 1000.

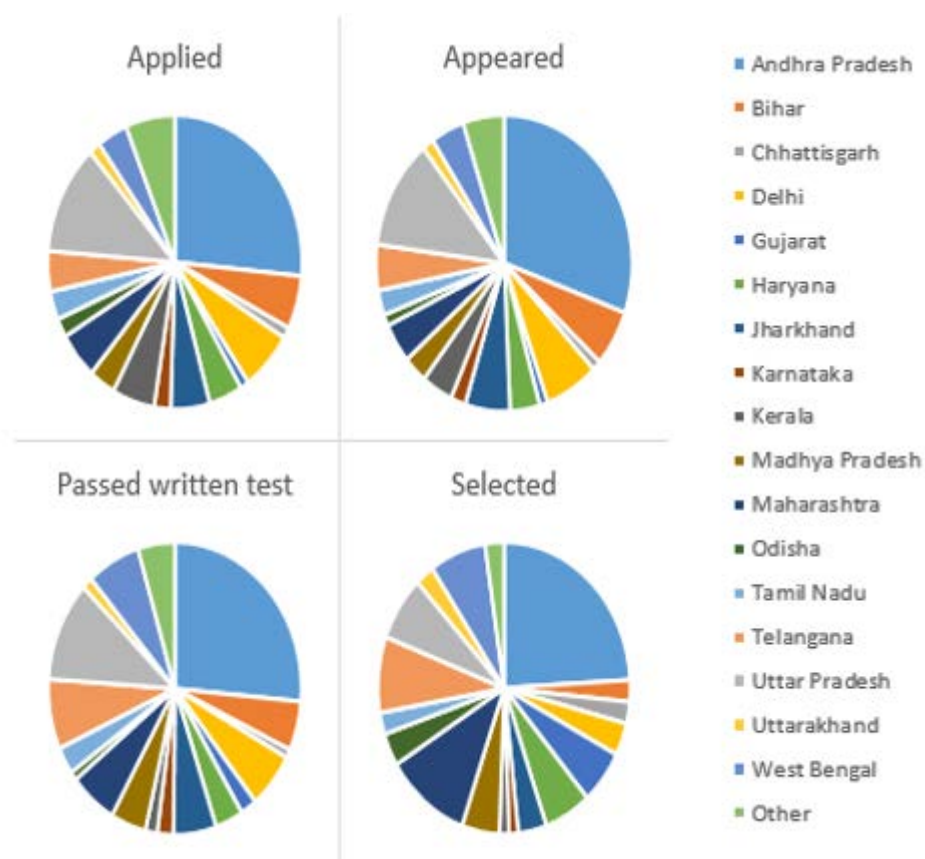
Identify the income group that indicated the most positive change in the employment scenario.



- (A) Less than Rs. 5K per month
- (B) Greater than or equal to Rs. 5K per month but less than Rs. 10K per month
- (C) Greater than or equal to Rs. 50K per month but less than Rs. 100K per month
- (D) Greater than or equal to Rs. 100K per month

Q.24 For an all India admission test held last year for an academic programme in Andhra Pradesh, the following pie charts give the composition of candidates from different states and union territories (UTs) at successive stages of the admission process, namely those who applied for the programme, appeared in the written test, passed the written test and were selected through interview.

Identify the *incorrect* conclusion from the available summary of the data.



- (A) There were more applicants from Andhra Pradesh than from any other state/UT.
- (B) Applicants from Andhra Pradesh had a higher percentage of appearance in the written test in comparison with the overall percentage of appearance of all applicants.
- (C) Applicants from Andhra Pradesh, who had appeared for the written test, had a lower percentage of passing it in comparison with the overall percentage of passing the written test.
- (D) Applicants from Andhra Pradesh, who had passed the written test, had a higher percentage of clearing the interview in comparison with the overall percentage of clearing the interview.

Q.25 The following table summarizes the annually aggregated quantity and value of Indian imports of coking coal from four countries over a period of six years.

For which of the following countries of origin did the unit value of imported coking coal have the earliest turn-around from a rising trend to a falling trend?

Financial year	Sum of Quantity (Million Tonnes)				Sum of Value (Billion INR)			
	Australia	Canada	Mozambique	USA	Australia	Canada	Mozambique	USA
2015-16	38.994	1.355	1.890	1.161	246.88	8.40	11.20	8.49
2016-17	36.503	2.300	0.857	1.148	359.40	23.78	9.50	12.01
2017-18	35.761	3.301	2.382	3.285	449.54	40.39	28.47	48.85
2018-19	36.931	4.294	2.239	4.134	516.77	62.14	28.22	58.94
2019-20	35.916	4.647	1.778	3.775	427.27	57.29	20.89	45.88
2020-21	36.945	2.850	1.669	3.895	329.65	26.39	14.32	36.87

- (A) Australia
- (B) Mozambique
- (C) Canada
- (D) USA

Q.26 to Q.50 on Quantitative Aptitude

Q.26 If the alphabets of the word 'RANDOM' are arranged in a random order, then the probability that there will be exactly two letters between R and M is

(A) $\frac{1}{10}$

(B) $\frac{1}{5}$

(C) $\frac{3}{10}$

(D) $\frac{1}{4}$

Q.27 Two persons C and D are sitting in a round table having a capacity of six persons. The number of ways in which C and D will not sit together is

(A) 48

(B) 96

(C) 72

(D) 24

Q.28 A, B and C roll a dice independently in succession with the understanding that the first one to throw a '6' wins. Then the probability that B wins is

(A) $\frac{5}{91}$

(B) $\frac{10}{91}$

(C) $\frac{20}{91}$

(D) $\frac{30}{91}$

Q.29 Consider an isosceles trapezium ABCD where AB is parallel to DC. The three vertices A, B, C taken in order are given by A (2, 0), B (0, 2) and C (0, 7). Then the coordinates of D will be

(A) (5, 2) or (0, 7)

(B) (5, 0) or (2, 7)

(C) (2, 5) or (7, 0)

(D) (0, 5) or (7, 2)

Q.30 If the perpendicular from the origin O to a line AB meets the line at the point P whose coordinates are $(-2, 9)$, then the equation of the line AB is

(A) $9x - 2y + 85 = 0$

(B) $2x + 9y - 85 = 0$

(C) $9x + 2y - 85 = 0$

(D) $2x - 9y + 85 = 0$

Q.31 The equations of the lines which cut off intercepts on the axes whose sum and product are 1 and -6 , respectively, are

(A) $2x - 3y - 6 = 0$ and $-3x + 2y - 6 = 0$

(B) $-2x + 3y + 6 = 0$ and $3x - 2y - 6 = 0$

(C) $2x + 3y - 6 = 0$ and $3x - 2y + 6 = 0$

(D) $2x - 3y + 6 = 0$ and $-3x + 2y + 6 = 0$

Q.32

The coefficient of x^{10} in the binomial expansion of $\left(2x^2 - \frac{5}{x}\right)^{11}$, when $x \neq 0$, is

(A) $\binom{11}{4} \times 2^6 \times 5^5$

(B) $\binom{11}{4} \times 2^7 \times 5^4$

(C) $\binom{11}{4} \times 2^4 \times 5^7$

(D) $\binom{11}{3} \times 2^7 \times 5^4$

Q.33

Let S_n denote the sum of the first n terms of an A.P. If $S_{2n} = 6S_n$, then $\frac{S_{3n}}{S_n} =$

(A) 13

(B) 14

(C) 15

(D) 16

Q.34 If the system of linear equations

$$x + 2y - 3z = 6$$

$$2x - y + 4z = 10$$

$$-x + 3y + bz = c$$

has infinite number of solutions, then the value of $b + c$ is equal to

(A) -10

(B) 10

(C) -11

(D) 11

Q.35 A circle of radius 6 units touches the coordinate axes in the first quadrant. The equation of its image with respect to the line $y = 0$ is given by

(A) $x^2 + y^2 + 12x + 12y + 36 = 0$

(B) $x^2 + y^2 - 12x + 12y + 36 = 0$

(C) $x^2 + y^2 - 12x - 12y + 36 = 0$

(D) $x^2 + y^2 + 12x - 12y + 36 = 0$

Q.36 Consider a rectangle ABCD whose sides AB is on $y = -1$, DC is on $y = 3$, AD is on $x = -3$ and BC is on $x = 6$. The equation of the circle with diameter AC is

(A) $x^2 + y^2 + 3x + 2y + 21 = 0$

(B) $x^2 + y^2 + 3x - 2y - 21 = 0$

(C) $x^2 + y^2 - 3x - 2y + 21 = 0$

(D) $x^2 + y^2 - 3x - 2y - 21 = 0$

Q.37 If the latus rectum of an ellipse is equal to the half of the minor axis, the eccentricity of the ellipse is given by

(A) $\frac{\sqrt{3}}{4}$

(B) $\frac{\sqrt{3}}{2}$

(C) $\frac{\sqrt{2}}{3}$

(D) $\frac{\sqrt{2}}{4}$

Q.38 A computer sales company reports that 70 % of their computers are sold with a Pen drive, 80 % with CD drive, and 60 % with both. Let

P_1 = probability that a computer without a Pen drive is sold;

P_2 = probability that a computer with a Pen drive or a CD drive is sold;

P_3 = probability that a computer with a Pen drive but not a CD drive is sold;

P_4 = probability that a computer with a Pen drive or a CD drive but not both is sold.

Then which one of the following is true?

(A) $P_1 = P_2 < P_3 < P_4$

(B) $P_2 < P_1 < P_4 = P_3$

(C) $P_3 < P_1 = P_4 < P_2$

(D) $P_2 < P_1 = P_4 < P_3$

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Q.39 If $A = \begin{pmatrix} 1 & 0 \\ -1 & 6 \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then the value of k for which $A^2 = 7A + kI$ is

(A) -6

(B) 6

(C) -5

(D) 5

Q.40 If in any triangle, the ratio of the angles be $1:2:3$, the corresponding sides will be in the ratio

(A) $\sqrt{3}:1:2$

(B) $2:1:\sqrt{3}$

(C) $1:\sqrt{3}:2$

(D) $1:2:\sqrt{3}$

Q.41 The value of $15\sin\frac{5\pi}{12} + 15\cos\frac{5\pi}{12} - 20\sin^3\frac{5\pi}{12} - 20\cos^3\frac{5\pi}{12}$ is

(A) 0

(B) 1

(C) 2

(D) 3

Q.42 Which term of G.P. 5,10,20,40,... is 2560?

(A) 8

(B) 9

(C) 10

(D) 11

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Q.43 The solution set of the given inequation

$$\left| \frac{2}{x-3} \right| > 1, x \neq 3 \text{ in } R, \text{ is}$$

- (A) $(1,3) \cup (3,5)$
- (B) $(1,5)$
- (C) $(4,5)$
- (D) $(1,3) \cup (4,5)$

Q.44 For any real number x , let $[x]$ denote the greatest integer less than or equal to x . For the function $f(x) = (x - [x])^{-\frac{1}{2}}$, let P and Q denote the domain and range respectively. Then which of the following is correct?

- (A) $1 \in Q$
- (B) $3 \notin Q$
- (C) $-\frac{1}{5} \notin P$
- (D) $5 \in Q$

Q.45 Let $f(x) = \begin{cases} x^{12} - 1, & x \leq 1 \\ x^4, & x > 1 \end{cases}$.

Then, which of the following is correct?

- (A) $f(x)$ is continuous everywhere
- (B) $f(x)$ is continuous at $x = 1$
- (C) $f(x)$ is NOT continuous at $x = 1$
- (D) $f(x)$ is NOT continuous at $x = 0$

Q.46 Let $y(x) = 2^2 (2^{2 \log_2 x})$, $x > 0$. Then the value of $\frac{dy}{dx}$ at $x = 2$ is

- (A) 4
- (B) 8
- (C) 12
- (D) 16

Q.47 Let $f : R \rightarrow R$ be a differentiable function such that $f(1) = 1$, $f'(1) = 2$. Then

$$\lim_{x \rightarrow 1} \frac{\sqrt{4f(x)} - 2}{\sqrt{x} - 1} \text{ is}$$

- (A) 0
- (B) 2
- (C) 4
- (D) 8

Q.48 The minimum distance from a point P on the ellipse $\frac{x^2}{4} + y^2 = 1$ to $(1,0)$ is

- (A) 1.5
- (B) $\sqrt{\frac{2}{3}}$
- (C) $\sqrt{\frac{3}{2}}$
- (D) 0.5

Q.49 The integral $\int \frac{1}{\sqrt{\sin^3 x \cos^5 x}} dx$ is equal to

(A) $-\frac{2}{\sqrt{\tan x}} + \frac{2}{3}(\tan x)^{3/2} + C$

(B) $\frac{2}{\sqrt{\tan x}} - \frac{2}{3}(\tan x)^{1/2} + C$

(C) $\frac{2}{\sqrt{\tan x}} + \frac{2}{3}(\tan x)^{3/2} + C$

(D) $-\frac{2}{\sqrt{\tan x}} + \frac{2}{3}(\tan x)^{1/2} + C$

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Q.50 The area bounded between the lines $x = 1$, $x = 2$ and the curves $y_1(x) = -x^2 + 4x + 1$, $y_2(x) = -x^3 + 7x^2 - 10x + 3$ is

(A) $\frac{49}{13}$

(B) $\frac{51}{12}$

(C) $\frac{49}{12}$

(D) $\frac{47}{15}$

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