

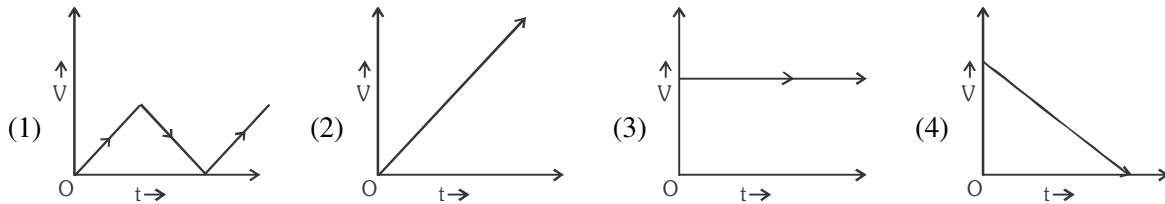
Date: 06/11/2016

Max. Marks: 100

SOLUTIONS

Time allowed: 90 mins

1. The velocity - time graph which represents a body is moving with zero acceleration is



Ans. (3)

Sol. For constant velocity, acceleration is zero.

2. A 100 meter long train moving with constant speed of 90 km/h crosses a tunnel of 300 meter long. The time taken by the train to cross the tunnel completely is

- (1) 16 seconds (2) 8 seconds (3) 4 seconds (4) 2 seconds

Ans. (1)

Sol. Total distance = 100 + 300 = 400 m

$$\text{speed} = 90 \text{ km/hr} = 90 \times \frac{5}{18} \text{ m/s} = 25 \text{ m/s}$$

$$\Rightarrow \text{Time taken} = \frac{400\text{m}}{25\text{m/s}} = 16\text{sec}$$

3. Assertion (A) : In the household electrical circuit fuse is a safety device and is connected in series.
Reason (R) : Electrical fuse is prepared by the material having very high melting point. So it can allow very high voltage/current in the household electrical circuit.

- (1) Both A and R are true and R is the correct explanation to A
(2) Both A and R are true but R is not the correct explanation to A
(3) A is true but R is false
(4) A is false but R is true

Ans. (3)

Sol. Conceptual (as fuse material should have low melting point).

4. Out of the following the best safety measure against lightning strikes is

- (1) Stand on the terrace of the building (2) Take shelter under a tree
(3) Run across an open high ground (4) Take shelter inside a metal box

Ans. (4)

Sol. Conceptual (As the metal frame directs lightning current to the ground).

5. Consider the following statements
 (a) The efficiency of Carnot's engine is 100%
 (b) Spark plug present in both petrol and diesel engines.
 (c) Carburettor is used to mix air and petrol in proper proportion.
 (d) Fuel injection pump is present in diesel engines.

The correct statement are

- (1) b, c and e (2) a, c and d (3) c, d and e (4) a, b and d

Ans. (3)

Sol. As no engine can give 100% efficiency hence (a) is wrong
 - Petrol engine has spark plug & diesel engine has fuel injection pump.
 - Piston is used to convert Linear motion in rotational motion

6. A student has been given a project to prepare an astronomical telescope, she has to select two lenses of type
 (1) Concave lenses of different focal length (2) Concave lenses of same focal length
 (3) Convex lenses of different focal length (4) Convex lenses of different focal length

Ans. (3)

Sol. An astronomical telescope is usually made up of two convex lenses. The objective lens, which is of large focal length and large aperture and eye lens having small focal length and small aperture.

7. Mirages are formed due to the natural phenomena
 (a) Earth's terrestrial heating (b) Reflection of light
 (c) Refraction of light (d) Diffraction of light
 (e) Total internal reflection of light
 (1) a, c and e (2) a, b and d (3) b, c and d (4) c, d and e

Ans. (1)

Sol. In the phenomena of mirage, the surface of earth become hot due, due to this the density of air close to surface of earth is reduced as compared to the above layers. Hence light from objects move from medium of higher refractive index to a lower one. So it full fills the conditions of TIR also.

8. A pendulum is moving in a periodic motion with period T. If its length is increased by 4 times, then its period
 (1) Increases by 4 times (2) Increases by 2 times
 (3) Decreases by 4 times (4) Decreases by 2 times

Ans. (2)

Sol. $T = 2\pi\sqrt{l/g}$
 \Rightarrow Hence if length is increased by four times, time period increases twice.

9. If the distance between two bodies is reduced to half of its initial value, the gravitational force between them is
 (1) Reduces to half of its initial value (2) Increases by 4 times of its initial value
 (3) Increases by 2 times of its initial value (4) Decreases by 4 times of its initial value

Ans. (2)

Sol. $F = \frac{Gm_1m_2}{r^2}$
 here $r^1 = r/2 \Rightarrow F^1 = 4F$

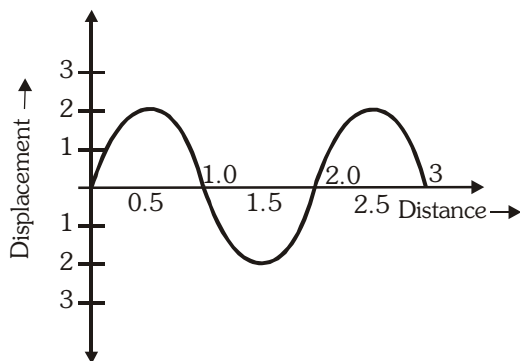
10. The evidence cited by the scientists for the continued expansion of universe is

- (1) Movement of asteroids in space
- (2) Occurrence of supernova explosion in space
- (3) Observation of red-shift phenomena in space
- (4) Appearance of flying saucers

Ans. (3)

Sol. The distant galaxies we see in all directions are moving away from the earth, as evidenced by their Red shifts.

11.



This diagram represents displacement distance graph of wave travelling in a straight line. The amplitude and wavelength of this wave in respectively are

- (1) 2 meter and 1 meter
- (2) 1 meter and 2 meter
- (3) 1 meter and 1 meter
- (4) 2 meter and 2 meter

Ans. (4)

Sol. Amplitude is the maximum displacement of particle from mean position.

And wavelength is the distance between two consecutive crest or Trough

Hence $\Rightarrow A = 2\text{m}$

$\lambda = 2\text{m}$

12. After firing a bullet of mass 8 g, it is moved with a velocity of 4ms^{-1} . The kinetic energy gained by this bullet is

- (1) 64 Joule
- (2) 6.4 Joule
- (3) 0.64 Joule
- (4) 0.064 Joule

Ans. (4)

Sol. $K = \frac{1}{2}mu^2 = \frac{1}{2} \times \frac{8}{1000} \times (4)^2 = 0.064J$

13. The stages of evolution of sun like stars in proper order is

- (1) Protostar - Steady state - Red gaint - Planetary nebula - White dwarf
- (2) Protostar - Red giant - Steady state - White dwarf - Planetary nebula
- (3) Protostar - Planetary nebula - Reg giant - Steady state - White dwarf
- (4) Protostar - Steady state - Red giant - White dwarf - Planetary nebula

Ans. (1)

Sol. Protostar \rightarrow steady - state \rightarrow Red giant \rightarrow plantary nebula \rightarrow white dwarf

18. Identify the trend of elements along a group of a periodic table shown below.

(A) The electropositive character of elements decreases

(B) The electronegative character of elements increases

(1) A is false and B is false

(2) A is true and B is false

(3) A is true and B is true

(4) A is false and B is true

Ans. (1)

Sol. Down the group electropositivity increases, electronegativity decreases

19. **Assertion (A)** : The flowers of Hydrangea plant turns to pink in the presence of potassium hydroxide

Reason (R) : The flowers of Hydrangea plant are usually pink which turn blue in the presence of a base.

(1) A is incorrect and R is correct

(2) Both A and R are correct and R is correct explanation of A

(3) A is correct and R is incorrect

(4) Both A and R are incorrect

Ans. (3)

Sol. Hydrangea plant: in basic medium : blue to pink

in acidic medium : pink to blue

20. The solution in which an immersed glass exhibits apparent disappearance is a mixture of

(1) Hydrogen fluoride and Acetic acid

(2) Hydrofluoric acid and Sulphuric acid

(3) Con.HCl and HNO₃ in the ratio of 3 : 1

(4) Acetone and Chloroform in suitable proportion

Ans. (2)

Sol. In presence of HF & H₂SO₄, Glass exhibits apparent disappearance.

21. The following substances are arranged in the increasing order of their pH values. The correct option is

(a) Tomato juice

(b) Tooth paste

(c) Saliva (after meals)

(d) Coffeee

(e) Blood

(1) b c e a d

(2) b e c d a

(3) b a c e d

(4) b d e c a

Ans. (NA)

Sol. Correct increasing order of pH = a < c < e < d < b

22. The law that explains the death of deep sea fishes when suddenly brought to surface is

(A) Charle's law

(B) Graham's law

(1) Only A

(2) Only B

(3) Both A and B

(4) Neither A nor B

Ans. (4)

Sol. "Boyle's law" explains the death of deep sea fishes when suddenly brought to surface.

23. Steps of an activity for boiling under reduced pressure are jumbled below. Correctly arranged option is

(a) Cool the flask over running water from a tap carefully.

(b) Water inside the flask starts boiling again.

(c) Take a cup of water in a conical flask.

(d) Gases in the flask are removed from the steam produced.

(e) Boil the water without closing its mouth for 3 minutes.

(f) Close the flask with a rubber cork.

(1) c a e b f d

(2) c e d f a b

(3) a c e f b d

(4) e d c b a f

Ans. (2)

Sol. We should boil water after taking in flask to remove air present in it without closing its mouth.

24. **Assertion (A)** : In the manufacturing of common sugar, the syrup obtained does not have any colours.
Reason (R) : Coconut shell charcoal is used to give colour to the syrup.
 (1) Both A and R are incorrect (2) A is correct and R is incorrect
 (3) Both A and R are correct (4) A is incorrect and R is correct

Ans. (1)

Sol. In manufacturing of sugar syrup, it has colours initially, to remove colours, we use coconut shell charcoal.

25. Silicon compound that is used as an abrasive for cutting and grinding glass is
 (1) Sodium silicate (2) Aluminium silicate (3) Silicon carbide (4) Sodium oxide

Ans. (3)

Sol. “SiC” is used for cutting and grinding glass.

26. The correct option about the following statement is
 (A) Gallium sheets are used more than Gallium wires.
 (B) Gallium exhibits ductility property but not the malleability.
 (1) A and B are true (2) A and B are false
 (3) A is true and B is false (4) A is false and B is true

Ans. (2)

Sol. “Ga” is liquid metal, can not be used as sheets and wires.

27. No urination due to shortage of water in the body is a typical symptom of this disease
 (1) Typhoid (2) Malaria (3) Dengue (4) Cholera

Ans. (4)

Sol. Dehydration is the typical characteristic of cholera.

28. Match Column-I and Column-II and identify the correct answer:

Column-I

- (A) Thrombocytes
 (B) Neutrophils
 (C) Erythrocytes
 (D) Lymphocytes

Column-II

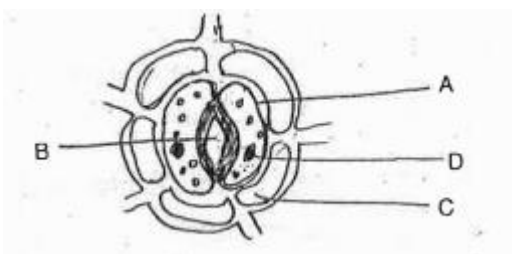
- (I) Phagocytosis
 (II) Releases chemicals
 (III) Produces antibodies
 (IV) Clotting of blood
 (V) Supply of oxygen

- (1) (A) – (III), (B) – (V), (C) – (II), (D) – (I) (2) (A) – (II), (B) – (IV), (C) – (I), (D) – (III)
 (3) (A) – (V), (B) – (III), (C) – (IV), (D) – (II) (4) (A) – (IV), (B) – (I), (C) – (V), (D) – (III)

Ans. (4)

Sol. (A) Thrombocytes – clotting of blood
 (B) Neutrophils – phagocytosis
 (C) Erythrocytes – Supply of oxygen
 (D) Lymphocytes – Produces antibodies

29. Study the diagram below and select the correct labelling



- (1) (A) Epidermal cells (B) Stoma (C) Guard cell (D) Chloroplast
 (2) (A) Guard cell (B) Stoma (C) Epidermal cells (D) Chloroplast
 (3) (A) Stoma (B) Epidermal cells (C) Chloroplast (D) Guard Cell
 (4) (A) Chloroplast (B) Stoma (C) Epidermal cells (D) Guard Cell

Ans. (2)

Sol. A – Guard cell, B – Stoma, C – Epidermal cells, D – Chloroplast

36. Read the following statements:

- (A) It forms a thick, tough barrier and protects, the underlying tissues in the skin.
 - (B) When it is present in sense organs contain receptor cells.
 - (C) It also helps in absorption of nutrients.
 - (D) When it is present in glands helps in secretion. Which one of the following represent the above mentioned characteristics?
- (1) Epithelial tissue (2) Connective tissue (3) Muscular tissue (4) Nerve tissue

Ans. (1)

Sol. The above mentioned characteristics are those of epithelial tissue.

37. Colour blindness is more common in men than in women due to

- (1) Dominant genes of such traits are found on 'Y' chromosome.
- (2) Dominant genes of such traits are found on 'X' chromosome.
- (3) Recessive genes of such traits which occur on the 'X' chromosome.
- (4) Recessive genes of such traits which occur on the 'Y' chromosome.

Ans. (3)

Sol. colour blindness is a X - linked Recessive trait.

38. The crop that would require minimum quantity of urea or NPK for its growth

- (1) Blackgram (2) Paddy (3) Sugarcane (4) Groundnut

Ans. (4)

Sol. Groundnut would require minimum quantity of urea or NPK for its growth.

39. Read the following statements and select the correct option.

- (A) Wind pollinating flowers need to produce more quantity of pollen grains
 - (B) Seeds from cross pollinated flowers produce weaker and less healthy plants
- (1) 'A' is false 'B' is true (2) 'A' is true 'B' is false
(3) Both 'A' and 'B' are true (4) Neither 'A' nor 'B' are true

Ans. (2)

Sol. Statement A is true and statement B is false.

40. Protein catalysts of chemical reactions in biological system

- (1) Hormones (2) Vitamins
(3) Enzymes (4) Both hormones and enzymes

Ans. (3)

Sol. Enzymes are the biological catalyst.

41. The British Victory in the Battle of Plassey implied

- (1) Mir Kasim became the Nawab of Bengal
- (2) Robert Clive introduced the dual government
- (3) Foundation of the British empire in India had been laid
- (4) All India rulers adopted modern British military strategies in later wars.

Ans. (3)

Sol. The British defeated nawab siraj-ud-daula and appointed Mir jafar as the nawab of bengal.

In return to this, the British got zamindari right of 24 parganas and became all powerful.

- 42.** Find out the correct statement/s with reference to Anglo-Mysore wars
 (a) Haider Ali crowned himself as the ruler of Mysore.
 (b) Tippu rejected the subsidiary alliance of the British
 (c) Rockets (missiles) were extensively used by Tippu and Haider.
 (d) The marathas and the Nizam of Hyderabad supported Haider and Tippu in the wars.
 (1) a, c and d only (2) b and c only (3) a and d only (4) b, c and d only

Ans. (2)

- Sol.** * Hyder ali crowned himself the ruler of Mysore in 1761.
 * Anglo mysore war started in the year 1767 [6 years later]
 * Nizam of Hyderabad and the Marathas helped Hyder Ali only in the first anglo mysore war. Tippu entered the war by the end of second anglo mysore war. He did not get any support from them.
 * These sources prove the options (a) and (b) wrong.
 Hence ans is [b and c] option 2.

- 43.** Choose the correct sequence to indicate the following statements as True (T) or False (F). During the Middle of 19th C
 (a) Indian handicraft products lost markets outside India.
 (b) Industrial capitalism made India rich.
 (c) Feudal system in Indian agriculture was encouraged under trade capitalism.
 (d) Large cities and towns sprang up in India.
 (1) F. T. T. F (2) T. F. T. F (3) T. F. F. F (4) T. F. F. T

Ans. (4)

- Sol.** * The entry of British to India deteriorated the market conditions. Indian handicrafts couldn't find market inside the country. So, its obvious that they couldn't be sold outside as the people didn't travel.
 * Industrial capitalism made the British rich not Indian as mentioned in the statement.
 * Feudal system was not encouraged.
 * Cities and towns did not develop.

- 44.** Match the following :

| Column-I | Column-II |
|--|--|
| (A) Samvad Kaumudi | (i) Swami Vivekananda |
| (B) Satyarth Prakash | (ii) Mrs. Annie Besant |
| (C) Ghulamgiri | (iii) Rajaram Mohan Roy |
| (D) New India | (iv) Dayanand Saraswathi |
| | (v) Jyothiba Phule |
| (1) (A) – (iii), (B) – (iv), (C) – (v), (D) – (ii) | (2) (A) – (ii), (B) – (iii), (C) – (iv), (D) – (v) |
| (3) (A) – (iv), (B) – (v), (C) – (i), (D) – (iii) | (4) (A) – (v), (B) – (i), (C) – (ii), (D) – (iv) |

Ans (1)

- Sol.** * The options are matched according to the facts available. Hence option - 1 is the right answer

- 45.** Find out the incorrect statement about consequences of I War of Indian Independence.

- (1) Rule of the East India Company ended
 (2) India came under the direct rule of the British Government
 (3) The Doctrine of Lapse was retained
 (4) Queen Victoria issued a Proclamation

Ans. (3)

- Sol.** The doctrine of lapse was not retained after the I war of Indian Independence

46. In the early 20thC.

Assertion (A) : Indian handloom industry made a steady progress.

Reason (R) : These industries used flying shuttle in the weaving process.

- (1) 'A' is true but 'R' is false
- (2) 'R' is true but 'A' is false
- (3) Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
- (4) Both 'A' and 'R' are true but 'R' is not the correct explanation of 'A'

Ans. (3)

Sol. Handloom industries used flying shuttle in the weaving process is correct explanation of option (a)

47. Arrange the following events in chronological order.

- (a) Arrival of Simon Commission
 - (b) Celebration of Poorna Swaraj
 - (c) Kheda Satyagraha
 - (d) Withdrawal of Partition of Bengal
- (1) a, d, b, c (2) d, c, a, b (3) b, c, d, a (4) a, c, d, b

Ans. (2)

Sol. d – Withdrawal of partition of Bangal – 1911

c – Kheda satyagraha – 1918

a – Arrival of Simon Commission – 1928

b – Celebration of Poorna Swaraj – 1930

48. Which of the following statement is/are true regarding the I.N.A and S.C Bose?

- (a) S.C. Bose took over the leadership of the I.N.A in Tokyo
 - (b) The I.N.A. captured Mowdak (near Chiagong) during its military operations against the British
 - (c) Provisional Government of Free India was setup in Singapore in 1943
 - (d) The British Government tried and punished the captured officers of the I.N.A
- (1) a, b and d are correct (2) b and d are correct
(3) b and c are correct (4) a and b are correct

Ans (1)

Sol. Provisional govt. of free India was setup in Singapore in 1943 but not related to INA so option 3 is correct.

49. Arrange the shaded regions shown on the map of India in chronological order of their merger with the Indian Union.



- (1) I, III, IV, II (2) II, I, IV, III (3) III, II, I, IV (4) IV, I, II, III

Ans. (2)

Sol. Hyderabad - 1948, Junagad - 1949 Jammu & kashmir - 1949 Goa - 1961 chronological order vise option - 2 is correct.

50. Assertion (A) : The East and the West Germany were reunited in 1990.

Reason (R) : Communist Government collapsed in the U.S.S.R in 1991.

- (1) Both 'A' and 'R' are correct and 'R' is the correct explanation of 'A'
- (2) Both 'A' and 'R' are correct but 'R' is not the correct explanation of 'A'
- (3) 'A' is true but 'R' is false
- (4) 'A' is false but 'R' is true

Ans. (2)

Sol. Assertion and Reason both are correct. However, the collapse of VSSR was not the reason for Germany unification.

51. Match the Column-I with appropriate items in Column-II by selecting the correct code given below:

| Column-I | Column-II |
|--|--|
| (a) The League of Nations | (i) Mao-Tse - Tung |
| (b) 5 year plans | (ii) Woodrow Wilson |
| (c) Perestroika | (iii) Joseph Stalin |
| (d) Cultural Revolution | (iv) Benito Mussolini |
| | (v) Gorbachev |
| (1) (a) – (ii), (b) – (iii), (c) 5 (v), (d) – (i) | (2) (a) – (iii), (b) – (iv), (c) – (ii), (d) – (v) |
| (3) (a) – (ii), (b) – (iv), (c) – (iii), (d) – (i) | (4) (a) 5 (iv), (b) – (i), (c) – (iii), (d) – (v) |

Ans. (1)

Sol. The option are matched according to the facts available.

52. Which of the following statement/s is/are correct regarding functions of banks?

- (a) Foreign exchange transactions are conducted
 - (b) Only private business transactions are carried out
 - (c) They formulate common monetary policy for all banks
 - (d) They provide safe deposit lockers
- (1) (a), (c) and (d) (2) (b) and (c) (3) (d) and (d) (4) (b), (c) and (d)

Ans. (1)

Sol. Option (b) is wrong, which states that only private business transactions are carried out.

53. Regarding Life Insurance

Assertion (A) : The premium is paid in lumpsum, at the time of purchasing the policy, by an employee.

Reason (R) : It provides tax - relief benefits for the policy holder.

- (1) 'A' is true but 'R' is false.
- (2) 'A' is false but 'R' is true.
- (3) Both 'A' and 'R' are correct, but 'R' is not the correct explanation of 'A'.
- (4) Both 'A' and 'R' are correct and 'R' is the correct explanation of 'A'.

Ans. (2)

Sol. (R) is correct. (A) is wrong. The premium is not paid in lumpsum at the time of purchasing the policy.

54. Examine the following statements and select the correct option:
 (A) An entrepreneur's main objective is to provide service to the public
 (B) There is no risk of loss, since the business is protected by the Government
 (1) 'A' is false, 'B' is true (2) 'A' is true, 'B' is false
 (3) Both 'A' and 'B' are true (4) Neither 'A' nor 'B' is true

Ans. (4)

Sol. Both (A) and (B) are wrong.
 Related to Entrepreneur option (a) & (b) are wrong.

55. In the wake of globalisation

Assertion (A) : There is a steady rise in unemployment, in the developed countries like the U.S.A.

Reason (R) : Out sourcing of employees from the developing countries helps the MNC's in maximising the profit.

- (1) 'A' and 'R' are true, and 'R' is the correct explanation of 'A'
 (2) 'A' and 'R' are correct but 'R' is not the correct explanation of 'A'
 (3) 'A' is true but 'R' is false
 (4) 'R' is true but 'A' is false

Ans. (1)

Sol. Developed countries are recruiting employees from developing countries for less salary. This in turn is making the natives of developed countries unemployed.

56. The Indus River flows between the ranges of

- (1) Pir Panjal and Mussorie (2) Ladakh and Zaskar
 (3) Pir Panjal and Zaskar (4) Ladakh and Mussorie

Ans. (2)

Sol. The Indus river flows between the ranges of Ladakh and Zaskar.

57. Match List-I (States) with List-II (Caused for land degradation). Select the correct answer using the codes given below:

List-I (States)

- (A) Jharkhand and Chhattisgarh
 (B) Gujarat and Rajasthan
 (C) Punjab and Haryana
 (D) Assam and Arunachal Pradesh

List-II (Caused for land degradation)

- (i) Overgrazing
 (ii) Floods
 (iii) Mining
 (iv) Over irrigation

- (1) (A) – (iii), (B) – (ii), (C) – (iv), (D) – (ii) (2) (A) – (iv), (B) – (i), (C) – (iii), (D) – (ii)
 (3) (A) – (i), (B) – (ii), (C) – (iv), (D) – (iii) (4) (A) – (ii), (B) – (iv), (C) – (i), (D) – (iii)

Ans. (1)

Sol. The options marked correctly are the reasons for land degradation of the given states.
 option - 1 is marked correctly

58. One of the following is the correct order of major irrigation projects in India from North to South

- (1) Rihind, Kosi, Hirakud, DVC (2) Kosi, Rihind, DVC, Hirakud
 (3) Hirakud, DVC, Rihind, Kosi (4) DVC, Kosi, Hirakud, Rihind

Ans. (2)

Sol. As per the location of ports

59. Uttar Pradesh stands first in the production of wheat because:

- (i) It receives less than 50 cm of Rainfall.
- (ii) It has well drained plain area and fertile alluvial soil.
- (iii) It has 20°C - 32°C of temperature
- (iv) It has excellent canal irrigation system

Select appropriate statements

- (1) (i), (ii) and (iii) (2) (i), (iii) and (iv) (3) (ii), (iii) and (iv) (4) (i), (ii) and (iv)

Ans. (3)

Sol. Option - ii, iii, iv, fulfill the required criteria to grow wheat

60. Identify the descending order of Land Use Pattern in India in the year 2007.

- (A) Forest area
 - (B) Net sown area
 - (C) Area under non - agricultural use
 - (D) Barren and waste land
- (1) (B), (C), (A) and (D) (2) (B), (A), (C) and (D)
(3) (B), (A), (D) and (C) (4) (B), (D), (A) and (C)

Ans. (2)

Sol. Descending order of land use pattern in India in 2007

- (1) Net sown area [B] (2) Area under non agricultural use [A]
(3) Barren and wasteland [C] (4) Forest area [D]

61. Identify the correct matching pairs :

- (A) Siderite – Iron ore
 - (B) Pyrolusite – Bauxite
 - (C) Biolite – Manganese
 - (D) Lignite – Coal
- (1) (A) and (B) (2) (B) and (D) (3) (A) and (D) (4) (A) and (C)

Ans (3)

Sol. Siderite – Iron ore and Lignite – coal are correct matching pairs as compound to B and C.

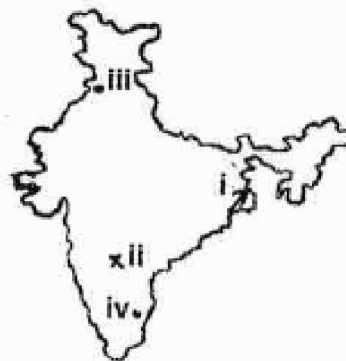
62. Connecting of Delhi, Mumbai, Chennai and Kolkata by 6 lane golden quadrilateral highway started in 1999 by

- (1) NHDP (2) NHAI (3) CADP (4) CPWD

Ans. (2)

Sol. Golden Quadrilateral was the largest highway project completed in India. The project was launched by NDA government led by Atal Bihari vajpayee in 2001 and NHAI maintenance golden quadrilateral highway project.

63. Match the International Airports on the map of India (i, ii, iii, iv) with their respective names?



- (A) Raja Sansi International Airport
 - (B) Anna International Airport
 - (C) Subhaschandra Bose International Airport
 - (D) Rajeev Gandhi International Airport
- (1) (A) – (i), (B) – (iii), (C) – (iv), (D) – (ii) (2) (A) – (iii), (B) – (ii), (C) – (iv), (D) – (i)
(3) (A) – (iv), (B) – (iii), (C) – (ii), (D) – (i) (4) (A) – (iii), (B) – (iv), (C) – (i), (D) – (ii)

Ans. (4)

Sol. (A) – Raja sansi International Airport in Amritsar Punjab hence (iii)

(B) – Anna International Airport in Chennai (iv)

(C) – Subhash Chandra Bose International Airport in Kolkata hence (i)

(D) – Rajiv Gandhi International Airport in Hyderabad hence (ii) [According to location given in Map]

- 64.** Identify the correct set of major ports along the East Coast of India
(1) Ennore, Paradeep, Tuticorin, Haldia (2) Ennore, Vishakapatnam, Tuticorin, Kandla
(3) Chennai, Ennore, Marmagao, Kochi (4) Ennore, Tuticorin, Kochi, Haldia

Ans. (1)

Sol. Ennore port in Chennai, Paradeep port in Odisha Tuticorin in Tamilnadu and Haldia in Kolkata these all are situated in East coast of India.

- 65.** Three iron and steel plants at Kulti, Hirapur and Burnpur were merged together and are now known as
(1) VISCO (2) IISCO (3) BISCO (4) DISCO

Ans (2)

Sol. Three iron and steel plants at kulti, Hirapur and Burnpur were merged together and are known as IISCO. Steel plant of Steel Authority of India Limited.

- 66.** Information on regarding the Earth surface is collected by
(1) Global Information System (2) Geographical Positioning System
(3) Advanced Technology (4) Remote Sensing Technology

Ans. (4)

Sol. Remote sensing technology collects information regarding the earth surface. It gather information about distance without physically touching the objects.

- 67.** Name the Constitutional Section which prohibits the practice of untouchability i.e., Untouchability Crime Act (1955).
(1) Section – 17 (2) Section – 12 (3) Section – 18 (4) Section – 19

Ans. (1)

Sol. Article 17 of Indian constitution seeks to abolish ‘untouchability’

- 68.** Read the statements and identify the correct answer:

- (i) Specialization developing in every field.
- (ii) Industries have grown in number.
- (iii) Expansion of Trade and Commerce.
- (iv) Invest money and gaining a lot of profit.

These lead to :

- (1) Division of Labour (2) Discrimination in Labour
- (3) Formation of Strata in Society (4) Division of Class

Ans. (1)

Sol. Specialization developing in every field industrial development, expansion of trade, commerce, investing money & gaining profit is possible only by division of labour not discrimination of labour hence answer 1 is correct.

- 69.** Read the statements and identify the correct answer:

- (i) Sometimes it leads to large scale loss of property and lives.
- (ii) It become serious challenges for law and order.
- (iii) It do not continue for a long time
- (iv) Communal and group clashes are some example of it.

- (1) Mobs (2) Riots
- (3) Collective behaviour and movements (4) Revolution

Ans. (2) [Riots]

Sol. Riots have become serious challenge for law and order, sometimes it leader of large scale loss & best example of communal & group clasher hence ‘Riots’ is correct answer.

70. Self awareness, self motivation and mutual trust to fulfill the economic and social necessities by efforts and co-operation' - This statement refers to

- (1) Micro – finance activity (2) Women’s self help groups
 (3) Women right oppurtunity (4) Representation in developmental projects

Ans. (2) [Women’s self help groups]

Sol. There are self help groups based on trust and co-operation. The concept of women’s self help group is derived from self-awareness, self motivation and mutual trust to fulfill the economic social necessities by their own efforts and co-operation.

71. Match the List-‘A’ (Concepts) with List-‘B’ (Descriptions) and select the correct matched codes given below

List - ‘A’ (Concepts)

- (A) Secular
 (B) Socialist
 (C) Sovereignty
 (D) Republic

List - ‘B’ (Descriptions)

- (I) Equal distribution of National Income
 (II) The Head of the State elected by people
 (III)Country free from Internal and external forces
 (IV)Follow any religion of people’s choice

Codes :

- (1) (A) – (ii), (B) – (iv), (C) – (i), (D) – (iii) (2) (A) – (iv), (B) – (i), (C) – (iii), (D) – (ii)
 (3) (A) – (iii), (B) – (iv), (C) – (ii), (D) – (i) (4) (A) – (iv), (B) – (i), (C) – (ii), (D) – (iii)

Ans. (2) (A) – (iv), (B) – (i), (C) – (iii), (D) – (ii) is option : 2

Sol. (1) Secular : People can follow any religion of their choice.
 (2) Socialist : Wealth distribution equally among rich / poor.
 (3) Sovereignty : Government free from ecternal control
 (4) Republic : From of Government whose headof state is not a nonarch.

72. Which of the following are associated with UNO?

- (a) Franklin D. Roosevelt (b) Veto Power
 (c) Common Market System (d) Military Alliance
 (e) New York City (f) British Supremacy

Choices

- (1) (a), (d), (f) (2) (b), (c), (e) (3) (a), (b), (e) (4) (c), (d), (f)

Ans. (3) ie, (a), (b), (e) is option : 3

Sol. The term United Nations was coined by President Franklin. D. Roosevelt & was first used in the declaration of 1st Jan 1942 signed by 26 nations & UNO Head quarters in New York.

73. Choose the correct sequence to indicate the following statements are True (T) or False (F)

- (A) In case of Money Bills, the Rajya Sabha has virtually no powers.
 (B) The Ministers are individually responsible to the President not collectively to the House of the People.
 (C) The President of India doesn’t have any power to withdraw the ordinance at any time after once promulgate it.

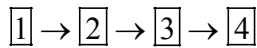
Choices :

- (1) TFT (2) FTT (3) TFT (4) FTF

Ans. (3) Choices option : 3 ie TFT

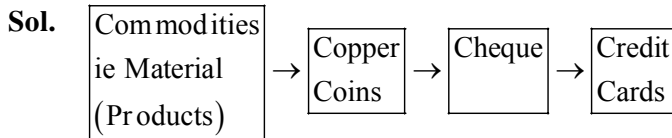
Sol. According to parliamentary bills Information system loksabha passes the bill. House of people is Loksabha, lawmaking is done by Prime Minister & cabinet ministers and President has right to address either or both houses of parliament.

77. The course of evolution of money is depicted in the following flow diagram. Identify the correct sequence.



- (a) Copper coins (b) Credit coins (c) Commodities (d) Cheques
 (1) 1a, 2b, 3c, 4d (2) 1d, 2c, 3b, 4a (3) 1b, 2d, 3a, 4c (4) 1c, 2a, 3d, 4b

Ans. (4) Option : 4 ie 1 c, 2 a, 3 d, 4 b Payment procedure followed



78. Income sources of Central Government are given below.

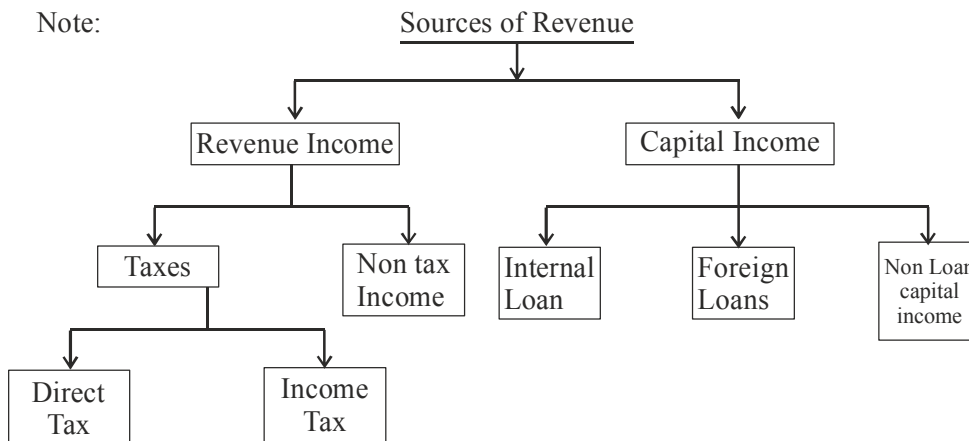
- (a) Internal and Foreign Loans
 (b) Coins and Mints
 (c) Disinvestment

Which of the above source/sources is/are the Capital Receipts of Central Government?

- (1) (a) only (2) (b) only (3) (a) and (c) only (4) (a) and (b) only

Ans. (3) Option : 3 is a and c only (Disinvestment means withdrawal of capital)

Sol: Note:



- | | |
|-----------------|---------------------|
| (1) Income | (1) Central |
| (2) Company | (2) Import Export |
| (3) Wealth | (3) Service |
| (4) Other Taxes | (4) Other Taxes |

Answer the Question no. 79 and 80 based on following table

| Country | Total National Income | Population | |
|---------|-----------------------|------------|--------|
| | | Male | Female |
| P | 10800 | 635 | 465 |
| Q | 10450 | 575 | 375 |
| R | 9000 | 380 | 220 |
| S | 10400 | 285 | 515 |

79. The country which has high per capita income is
 (1) P (2) Q (3) R (4) S

Ans. (3) Option : 3 ie country. R

Sol. Per capita Income = $\frac{\text{National Income}}{\text{No of population}}$

So. per capita
of Countries

$$(1) P = 10,800 \quad \frac{M}{635} \frac{F}{465} = \frac{10,800}{(635+465) \cdot 1100} = 9.818$$

Country P = 9.818

$$(2) Q = 10,450 \quad \frac{M=575}{F=375} = \frac{10,450}{575+375} = \frac{10,450}{950} = 11$$

Country Q = 11

$$(3) R = 9000 \quad \frac{M=380}{F=220} = \frac{9000}{380+220} = \frac{9000}{600} = 15$$

Country R = 15

$$(4) S = 10,400 \quad \frac{\text{Male}=285}{\text{Female}=515} = \frac{10,400}{285+515} = \frac{10,400}{800} = 13$$

Country S = 13

So country R has the high per capita Income ie R = 15

80. Identify the correct chronological order of nations which has low per capita income to high per capita income

- (1) PQRS (2) SQRP (3) RSPQ (4) QPSR

Ans. Option : Not given hence bonus

Sol. Answer should be PQSR ie lower per capita Income to High per capita income

$$P = 9.818 \quad R = 15$$

$$Q = 11 \quad S = 13$$

is so PQSR ie 9.818 , 11, 13, 15

81. The variance of 20 observation is 5. If each observation is multiplied by 2, then new variance of the resulting observations is

- (1) 7 (2) 10 (3) 20 (4) 40

Ans. (3)

Sol. n = 20, Variance = 5

\bar{x} = Mean of 20 observation

x_1, x_2, \dots, x_{20} are 20 obseravtion

$$\frac{1}{20} \sum_{i=1}^{20} (x_i - \bar{x})^2 = 5 \quad \sum_{i=1}^{20} (x_i - \bar{x})^2 = 100 \dots (1)$$

If each observation is multiplied by 2, then the new observation are $y_1 = 2x_1, y_2 = 2x_2$

$$\therefore y_i = 2x_i$$

$$\Rightarrow x_i = \frac{y_i}{2}$$

$$\therefore \bar{y} = \frac{1}{20} \sum_{i=1}^{20} y_i = \frac{1}{20} \times \sum_{i=1}^{20} 2x_i \Rightarrow \bar{y} = \frac{\bar{y}}{2}$$

Substituting in (1)

$$\sum_{i=1}^{20} \left(\frac{y_i}{2} - \frac{\bar{y}}{2} \right)^2 = 100 \quad \sum_{i=1}^{20} \frac{1}{4} (y_i - \bar{y})^2 = 100 \quad \sum_{i=1}^{20} (y_i - \bar{y})^2 = 400$$

$$\therefore \text{New Variance} = \frac{\sum_{i=1}^{20} (y_i - \bar{y})^2}{20} = \frac{400}{20} = 20$$

82. The polynomials $(x^3 - 1)$ and $(x^2 + 1)$ are divided by $(x + 1)$ leave the remainder as R_1 and R_2 .

The true statement among the following is

- (1) $R_1 + R_2 = 0$ (2) $R_1 - R_2 = 0$ (3) $2R_1 + R_2 = 0$ (4) $R_1 - 2R_2 = 0$

Ans. (1)

Sol. $R_1 + R_2 = 0$

By remainder theorem

$$\text{Let } f(x) = x^3 - 1 \quad \& \quad g(x) = x^2 + 1$$

$$f(-1) = (-1)^3 - 1 \quad g(-1) = (-1)^2 + 1 \\ = -2 = 2$$

$$R_1 = -2$$

$$R_2 = 2$$

$$R_1 + R_2 = 0$$

83. In $\triangle ABC$, $XY \parallel BC$ and XY divides the triangle into two parts of equal areas. The value of $\frac{AX}{BX}$ is

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

Ans. (4)

Sol. $\text{ar}(\triangle AXY) = \text{ar}(\triangle XBCY)$

$$\text{ar}(\triangle ABC) = \text{ar}(\triangle AXY) + \text{ar}(\triangle XBCY)$$

$$= 2\text{ar}(\triangle AXY) \quad \therefore XY \parallel BC$$

$$\angle AXY = \angle ABC$$

$$\angle AYX = \angle ACB \quad \therefore \triangle AXY \sim \triangle ABC$$

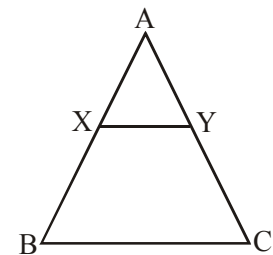
$$\frac{\text{ar}(\triangle AXY)}{\text{ar}(\triangle ABC)} = \frac{(AX)^2}{(AB)^2} \Rightarrow \frac{1}{2} = \frac{(AX)^2}{(AB)^2} \Rightarrow \frac{AX}{AB} = \frac{1}{\sqrt{2}}$$

$$\frac{AB}{AX} = \frac{\sqrt{2}}{1}$$

$$\frac{AB - AX}{AX} = \frac{\sqrt{2} - 1}{1} \quad (\text{By Dividendo})$$

$$\frac{BX}{AX} = \frac{\sqrt{2} - 1}{1}$$

$$\frac{AX}{BX} = \frac{1}{\sqrt{2} - 1} \times \frac{\sqrt{2} + 1}{\sqrt{2} + 1} = \sqrt{2} + 1$$



84. If $a = \sqrt{5+2\sqrt{6}}$ then $\frac{1+a^4}{a^2} =$

- (1) $4\sqrt{6}$ (2) 10 (3) 5 (4) $2\sqrt{6}$

Ans. (2)

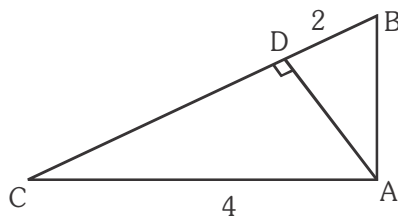
Sol. $a^2 = 5+2\sqrt{6}$

$$a^4 = 25+24+20\sqrt{6}$$

$$= 49+20\sqrt{6}$$

$$\frac{a^4+1}{a^2} = \frac{1+49+20\sqrt{6}}{5+2\sqrt{6}} = \frac{50+20\sqrt{6}}{5+2\sqrt{6}} = 10$$

85.



In the given figure, if $AD \perp BC$, $AC = 4$, $BD = 2$

$AB = a$ and $CD = b$ then $a^2 + b^2 =$

- (1) 6 (2) 8 (3) 12 (4) 20

Ans. (4)

Sol. In $\triangle ADC$

$$AC^2 = AD^2 + DC^2$$

$$16 = AD^2 + b^2$$

$$AD^2 = 16 - b^2 \quad (1)$$

In $\triangle BDA$

$$BA^2 = BD^2 + AD^2$$

$$a^2 = 4 + AD^2 \quad (2)$$

from (1) and (2)

$$16 - b^2 = a^2 - 4$$

$$-a^2 - b^2 = -16 - 4$$

$$a^2 + b^2 = 20$$

86. If $\sin x + \sin^2 x = 1$ then the value of

$$\cos^{12} x + 3\cos^{10} x + 3\cos^8 x + \cos^6 x \text{ is}$$

- (1) 0 (2) 1 (3) 2 (4) 3

Ans. (2)

Sol. $\sin x + \sin^2 x = 1$

$$\sin x = \cos^2 x \Rightarrow \sin^2 x = \cos^4 x$$

Now,

$$\cos^{12} x + 3\cos^{10} x + 3\cos^8 x + \cos^6 x$$

$$= (\cos^4 x + \cos^2 x)^3$$

$$= (\sin^2 x + \sin x)^3 = (1)^3 = 1$$

87. The area of the triangle formed by the points $(a, b+c), (b, c+a)$ and $(c, a+b)$ is

- (1) 0 (2) 1 (3) $\frac{abc}{2}$ (4) $\frac{a+b+c}{2}$

Ans. (1)

Sol. Area of $\Delta = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$
 $= \frac{1}{2} |a(c+a-b) + b(a+b-c) + c(b+c-a)|$
 $= \frac{1}{2} |ac+ab-bc+bc+ac-ac|$
 $= 0$

88. Two lines are to be parallel. The equation of one of the lines is $8x + 6y = 28$. The equation of the second line can be

- (1) $3x + 4y = 14$ (2) $6x + 8y = 28$ (3) $2y + x = 28$ (4) $3y + 4x = 14$

Ans. (4)

Sol. Equation of line $8x + 6y = 28 \Rightarrow 4x + 3y - 14 = 0$
 Line // to the above line, will have same slope
 Hence, $4x + 3y = 14$

89. If A and G are AM and GM of two given positive numbers 'a' and 'b', then $\left(\frac{\sqrt{a}-\sqrt{b}}{\sqrt{2}}\right)^2 =$

- (1) $A + G$ (2) $A - G$ (3) $A \times G$ (4) $A \div G$

Ans. (2)

Sol. $A.M = \frac{a+b}{2}$ $G.M = \sqrt{ab} \Rightarrow \left(\frac{\sqrt{a}-\sqrt{b}}{\sqrt{2}}\right)^2$
 $\Rightarrow \frac{a+b-2\sqrt{ab}}{2} \Rightarrow \frac{a+b}{2} - \frac{2\sqrt{ab}}{2} \Rightarrow A - G$

90. If the m^{th} term of harmonic progression is "n" and n^{th} term is "m" then $(mn)^{\text{th}}$ term is

- (1) mn (2) $\frac{1}{mn}$ (3) 1 (4) -1

Ans. (3)

Sol. m^{th} term of H.P is n
 n^{th} term of H.P is m
 $A/q,$

$$\frac{1}{a+(m-1)d} = n \Rightarrow a+(m-1)d = \frac{1}{n} \dots\dots(i)$$

$$\frac{1}{a+(n-1)d} = m \Rightarrow a+(n-1)d = \frac{1}{m} \dots\dots(ii)$$

(i) - (ii)

$$(m-n)d = \frac{1}{n} - \frac{1}{m} \quad (m-n)d = \frac{(m-n)}{mn}$$

$$d = \frac{1}{mn}$$

Put d in equation (i)

$$\Rightarrow a + (m-1)\frac{1}{mn} = \frac{1}{n} \Rightarrow a = \frac{1}{mn}$$

$$a_{mn} = \frac{1}{a + (mn-1)d}$$

$$= \frac{1}{\frac{1}{mn} + (mn-1)\frac{1}{mn}} = \frac{1}{\frac{1}{mn} + 1 - \frac{1}{mn}} = 1$$

91. The maximum number of non - empty subsets of set {0, 1, 2, 3} is

- (1) 7 (2) 8 (3) 15 (4) 16

Ans. (3)

Sol. $A = \{0, 1, 2, 3\}$

\therefore set A has 4 elements

\therefore Maximum no. of possible

subsets = 2^4

Out of which 1 set is ϕ

\therefore No. of non - empty subsets = $16 - 1$

= 15

92. The number of arrangements of all the letters of the word "GOURI", so that all vowels do not occur together will be

- (1) 36 (2) 84 (3) 108 (4) 120

Ans. (2)

Sol. GOURI

Total permutations = $5!$

(without restrictions)

Now, G, R, O U I

Now, permutations keep the vowels together = $3! 3!$

\therefore Required permutations = $5! - 3! 3! = 84$

93. If ${}^{2n}C_3 : {}^nC_3 = 12 : 1$ then the value of 'n' is

- (1) 5 (2) 6 (3) 10 (4) 11

Ans. (1)

Sol. ${}^{2n}C_3 : {}^nC_3 = 12 : 1$

$$\frac{2n!}{(2n-3)! 3!} = \frac{12}{\frac{n!}{(n-3)! 3!}}$$

$$\frac{2n(2n-1)(2n-2)}{n(n-1)(n-2)} = 12$$

$$\frac{2(2n-1)2(n-1)}{2(n-1)(n-2)} = 12$$

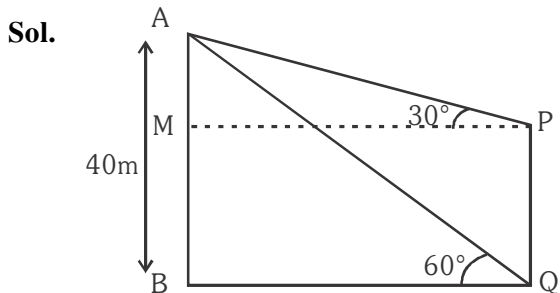
$$2n-1 = 3n-6$$

$$n = 5$$

94. There are two temples one on each bank of a river just opposite to each other. One temple is 40 m high. As observed from the top of this temple, the angle of depression of the top and foot of the other temple are 30° and 60° respectively. The width of river is

- (1) $\frac{40\sqrt{3}}{3}$ m (2) $\frac{40}{3}$ m (3) $\frac{120}{\sqrt{3}}$ m (4) $\frac{80}{\sqrt{3}}$ m

Ans. (1)



In $\triangle ABQ$, $\frac{AB}{BQ} = \tan 60^\circ \Rightarrow \frac{AB}{BQ} = \sqrt{3} \Rightarrow BQ = \frac{AB}{\sqrt{3}}$

$BQ = \frac{40}{\sqrt{3}}$

Width of the river = $\frac{40\sqrt{3}}{3}$ m

95. Out of 30 consecutive positive numbers 2 are choose at random. The probability that their sum is odd is

- (1) $\frac{10}{29}$ (2) $\frac{14}{29}$ (3) $\frac{15}{29}$ (4) $\frac{16}{29}$

Ans. (3)

Sol. Out of 30 consecutive positive number
15 numbers are even
15 numbers are odd

To have the sum as odd, we must add one even number and one odd number
 \therefore We must select one even number out of 15 even numbers, and odd number out of 15 odd numbers.
In total, we have to select 2 numbers out of 30 numbers

\therefore Required probability = $\frac{{}^{15}C_1 \times {}^{15}C_1}{{}^{30}C_2} = \frac{15 \times 15 \times 2}{30 \times 29} = \frac{15}{29}$

96. **Statement A :** The rationalising factor of $\sqrt[3]{a} + \sqrt[3]{b}$ is $\sqrt[3]{a} - \sqrt[3]{b}$

Statement B : The product of $(\sqrt[3]{a} - \sqrt[3]{b})$ and $(\sqrt[3]{a^2} + \sqrt[3]{b^2} + \sqrt[3]{ab})$ is $(a - b)$.

- (1) Both A and B statements are true (2) Both A and B statements are false
(3) A is true and B is false (4) A is false and B is true

Ans. (4)

Sol. Statement A

$$\begin{aligned} & (\sqrt[3]{a} + \sqrt[3]{b}) \times (\sqrt[3]{a} - \sqrt[3]{b}) \\ &= (a)^{\frac{2}{3}} - (b)^{\frac{2}{3}} \rightarrow \end{aligned}$$

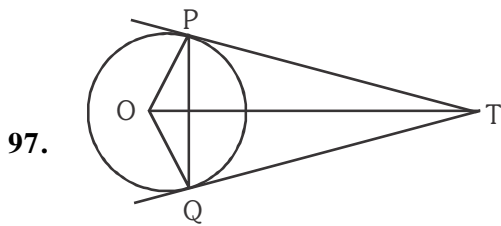
This is not the standard form

So statement A is false

Statement B

$$\begin{aligned} & (\sqrt[3]{a} - \sqrt[3]{b}) \times (\sqrt[3]{a^2} + \sqrt[3]{b^2} + \sqrt[3]{ab}) \\ &= \left(a^{\frac{1}{3}}\right)^3 - \left(b^{\frac{1}{3}}\right)^3 = a - b \end{aligned}$$

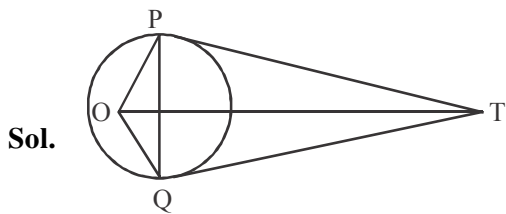
Statement B is correct



TP and TQ are tangents drawn to a circle with centre 'O' $\angle OPQ = 2a$, measure of $\angle PTO$ is

- (1) $\frac{1}{2}a$ (2) a (3) 2a (4) 4a

Ans. (3)



$$\begin{aligned} \angle OPQ &= 2a \\ \angle OQP &= 2a \\ \angle POQ &= 180 - 4a \\ \angle POT &= \frac{\angle POQ}{2} = 90 - 2a \end{aligned}$$

So

$$\begin{aligned} \angle POT + \angle OPT + \angle PTO &= 180^\circ \\ 90 - 2a + 90 + \angle PTO &= 180^\circ \\ \angle PTO &= 2a \end{aligned}$$

98. If one root of the equation $x^2 + ax + b = 0$ is $\frac{1}{3}$ times the other. Then the correct relations among the following is

- (1) $3a^2 = 16b$ (2) $16a^2 = 3b$ (3) $3a = 16b^2$ (4) $16a = 3b^2$

Ans. (1)

Sol. $x^2 + ax + b = 0$
 Roots $\rightarrow B, \frac{1}{3}B$

$$B + \frac{1}{3}B = -a, \frac{4}{3}B = -a$$

$$B = \frac{-3a}{4} \dots (1)$$

$$B \times \frac{1}{3}B = b$$

$$\frac{B^2}{3} = b$$

$$\left(\frac{-3a}{4}\right)^2 = b, \frac{9a^2}{16 \times 3} = b$$

$$3a^2 = 16 \times b$$

99. The mean and mode of a set of data are respectively $2n$ and $5n$. The median of same data is

- (1) $9n$ (2) $7n$ (3) $5n$ (4) $34n$

Ans. (4)

Sol. Mode = $3 \times$ median $- 2 \times$ median

$$5n = 3 \times \text{median} - 2 \times 2n$$

$$5n + 4n = 3 \times \text{median}$$

$$\frac{9n}{3} = \text{median}$$

$$3n = \text{median}$$

100. The diameter of a metal ball is 3.5 cm. If the density of the metal is 9.8 g/cm³ then mass of the ball is

- (1) 200 g (2) 220 g (3) 1600 g (4) 1760 g

Ans. (2)

Sol. Density = $\frac{\text{Mass}}{\text{Volume}}$

$$R = \frac{3.5}{2}$$

$$9.8 = \frac{\text{Mass}}{\frac{4}{3} \times \pi \times R^3}$$

$$\text{Mass} = 9.8 \times \frac{4}{3} \times \pi \times \left(\frac{3.5}{2}\right)^3 = 220\text{g}$$