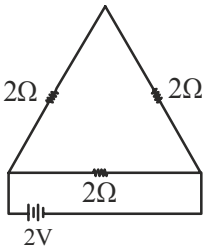
ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)
BENGALURU, KARNATAKA

NATIONAL TALENT SEARCH EXAMINATION
(NTSE-2019) STAGE -1
STATE : KARNATAKA PAPER : SAT

Date: 04.11.2018

Max. Marks: 100 **SOLUTIONS** **Time allowed: 120 minutes**

1. The current in the circuit shown below is



(1) 1.5 A (2) 0.5 A (3) 2.5 A (4) 0.66 A

Ans. (1)

Sol. $R' = 2 + 2 = 4\Omega$

$$R_{eq} = \frac{4 \times 2}{4+2} = \frac{8}{6} = \frac{4}{3}\Omega$$

$$I = \frac{V}{R} = \frac{\cancel{2} \times 3}{\cancel{4}_2} = 1.5\,A$$

2. A Heating unit of an electric stove is rated at 880 W. It is connected to a power supply of 220 V the current it will consume

(1) 2 A (2) 6 A (3) 4 A (4) 8 A

Ans. (3)

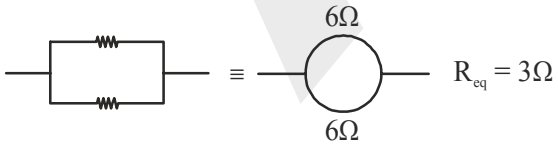
Sol. $P = VI \Rightarrow I = \frac{P}{V} = \frac{880}{220} = 4A$

3. A wire of resistance 12 ohm is bent in the form of a circular ring. The effective resistance between the two points on any diameter of the circle is

(1) 24 Ω (2) 12 Ω (3) 6 Ω (4) 3 Ω

Ans. (4)

Sol.



4. A person needs a lens of power – 4.5D for correction of his/her vision then the focal length of corrective lens is

(1) + 4.5 m (2) – 0.22 m (3) + 0.22 m (4) + 0.45 m

Ans. (2)

Sol. $P = -4.5D,\ f = \frac{1}{P} = \frac{1}{-4.5} = -0.22\ m$

5. Sheela cannot read newspaper when she holds it closer than 100 cm. The defect in her eye and the power of lens prescribed to her [Normal eye near point = 25 cm]

(1) Myopia with + 3D lens (2) Myopia with – 3D lens

(3) Hypermetropia with – 3D lens (4) Hypermetropia with + 3D lens

Ans. (4)

Sol. u = – 25 cm, v = – 100 cm

$$\frac{1}{f}=\frac{-1}{100}+\frac{1}{25}=\frac{3}{100} \qquad f=\frac{100}{3}\text{cm}=+\frac{1}{3}\text{m}$$

$$P=\frac{1}{1/3}=+3\text{D}$$

Farsightedness i.e., Hypermetropia. Corrective lens $\rightarrow$ Convex lens of P = + 3D.

6. A metallic rod falls under gravity with its ends pointing east and west, then

(1) No e.m.f. induced at all

(2) An e.m.f. induced in it as it cuts the magnetic lines of force

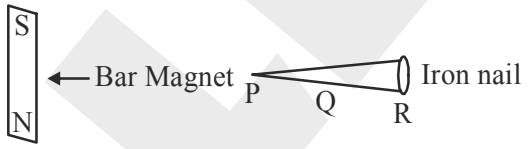
(3) Two e.m.f.s of equal but opposite signs are induced giving no net e.m.f.

(4) Its acceleration is equal to the product of g and the radius of the ring

Ans. (2)

Sol. The rod will cut the horizontal component of earth's magnetic field lines, hence an e.m.f is induced.

7. A bar magnet is used to pick up an Iron nail



At which part P, Q and R is the easiest for the magnet to pick up the iron nail ?

(1) At P (2) At Q

(3) At R (4) It makes no difference at any part

Ans. (3)

Sol. It will be easier of lift from part R.

8. An athlete completes one round of a circular track of radius R in 40 seconds. The displacement at the end of 2 minutes 20 seconds will be

(1) Zero (2) 2R (3) πR (4) 7πR

Ans. (2)

Sol. The displacement at the end of 2 minutes 20 seconds i.e., 140 s will be the diameter because the athlete will complete 3 and half rounds. Therefore, displacement = 2R.

9. The amount of material that releases 4.5×10^{14} J of energy when it is completely converted into energy during a nuclear reaction [Given speed of light $=3\times10^{8}$ m/s]

(1) 0.5 g (2) 5 g (3) 50 g (4) 500 g

Ans. (2)

Sol. $E = mc^2$ $\quad \therefore \quad m = \dfrac{E}{C^2} = \dfrac{4.5\times10^{14}}{\left(3\times10^{8}\right)^2} = \dfrac{\cancel{9}\times10^{14}}{2\times\cancel{9}\times10^{16}}$

$$= \frac{1}{2}\times10^{-2}\,\text{kg} = \frac{1}{2}\times10^{-2}\times10^{3}\,\text{g} = 5\ \text{g}$$

10. For a nuclear reactor 48 KJ of energy is produced per minute. If the energy released per fission is 3.2×10^{-11} J then the number of fissions which would be taking place in a reactor per second is

(1) 5×10^{14} (2) 2×10^{14} (3) 5.2×10^{13} (4) 2.5×10^{13}

Ans. (4)

Sol. 48×10^{3} J in 1 minutes.

$\therefore$ In 1s $\rightarrow$ 800 J of energy will be released.

$$\therefore \text{ Number of fission taking place} = \frac{800}{3.2\times10^{-11}} = 250\times10^{11}$$

$$= 2.5\times10^{13}$$

11. Select the correct statement.

(1) A lens with + 2D power and – 0.5m focal length is convex lens.

(2) A lens with + 2D power and + 0.5m focal length is convex lens.

(3) A lens with – 2D power and + 0.5m focal length is concave lens.

(4) A lens with + 2D power and – 0.5m focal length is concave lens.

Ans. (2)

Sol. Convex lens have positive focal length and power.

$$P = \frac{1}{f} \Rightarrow f = \frac{1}{P} = \frac{1}{+2} = +\,0.5\ \text{m}$$

12. The magnification of image formed at a distance of 4 cm by a needle when it is placed at a distance of X cm away from a convex mirror of focal length 12 cm

(1) – 0.66 (2) + 0.66 (3) – 1.5 (4) + 1.5

Ans. (2)

Sol. $u = x$ $\qquad \dfrac{1}{f} = \dfrac{1}{u} + \dfrac{1}{v} \Rightarrow \dfrac{1}{12} = \dfrac{1}{x} + \dfrac{1}{4} \Rightarrow \dfrac{1}{x} = \dfrac{1}{12} - \dfrac{1}{4} = \dfrac{-1}{6}$

$v = +4$

$f = +12$ $\qquad x = -6$

$$m = \frac{-v}{u} = \frac{-(+4)}{(-6)} = +0.66$$

13. The speed of sound in air at NTP is 332 m/s. If air pressure becomes four times the normal then the speed of sound waves will

(1) Double (2) Quadruple

(3) Remain the same (4) become $\frac{1}{4}$ of the original value

Ans. (3)

Sol. Speed of sound in air is independent of pressure.

14. An isoelectronic species are

a. Na^+ b. Al^{3+} c. Mg^{2+} d. Ca^{2+}

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

Ans. (1)

Sol. Na^+, Mg^{2+}, Al^{3+} = 10 e^-

Ca^{2+} = 18 e^-

15. Identify the correct order of elements according to their metallic character.

(1) B > Al > Mg > K (2) Al > Mg > B > K (3) Mg > Al > K > B (4) K > Mg > Al > B

Ans. (4)

Sol. K > Mg > Al > B (Reactivity series)

16. Identify the correct representation of reaction occurring during chloralkali process.

(1) $2NaCl_{(l)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(l)} + Cl_{2(g)} + H_{2(g)}$

(2) $2NaCl_{(aq)} + 2H_2O_{(aq)} \rightarrow 2NaOH_{(aq)} + Cl_{2(g)} + H_{2(g)}$

(3) $2NaCl_{(aq)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + Cl_{2(aq)} + H_{2(g)}$

(4) $2NaCl_{(aq)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + Cl_{2(g)} + H_{2(g)}$

Ans. (4)

Sol. $2NaCl_{(aq)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + Cl_{2(g)} + H_{2(g)}$

17. Identify the sets of quantum numbers which are not possible?

a. $n = 0, l = 1, m_l = 0, m_s = +\frac{1}{2}$ b. $n = 1, l = 0, m_l = 0, m_s = -\frac{1}{2}$

c. $n = 1, l = 1, m_l = 0, m_s = +\frac{1}{2}$ d. $n = 2, l = 1, m_l = 0, m_s = -\frac{1}{2}$

(1) a and b (2) a and c (3) a and d (4) b and d

Ans. (2)

Sol. n = 0 not possible.

n = ℓ also not possible.

18. An example(s) for endothermic process(es) is (are)

a. Dilution of sulphuric acid b. Sublimation of dry Ice

c. Condensation of water vapours d. Evaporation of water

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

Ans. (4)

Sol. Sublimation and evaporation both are endothermic.

19. $X \xrightarrow{\text{Alkaline } KMnO_4+\text{Heat}} Y$

$Y + X \xrightarrow[(\text{acid})]{\text{Esterification}} Z$

Identify X, Y and Z.

(1) Ethanoic acid, Ethanol and Ethylethanoate (2) Ethanol, Ethylethanoate and Ethanoic acid

(3) Ethanol, Ethanoic acid and Ethylethanoate (4) Ethanoic acid, Ethylethanoate and Ethanol

Ans. (3)

Sol. $\text{Ethanol} \xrightarrow[\Delta]{\text{Alk.}KMnO_4} \text{Ethanoic Acid}$

$\text{Ethanoic Acid} + \text{ethanol} \xrightarrow[\text{acid}]{\text{esterification}} \text{ethylethanoate}$

20. Identify the solid acid at room temperature.

(1) $\begin{matrix}COOH\\|\\COOH\end{matrix}$ (2) CH_3COOH (3) H_2CO_3 (4) HCOOH

Ans. (1)

Sol. Oxalic acid $(COOH)_2$ is solid.

21. Assertion(A): Combustion of 16 g of methane gas liberates 18 g of water.

Reason (R): In the combustion of methane, water is one of the product.

Select the correct option from the given alternatives.

(1) Both A and R are true, but R is not the correct explanation of A

(2) A is true but R is false

(3) A is false but R is true

(4) Both A and R are false

Ans. (3)

Sol. $\underset{(16\text{ gm})}{CH_4} + 2O_2 \longrightarrow CO_2 + \underset{(36\text{ gm})}{2H_2O}$

22. Assertion(A): Sodium Chloride formed by the action of Chlorine gas on sodium metal is a stable compound.

Reason(R): Sodium and Chloride ions acquire octet configuration in sodium Chloride formation.

Select the correct option from the given alternatives.

(1) A and R are correct 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) Both A and R are false

Ans. (1)

Sol. $Na_{(s)} + \frac{1}{2}Cl_{2(g)} \longrightarrow NaCl_{(s)}[\text{Octet complete \& electrostatic force}]$

23. Choose the correct statements about the given chemical reaction.

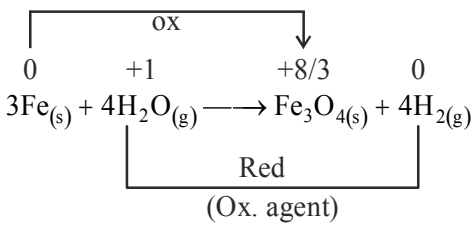
$3Fe_{(s)} + 4H_2O_{(g)} \rightarrow Fe_3O_{4(s)} + 4H_{2(g)}$

a. Iron is getting oxidised.
b. Water is getting reduced.
c. Water is acting as reducing agent.
d. Water is acting as oxidising agent.

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

Ans. (3)

Sol.



24. The half life of a radioisotope is 4 hours. If the initial mass of the isotope was 200 g, the mass remaining after 24 hours undecayed

(1) 1.042 g (2) 3.125 g (3) 2.084 g (4) 4.167 g

Ans. (2)

Sol. $m_i = 200 \text{ gm} \Rightarrow m_f = m_i\left(\frac{1}{2}\right)^6$

$m_f = \cancel{200}^{50} \times \frac{1}{\cancel{4} \times 4 \times 4} = 3.125\text{g}$

25. The element 'X' has an electronic configuration 2, 8, 3. Element 'Y' has an electronic configuration 2, 8, 7. The chemical formula of the compound formed when they react is

(1) Ionic XY_3 (2) Covalent X_3Y (3) Covalent XY_3 (4) Ionic X_3Y

Ans. (3)

Sol. $\underset{(2,8,3)}{X} \longrightarrow X^{+3} + 3e^-$

$\underset{(2,8,7)}{Y} \xrightarrow{+e^-} Y^-$

$\text{comp} = XY_3 \Rightarrow AlCl_3 = \text{covalent compound}$

26. Identify the olfactory indicators.

(1) Vanilla and turmeric (2) Vanilla and petunia (3) Vanilla and clove (4) Vanilla and hydrangia

Ans. (3)

Sol. Vanilla and clove oil, Onion = olfactory indicators.

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

A : When the body size of animals is large, the diffusion pressure alone cannot take care of oxygen delivery to all parts of the body.

B : In human beings, haemoglobin pigments take up oxygen from the air in the lungs to carry it to tissues which are deficient in oxygen.

(1) A is true and B is false (2) A is false and B is true

(3) Both A and B are true (4) Both A and B are false

Ans. (3)

Sol. When the body size of animals is large, the diffusion pressure alone cannot take care of oxygen delivery to all parts of the body.

In human beings, haemoglobin pigments take up oxygen from the air in the lungs to carry it to tissues which are deficient in oxygen.

28. Assertion(A): Plants can survive without separate respiratory organs.

Reason(R): Each plant part takes care of its own gas exchange needs.

Select the correct option from the given alternatives.

(1) A is true and R is false (2) A is false and R is true

(3) Both A and R are true and R explains A (4) Both A and R are true but R doesnot explain A

Ans. (3)

Sol. Each plant part takes care of its own gas exchange needs. Hence, Plants can survive without separate respiratory organs.

29. Match Column - I with Column - II and identify the correct answer.

Column - I		Column - II	
A.	Oxytocin	i.	Reabsorption of water
B.	Luteinizing hormone	ii.	Regulation of diurnal rhythm of our body
C.	Vasopressin	iii.	Uterus contraction during child birth
D.	Melatonin	iv.	Body growth
		v.	Induces ovulation

(1) A – iii, B – v , C – i, D – ii (2) A – ii, B – iii , C – iv, D – i

(3) A – v, B – i , C – ii, D – iv (4) A – v, B – iv , C – i, D – iii

Ans. (1)

Sol.

Column - I		Column - II
A.	Oxytocin	Uterus contraction during child birth
B.	Luteinizing hormone	Induces ovulation
C.	Vasopressin	Reabsorption of water
D.	Melatonin	Regulation of diurnal rhythm of our body

30. The recessive character in pea plant in the following

(1) Violet flower (2) Axillary flower (3) Round seed (4) Green seed

Ans. (4)

Sol. The recessive character in pea plant is Green Seed. Rest of them are dominant character i.e., Violet flower, Axillary flower and Round seed.

31. Assertion(A): The walls of the ventricle are thicker than the walls of the auricles.
Reason(R): The ventricles have to pump blood to long distances and various organs.
Select the correct option from the given alternatives.
(1) A is true and R is false (2) A is false and R is true
(3) Both A and R are true and R explains A (4) Both A and R are true but R does not explain A

Ans. (3)

Sol. The walls of the ventricle are thicker than the walls of the auricles because the ventricles have to pump blood to long distances and various organs.

32. The presence of following kind of bacteria in water indicates contamination by disease causing micro-oganisms
(1) Agrobacterium (2) Coliform (3) Pseudomonas (4) Lactobacillus

Ans. (2)

Sol. The presence of Coliform bacteria in water indicates contamination. Which causse diseases in animals.

33. Read the following statements and select the correct option.
A: Imbibition is a special type of phenomenon by which plant cells absorb water.
B: The rupturing of seed coat in germinating seeds Is due to imbibition.
(1) Both A and B are true (2) Both A and B are false
(3) A is true and B is false (4) A is false and B is true

Ans. (1)

Sol. Imbibition is a special type of phenomenon by which plant cells absorb water.
The rupturing of seed coat in germinating seeds Is due to imbibition.

34. Identify the correct statements about chlorophyll.
A. Chlorophyll is highly sensitive to light.
B. There are varieties in Chlorophyll.
C. The formation of Chlorophyll does not depend on the exposure of the plant to light.
D. Nutritional deficiencies of minerals cause loss of chlorophyll.
(1) A and C only (2) A, B and D only (3) B, C and D only (4) A and D only

Ans. (2)

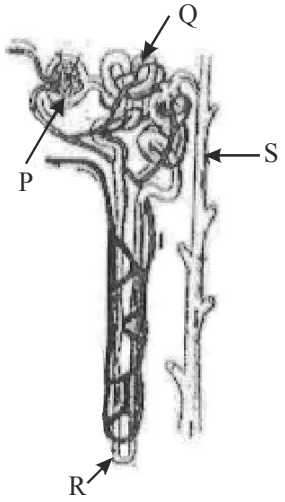
Sol. The formation of Chlorophyll depend on the exposure of the plant to light.

35. Haemophilia is more common in males because it is a
(1) Recessive character carried by Y chromosome (2) Dominant character carried by Y chromosome
(3) Dominant trait carried by X chromosome (4) Recessive trait carried by X chromosome

Ans. (4)

Sol. Haemophilia is more common in males because it is a recessive trait carried by X chromosome.

36. A person was found to have reduced level of reabsorption of water and glucose due to kidney damage. The following labelled part would be the site of damage for this patient.



(1) Q (2) P (3) S (4) R

Ans. (1)

Sol. Q is responsible for reabsorption of water and glucose.

37. Examine the following statements and select the correct option.

A: Ethylene promotes fruits ripening.

B: Gibberllns are used to Increase the length of grape stalks.

(1) A Is true and B is false (2) A is false and B is true

(3) Both A and B are true (4) Both A and B are false

Ans. (3)

Sol. Ethylene promotes fruits ripening.

Gibberllns are used to Increase the length of grape stalks.

38. Identify the correct statements about blood.

A. Platelets are produced in the bone marrow.

B. When haemoglobin combines with oxygen it forms carboxyhaemoglobin.

C. Calcium ions play an important role in clotting of blood.

D. Fibrins are formed by the conversion of fibrinogen by the enzyme thrombin.

(1) A and B only (2) B, C and D only (3) B and D only (4) A, C and D only

Ans. (4)

Sol. When haemoglobin combines with carbon monoxide it forms carboxyhaemoglobin.

39. A farmer wants to save his crops from heavy rain and likes to have early flowering. The technique that could be used In this situation

(1) Photoperiodism (2) Vernalization (3) Phototropism (4) Polyploidy

Ans. (2)

Sol. A farmer wants to save his crops from heavy rain and likes to have early flowering. The technique that could be used in this situation is called Vernalization.

40. Assertion (A): Genetic variation is disadvantageous to a population.

Reason (R): It does not enable any individual to adapt to the environment.

Select the correct option from the given alternatives.

(1) Both A and R are true and R explains A (2) Both A and R are false

(3) A is true and R is false (4) A is false and R is true

Ans. (2)

Sol. Genetic variation is advantageous to a population. It enable individuals to adapt to the changing environment.

41. The location shown on the map of India was a French Colony

(1) Chandranagore (2) Goa (3) Mahe (4) Pondicherry

Ans. (3)

42. Assertion (A): The Mughal Emperor Jahangir issued a royal permission to English East India Company to establish their warehouse factory.

Reason (R): English Company established their first warehouse factory at Surat.

Select the correct option from the given alternatives.

(1) A is true R is false

(2) R is true A is false

(3) Both A and R are correct. R is the correct explanation of A

(4) Both A and R true, but R is not correct explanation of A

Ans. (4)

43. The correct chronological order of the treaties signed between British and Native States.

A. The treaty of Salbai, the treaty of Srirangapatna, the treaty of Amritsar and the treaty of Mangalore.

B. The treaty of Salbai, the treaty of Mangalore, the treaty of Srirangapatna and the treaty of Amritsar.

C. The treaty of Amritsar, the treaty of Mangalore, the treaty of Salbai and the treaty of Srirangapatna.

D. The treaty of Amritsar, the treaty of Salbai, the treaty of Srirangapatna and the treaty of Mangalore.

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

Ans. (2)

44. The List 'A' contains the great personalities and the List 'B' with their works. The correct option that matches exactly.

A	B
A. Montesqueeu	I. Uncle Tom's Cabin
B. Rousseau	II. Common Sense
C. Mazini	III. The Spirit of Laws
D. Harriet Stowe	IV. Social Contract
	V. Italy Austria Papacy

	A	B	C	D
(1)	III	IV	V	I
(2)	iv	III	I	II
(3)	V	IV	I	III
(4)	II	IV	III	I

Ans. (1)

45. The correct provision passed by the British Government In India in their chronological order Is

A. Supreme Court of Judicature was established at Calcutta.

B. A new institution named 'Board of Controllers' consisting of six Commissioners was started. .

C. The post of Governor General was changed In to Viceroy.

D. Representation of the Regional Council was allowed Indians through election based on religion.

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

Ans. (2)

46. Choose the correct statements with reference to the Indian Judiciary system before the British rule In northern part of India.

A. All Indians were treated with only the Sharlyat laws of Mughals

B. Criminal courts were under the control of Qajis

C. Civil courts were called 'Diwani Adalat'

D. Hindus were dispensed Justice as per the Hindu scriptures

(1) A and B only (2) A, B and C only (3) C and D only (4) B, C and D only

Ans. (4)

47. The correct statement related to Sathya Shodak Sama is

A. The sama started the Cow Protection Association

B. The samaj opened the schools for shudras and girls

C. The samaj advocated polytheism

D. The sama encouraged vedic education

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

Ans. (2)

48. Select the correct order of events related to freedom struggle starting from North to South as shown In the map.

(1) A. Dandi Sathyagraha took place B. The Moplah uprising against British

C. The Declaration of Poorna Swaraj D. The Quit India Movement was launched

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

Ans. (1)

49. The chronological order of the incidents of the first war of Indian Independence.

A. The Queen of Britain passed a Declaration assuring a Stable Government for Indians.

B. A group of soldiers declared Bahadurshah Zafar as the emperor of India.

C. The Sepoys of Meerut revolted against their British Officers.

D. Tantia Tope was executed by British at Shivapuri.

(1) D C B A

(2) B A C D

(3) A D B C

(4) C B A D

Ans. (4)

50. The correct group of statements related to the functions and characteristics of banks.

A. Acceptance of deposits and deals with money.

B. Issuing national savings certificates.

C. Issuing letters of credit guarantee.

D. Discounting of bills.

(1) A and B only (2) A, C and D only (3) A, B and C only (4) C and D only

Ans. (2)

51. Assertion (A) : The R.B.I, lends money to commercial banks in the events of any shortfall of funds.

Reason (R): The R.B.I, controls the supply of money through reverse repo rate.

Select the correct option from the given alternatives.

A. A is correct and R is the correct explanation of A

B. R is correct and A is wrong

C. Both A and R are wrong

D. A is correct and R is not the correct explanation of A

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

Ans. (4)

52. Observe the following pictures of Entrepreneurs and identify them in correct order of their achievements.

I II III Iv

A. Successful in getting listed the company first on NASDAQ.

B. Established a small scale Anand Milk Dairy (Amul) in Kaira District.

C. Awarded the best entrepreneur of the year 2001 by the Ernest Young.

D. Took the advantage of open sky policy of the government and started JET.

	i	ii	iii	iv
(1)	B	C	D	A
(2)	A	c	B	D
(3)	B	D	C	A
(4)	C	B	A	D

Ans. (4)

53. Select the correct statements regarding the advantage of registration of partnership firms.

A. A registered firm can file a suit in court-of law against third party.

B. A registered firm can file a case against the other partners against the loans they owe to the firm.

C. Partnership firm partners can not file case against their own firm.

D. A registered partnership firm can not be dissolved.

(1) A and C only (2) C and D only (3) D and A only (4) A and B only

Ans. (4)

54. Assertion (A): Service charges are collected from current account holder by the banks.

Reason (R) : This account is opened by business men only for the development of their business.

Select the correct option from the given alternatives.

(1) R is correct, A is wrong (2) Both R and A are wrong

(3) R is correct and A is exactly related to R (4) R is correct and A is not exactly related to R

Ans. (3)

55. The correct option organised on the basis of evolution and growth of commerce

A. International trade stage B. Money economy stage

C. Agricultural stage D. Pastoral stage

(1) A B D C

(2) B A C D

(3) D C B A

(4) C B A D

Ans. (3)

56. Choose the group of correct statements related to Mica.

a. It Is an Important non-metallic mineral.

b. It can be easily split Into very thin.

c. It Is transparent and heat resistant.

d. It Is used In electrical Industry, telephone, aeroplanes.

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

Ans. (4)

57. Choose the correct group of statements with respect to "The Siwalik Hills".

a. They are the outer most ranges or foot hills of the Himalayas.

b. They are the lowest range of the Himalayas.

c. Their height is 600 to 1500 mts. and width is 15 to 150 k.m.

d. They extend from Rajasthan to Assam.

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

Ans. (1)

58. Match Column 'A' with Column 'B' and choose the correct matching.

Column-A	Column - B
a. Karnataka	I. Kala baisakhi
b. Uttar Pradesh	II. Mango showers
c. West Bengal	III. Coffee blossom
d. Kerala	IV. Andhis
	V. Tea blossom

	a	b	c	d		a	b	c	d
(1)	iii	i	ii	iv	(2)	i	iii	ii	v
(3)	iii	iv	i	ii	(4)	iv	iii	ii	v

Ans. (3)

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

A. It Is a method of farming In which a large amount of capital and labour are applied per unit of land.

B. Under this type of farming, land Is cultivated throughout the year.

C. Farmers try to raise two or more crops to get maximum production from small land holdings.

D. It Is common In the fertile and Irrigated areas of the country.

(1) Shifting farming (2) Humid farming (3) Plantation farming (4) Intensive farming

Ans. (4)

60. Match Column 'A' with Column 'B' and choose the correct answer.

Column - A	Column - B
a. Yamunotrl	I. Valley
b. Armakonda	II. Hill station
c. Kulu	III. Glacier
d. Ranlkhet	IV. Peak
	V. Ground water

	a	b	c	d
(1)	III	IV	I	V
(2)	II	IV	I	III
(3)	IV	III	II	I
(4)	III	IV	I	II

Ans. (4)

61. Match Column 'A' with Column 'B' and choose the correct answer.

Column - A	Column - B
A. Black buck	I. Extinct
B. Asiatic elephant	II. Rare
C. Andaman wild pig	III. Endangered
D. Himalayan brown bear	IV. Vulnerable
	V. Endemic

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

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

Ans. (2)

62. The Himalayan yew species is in danger because

(1) A chemical compound called Taxol' is extracted from the bark to cure cancer.

(2) The hide of the animal is'extracted for producing percussive instruments.

(3) The birds feathers are colourful and they are collected by killing.

(4) The insecticides have brought adverse effects on them.

Ans. (1)

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

A. During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively.

B. In the 14th century, the tank in Hauz Khas in Delhi was constructed by lltutmish for supplying water to Siri Fort area.

(1) A is false and B is true (2) A is true and B is false

(3) Both A and B are true (4) Both A and B are false

Ans. (3)

64. Read the following statements and write the correct option with which all those links.

A. This soli Is suitable for cultivation of coffee with adequate doses of manures and fertilizers.

B. This soil Is mainly found In Karnataka, Kerala, Tamil Nadu, Madhya Pradesh and the hilly areas of Odisha and Assam.

C. Humus content in this soil Is low.

D. It is found in areas with high temperature and heavy rainfall.

(1) Alluvial Soil (2) Black Soil (3) Red Soil (4) Laterite Soil

Ans. (4)

65. Choose the correct type of soil with reference to the shaded areas in the given map.

(1) Mountain Soils (2) Black Soils (3) Laterite Soils (4) Red and Yellow Soils

Ans. (2)

66. Choose the correct group of answer with regarding Child Adolescent Labour Prohibition and Regulation Act.

a. No children below 14 years shall be employed In any sector for any reasons.

b. As per this Act, children between the age of 15 and 18 are considered as Adolescent children.

c. According to the Article 14 of this Act, a fins of rupees 50,000 and 2 years Imprisonment Is Imposed on violators.

d. If children below 14 years are engaged In any household activities, the parents and the head of the family is declared as offenders.

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

Ans. (2)

67. Arrange the following Acts in Chronological order.

a. Civil Rights Protection Act.

b. Untouchability Crime Act

c. Child Adolescent, Labour Prohibition and Regulation Act.

d. Protection of Children from Sexual Offences Act.

(1) a, b, c, d (2) b, a, c, d (3) b, a, d, c (4) c, b, d, a

Ans. (2)

68. "Culture Is that complex whole which Includes knowledge, belief, art, rules and regulations, traditions and any other capabilities earned by the human being as a member of society" It was defined by

(1) Malinowski (2) E.B. Tylor (3) Max Weber (4) Emile Durkheim

Ans. (2)

69. Choose the correct option relating to untouchability Crime Act.

A. The Government of India has Implemented this Act In 1955.

B. This Act was renamed as 'Civil Rights Protection Act'in 1976.

C. According to this Act, practice of untouchability Is a crime.

D. This Act consisted of certain mistakes which were amended later.

(1) A and B (2) B and C (3) B.C and D (4) A.B.C and D

Ans. (4)

70. In Column 'A' the works and in Column 'B' their authors are given. Choose the correct matching.

	Column - A	Column - B
a.	Buddha and his Dhamma	i. G.S. Ghruye
b.	Indian Saints	ii. Iravati Karve
c.	Institutions and Relationship	iii. A. R. Desai
d.	Indian rural Sociology	iv. C. Parvathamma
		v. Dr. B.R. Ambedkar

	a	b	c	d
(1)	v	ii	iii	iv
(2)	ii	iii	iv	v
(3)	iii	iv	v	i
(4)	v	i	ii	iii

Ans. (4)

71. Which of the following statement/statements is/are not correct related to the President of India ?

a. appoint the Governors to the States

b. addresses the joint session of both the Houses of Parliament

c. appoint the Chief Ministers of the States

d. nominates 12 members to the Rajya Sabha

Choices:

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

Ans. (3)

72. The President of India may declare 'National Emergency'

a. External aggression b. Internal disturbances

c. Natural disasters d. Financial crises Choices:

(1) a and b only (2) band conly (3) c and d only (4) a and c only

Ans. (1)

73. Identify the correct chronological sequence In which among the following became Secretary Generals of UNO.

i. Antonio Guterres ii. U. Thant iii. Kofi Annan iv. Boutros Ghali Choices:

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

Ans. (2)

74. Choose the correct sequence to Indicate the following statements as True (T) or False (F).

a. RTI Is an implied Fundamental Right

b. RTI has been Included in Article 19((1) of the Constitution

c. RTI came into force on October 12,2005 Choices:

(1) FFF (2) TTT (3) FFT (4) FTT

Ans. (2)

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

Assertion (A) : Directive Principles are enshrined in the Constitution for the Government Administration.

Reason (R): People can question in the court for not implementing Directive Principles.

(1) A is false but R is true

(2) R is false but A is true

(3) A and R are true and R is correct explanation of A

(4) A and R are true but R is not correct explanation of A

Ans. (2)

76. Indicators involved in Human Development Index (HDI)

(1) National Income, Employment Rate and Sex Ratio

(2) Per Capita Income, Life Expectancy and Literacy Rate of Women

(3) Life Expectancy, Literacy Attainment and Purchasing Power of People

(4) National Income, Purchasing power of People and Sex Ratio

Ans. (3)

77. Identify the correct statement from the following.

(1) As the literacy of people increases, birth rate also increases

(2) As the literacy of people increases, birth rate decreases

(3) As the literacy of people decreases birth rate also decreases

(4) There is no relation between literacy of people and birth rate

Ans. (2)

78. Consider the following aspects of Fiscal

A. $\text{Primary Dificit} = \left(\begin{matrix}\text{Fiscal}\\ \text{Deficit}\end{matrix}\right) - \left(\begin{matrix}\text{Interest}\\ \text{Payment}\end{matrix}\right)$

B. $\text{Revenue Deficit} == \left(\begin{matrix}\text{Total}\\ \text{Revenue}\end{matrix}\right) - \left(\begin{matrix}\text{Total}\\ \text{Expenditure}\end{matrix}\right)$

Reference to the above

(1) 'A' is correct, 'B' is not correct (2) 'B' is correct, 'A' is not correct

(3) Both 'A' and 'B' are correct (4) Both 'A' and 'B' are not correct

Ans. (1)

79. Aspects of Money Supply Concepts are given below.

a. Currency Notes
b. Coins
c. Savings deposits in Post Office
d. Time/term deposits of Commercial Banks

The Group which classifies the above aspects as 'Narrow' and 'Broad' Money respectively.

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

Ans. (1)

80. Statistics related to 2011 census are given below. Identify the correctly matched ones.

List - A	List - B
A. Work participation rate	i. 30.7%
B. People living in villages	ii. 65.46%
C. Female literacy rate	iii. 39.8%
D. 0-14 years children	iv. 68.8%

Choices :

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

Ans. (2)

81. If the sum of 'n' terms of an arithmetic progression is $S_n = 3n + 2n^2$ then its common difference is

(1) 9 (2) 6 (3) 4 (4) 3

Ans. (3)

Sol. $S_n = 3n + 2n^2$

$T_1 = 5 = S_1$

$S_2 = 6 + 8 = 14$

$\Rightarrow T_2 = 9$

Thus $d = 4$

82. The value of $\left(\sqrt[2010]{2\sqrt{7} - 3\sqrt{3}}\right)\left(\sqrt[4020]{55 + 12\sqrt{21}}\right)$ is

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

Ans. (3)

Sol. $\left(\sqrt[2010]{2\sqrt{7} - 3\sqrt{3}}\right)\left(\sqrt[4020]{55 + 12\sqrt{21}}\right)$

$\Rightarrow \left[\left(2\sqrt{7} - 3\sqrt{3}\right)^2 \left(55 + 12\sqrt{21}\right)\right]^{1/4020}$

$\Rightarrow \left[\left(28 + 27 - 12\sqrt{21}\right)\left(55 + 12\sqrt{21}\right)\right]^{1/4020}$

$\Rightarrow \left[(55)^2 - 144 \times 21\right]^{1/4020}$

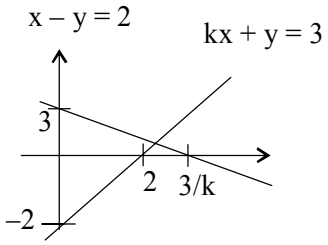
$= 1$

83. If the graphs of x – y = 2 and kx + y = 3 (k is constant) intersect at a point in first quadrant then the value of k is

(1) equal to (2) greater than –1 (3) less than $4/3$ (4) between –1 and $4/3$

Ans. (4)

Sol. To intersect in 1st quad



If $K > 0$, $\frac{3}{K} > 2$

$K < 3/2$

Also $(K+1)x = 5$

$$x = \frac{5}{K+1} \quad y = \frac{5}{K+1} - 2$$

$$\Rightarrow \frac{5-2K-2}{K+1}$$

$$= \frac{3-2K}{K+1}$$

To be in 1st quad : x > 0, y > 0

$$\Rightarrow \frac{5}{K+1} > 0$$

$$\Rightarrow K > -1$$

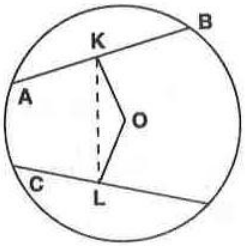
$$\frac{3-2K}{K+1} > 0$$

$$\frac{2K-3}{K+1} < 0$$

$$\rightarrow K \in \left(-1, 3/2\right)$$

Ans. 4.

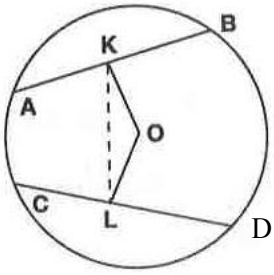
84. In the given circle with centre 'O', K and L are the mid points of equal chords AB and CD respctively. $\angle OLK = 25°$ then the vlaue of $\angle LKB$ is equal to



(1) 125° (2) 115° (3) 105° (4) 90°

Ans. (2)

Sol.



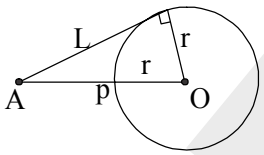
$\angle LKB = 90 + 25 = 115°$

85. A tangent of length 'L' is drawn from a point 'A' to a circle of radius 'r'. The length of tangent of $\frac{4}{3}$ of r, then the shortest distance from point A to circle is

(1) $\frac{r}{2}$ (2) $\frac{2r}{3}$ (3) $\frac{L}{2}$ (4) $\frac{2L}{2}$

Ans. (2)

Sol. $L = \frac{4}{3}r$

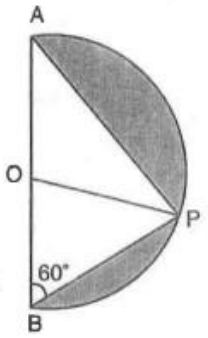


$AO = \sqrt{L^2 + r^2}$

$\Rightarrow \sqrt{\frac{16}{9}r^2 + r^2} = \frac{5r}{3}$

Thus; $AP = \frac{5r}{3} - r = \frac{2r}{3}$

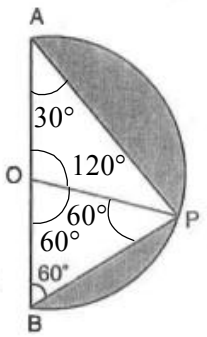
86. In the figure a semicircle with centre 'O' is drawn on AB. If $\underline{|ABP} = 60°$ then the ratio of larger to smaller shaded region is



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

Ans. (3)

Sol. $\dfrac{A_L}{A_S}=\dfrac{\frac{1}{3}\times\pi r^2-\frac{1}{2}r^2\sin 120°}{\frac{1}{6}\pi r^2-\frac{1}{2}r^2\sin 60°}$



$\Rightarrow\dfrac{\frac{1}{3}\pi-\frac{1}{2}\frac{\sqrt{3}}{2}}{\frac{1}{6}\pi-\frac{1}{\sqrt{2}}\frac{\sqrt{3}}{2}}$

$\Rightarrow\dfrac{2\left(4\pi-3\sqrt{3}\right)}{4\pi-6\sqrt{3}}$

$\Rightarrow\dfrac{4\pi-3\sqrt{3}}{2\pi-3\sqrt{3}}$

87. The value of 'C' if $\left(\dfrac{C}{2},14\right)$ is the mid point of the line joining the points (–3, 8) and (–15, 20) is

(1) 2 (2) –9 (3) –18 (4) –15

Ans. (3)

Sol. $\dfrac{C}{2}=-9$

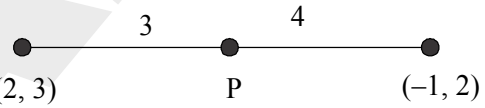
$C=-18$

88. If the line segment joining (2, 3) and (–1, 2) is divided internally in the ratio 3 : 4 by the graph of the equation $x+2y=k$ then the value of 'k' is

(1) $\dfrac{5}{7}$ (2) $\dfrac{31}{7}$ (4) $\dfrac{36}{7}$ (4) $\dfrac{41}{7}$

Ans. (4)

Sol. $P=\left(\dfrac{-3+8}{7},\dfrac{6+12}{7}\right)$



$=\left(\dfrac{5}{7},\dfrac{18}{7}\right)$

Now, $\dfrac{5}{7}+2\left(\dfrac{18}{7}\right)=K$

$\Rightarrow K=\dfrac{41}{7}$

89. If $(\sin\theta+\operatorname{cosec}\theta)^2+(\cos\theta+\sec\theta)^2=\tan^2\theta+\cot^2\theta+k$ then the value of 'k' is

(1) 9 (2) 7 (3) 4 (3) 3

Ans. (2)

Sol. $\sin^2\theta+\operatorname{cosec}^2\theta+2+\cos^2\theta+\sec^2\theta+2=\tan^2\theta+\cot^2\theta+K$

$\Rightarrow 1+1+2+2=K$

$K=7$

90. If $(3\sin\theta)+(5\cos\theta)=5$ then the value of $(5\sin\theta)-(3\cos\theta)$ is

(1) ±4 (2) ±3 (3) ±5 (4) ±2

Ans. (2)

Sol. $3\sin\theta+5\cos\theta=5$

$5\sin\theta-3\cos\theta=K$

$\Rightarrow$ squaring and adding;

$9+25=25+K^2$

91. If the roots of $x^2-px+q=0$ are two consecutive integers the value of p^2-4q is

(1) 4 (2) 3 (2) 2 (4) 1

Ans. (4)

Sol. $x^2-px+q=0$

$\text{given}:|\alpha-\beta|=1$

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

$\Rightarrow\sqrt{p^2-4q}=1$

$p^2-4q=1$

92. The mean of 'n' numbers of a series is $\overline{X}$. If the sum of first (n – 1) terms is 'k' then the n^{th} number is

(1) $\overline{X}-k$ (2) $n\overline{X}-k$ (3) $\overline{X}-nk$ (4) $n\left(\overline{X}-k\right)$

Ans. (2)

Sol. Given $\dfrac{K+\alpha}{n}=\overline{X}$

$\alpha=n\overline{X}-K$

93. Three squares of a chess board are selected at random. The probability of getting two squares of one colour and other of a different colour is

(1) $\dfrac{16}{21}$ (2) $\dfrac{8}{21}$ (3) $\dfrac{3}{32}$ (4) $\dfrac{3}{8}$

Ans. (1)

Sol. $\frac{^{32}C_2 \times ^{32}C_1 \times 2}{^{64}C_3}$ (Two white + 1 black or Two black + 1 white)

$$\frac{\frac{32\times31}{2}\times32\times2}{\frac{64\times63\times62}{6}}$$

$$\Rightarrow \frac{32^{8}\times31\times32\times6}{64_{2}\times63\times62_{2}}$$

$$=\frac{48}{63}=\frac{16}{21}$$

94. The string of a kite of length 100 m takes imaging that there is no slack in the string, the height of the kite from the ground is

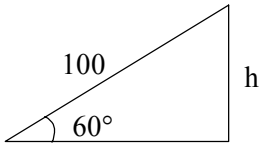
(1) $50\sqrt{3}$m (2) $100\sqrt{3}$m (3) $50\sqrt{2}$m (4) 100 m

Ans. (1)

Sol. $\sin 60=\frac{h}{100}$

$h=100\sin 60$

$=50\sqrt{3}$m



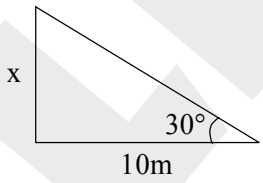
95. The tip of a partially broken tree touches the ground at a point 10 m from foot of it and makes an angle of elevation of 30° from the ground. Then, the height of the tree is

(1) $\frac{10}{\sqrt{3}}$m (2) $10\sqrt{3}$m (3) $\frac{20}{\sqrt{3}}$m (4) $30\sqrt{3}$m

Ans. (1)

Sol. $\tan 30=\frac{x}{10}$

$x=10\times\frac{1}{\sqrt{3}}$m



96. If l, m and n are zeroes of the polynomial $f(x)=2x^3+5x^1+6x+10$ then the value of $\frac{1}{l}+\frac{1}{m}+\frac{1}{n}$ is

(1) $-\frac{5}{2}$ (2) $-\frac{3}{5}$ (3) $-\frac{5}{3}$ (4) $-\frac{2}{5}$

Ans. (2)

Sol. Given: $f(x)=2x^3+5x^2+6x+10$

$$\frac{1}{l}+\frac{1}{m}+\frac{1}{m}$$

$$=\frac{mn+ln+lm}{lmn}=\frac{6/2}{-10/2}=-3/5$$

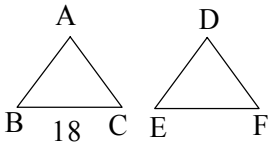
97. The perimeters of similiar triangles ΔABC and ΔDEF are 60 cm and 35 cm respectively. If $BC = 18cm$ then measure of EF is

(1) 1.08 cm (2) 30 cm (3) 10.8 cm (4) 8 cm

Ans. (3)

Sol. $\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF} = \frac{60}{36}$

$\frac{18}{EF} = \frac{60}{36}$



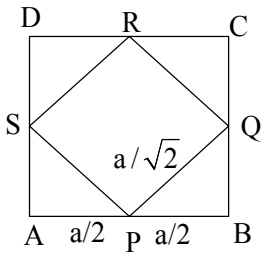
$EF = \frac{18 \times \cancel{36}^{6^3}}{\cancel{60}^{10^5}} = \frac{54}{5} = 10.8$ cm

98. If PQRS is a square whose vertices are on the sides of a square ABCD then the ratio of the areas of square PQRS to square ABCD is

(1) 1 : 2 (2) $1:\sqrt{2}$ (3) 2 : 1 (4) $\sqrt{2}:1$

Ans. (1)

Sol.



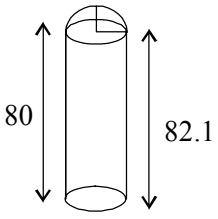
$\frac{ArPQRS}{ArABCD} = \frac{\frac{a^2}{2}}{a^2} = 1/2$

99. The volume of a burette of height 82.1 cm obtained by attaching hemispherical nob on one side of a cylinder of heigh 80 cm is

(1) 1.1 Lt (2) 1.0 Lt (3) 1.2 Lt (4) 1.4 Lt

Ans. (1)

Sol. $\Rightarrow r = 2.1cm$



$v = \pi r^2 h + \frac{2}{3}\pi r^3$

$= \pi\left[4.41 \times 80 + \frac{2}{3} \times 9.261\right]$

$= \pi\left[352.8 + 6.174\right] = 1128.204cm^3$

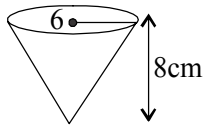
$\approx 1.12L$

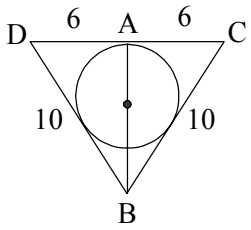
100. A conical vessel of radius 6cm and height 8 cm is completely filled with water. A metal sphere is lowered into the water. The size of the sphere is such that when it touches the inner surface, it just gets immersed. Then, the fraction of water that overflows from the conical vessel is

(1) $\frac{3}{8}$ (2) $\frac{5}{8}$ (3) $\frac{7}{8}$ (4) $\frac{5}{16}$

Ans. (1)

Sol.





AB = 8

Area of $\Delta BCD = \frac{1}{2} \times 12 \times 8$

Semiperimeter of $\Delta BCD = 16$

radius of sphere = $\frac{48}{16} = 3$

Thus fraction of volume : $\frac{\frac{4}{3}\pi r^3}{\frac{1}{3}\pi\left(6^2\right)8}$

$= \frac{4 \times 27}{4 \cancel{36} \times 8} = \frac{3}{8}$

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