

Date: 05/11/2017

Max. Marks: 100

SOLUTIONS

Time allowed: 90 mins

1. A car covers 30 km at a uniform speed of 60 km/hr and the next 30 km at a uniform speed of 40 km/hr. The total time taken is
 (A) 30 min (B) 45 min (C) 75 min (D) 120 min

Ans. (C)

Sol. $t_1 = \frac{s}{v_1} \Rightarrow t_1 = \frac{30}{60} = \frac{1}{2} \text{ hr}$

$t_2 = \frac{s}{v_2} \Rightarrow t_2 = \frac{30}{40} = \frac{3}{4} \text{ hr}$

$t = t_1 + t_2$

$= \left(\frac{1}{2} + \frac{3}{4} \right) \text{ hr} \Rightarrow t = 75 \text{ min}$

2. A stone is thrown upwards with a speed 'u' from the top of a tower. It reaches the ground with a velocity '3u'. The height of the tower is

(A) $\frac{u^2}{g}$ (B) $\frac{2u^2}{g}$ (C) $\frac{3u^2}{g}$ (D) $\frac{4u^2}{g}$

Ans. (D)

Sol. Initial velocity = +u $v^2 = u^2 + 2gh$
 final velocity = -3u $9u^2 = u^2 - 2gh$
 acc. = -g $8u^2 = -2gh$

$h = ?$ $h = -\frac{4u^2}{g}$

(-ve means downward displacement)

3. When the speed of a particle is doubled, the ratio of its kinetic energy to its momentum :
 (A) remains the same (B) gets doubled (C) becomes half (D) becomes four times

Ans. (B)

Sol. Ratio of $\frac{KE}{\text{momentum}} = \frac{\frac{1}{2}mv^2}{mv} \Rightarrow \frac{KE}{\text{momentum}} \propto v$

So when the speed is doubled, $\frac{KE}{\text{momentum}}$ is also doubled

4. Calculate the wavelength of radio waves of frequency 10^9 Hz. The speed of radio waves is 3×10^8 m/s.
 (A) 60 cm (B) 40 cm (C) 30 cm (D) 10 cm

Ans. (C)

Sol. $\lambda = \frac{c}{f} = \frac{3 \times 10^8}{10^9} = 3 \times 10^{-1} \text{ m} = 30 \text{ cm}$

$\lambda = 30 \text{ cm}$

5. A force of 16 N is distributed uniformly on one surface of a cube of edge 8 cm. The pressure on this surface is
 (A) 3500 Pa (B) 2500 Pa (C) 4500 Pa (D) 5500 Pa

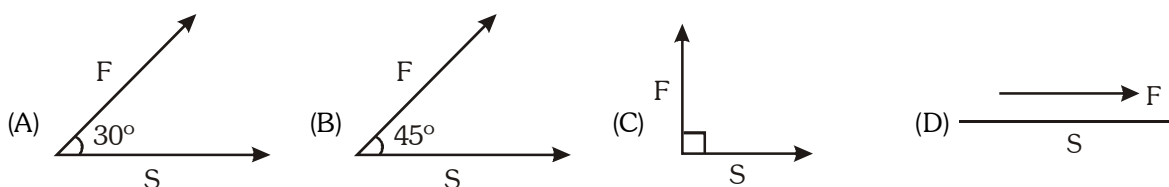
Ans. (B)

Sol. $F = 16 \text{ N}$

$A = 8 \times 8 \times 10^{-4} \text{ m}^2$

$P = \frac{F}{A} = \frac{16}{64 \times 10^{-4}} = \frac{10000}{4} = 2500 \text{ Pa}$

6. In which of the following cases, is the work done maximum ?



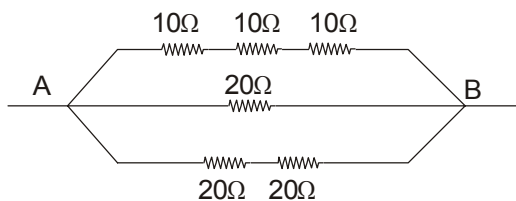
Ans. (D)

Sol. $w = F S \cos \theta$

in case of option D, $\theta = 0^\circ$

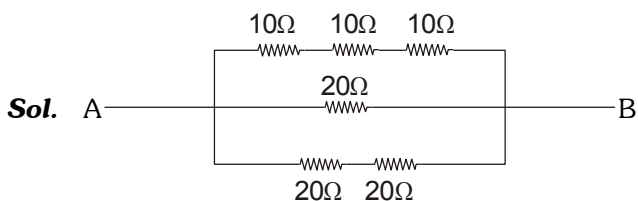
\therefore work done is maximum

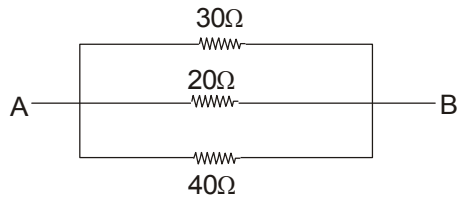
7. The total electrical resistance between the points A and B of the circuit shown is:



- (A) 9.23Ω (B) 15Ω (C) 30Ω (D) 100Ω

Ans. (A)





$$\frac{1}{\text{Req.}} = \frac{1}{30\Omega} + \frac{1}{20\Omega} + \frac{1}{40\Omega}$$

$$\frac{1}{\text{Req.}} = \frac{4 + 6 + 3}{120\Omega}$$

$$\text{Req.} = \frac{120}{13}\Omega = 9.23\Omega$$

8. Two wires of same material have lengths L and $2L$ cross-sectional areas $4A$ and A respectively. The ratio of their resistances would be:

- (A) 1 : 1 (B) 1 : 8 (C) 8 : 1 (D) 1 : 2

Ans. (B)

Sol. AS $R = \frac{\rho l}{A}$

As material is same ρ is constant

$$R \propto \frac{l}{A}$$

$$\frac{R_1}{R_2} = \frac{l_1}{A_1} \times \frac{A_2}{l_2}$$

$$\frac{R_1}{R_2} = \frac{L}{4A} \times \frac{A}{2L} = 1 : 8$$

$$\therefore \begin{bmatrix} l_1 = L \\ l_2 = 2L \\ A_1 = 4A \\ A_2 = A \end{bmatrix}$$

9. Wire of resistance R is stretched to thrice of its original length, what is its new resistance

- (A) $9R$ (B) $\frac{R}{9}$ (C) $3R$ (D) $R/3$

Ans. (A)

Sol. As volume is constant in stretching of wire

$$A_1 l_1 = A_2 l_2$$

$$R = \rho \frac{l}{A} \text{ So, if } l_2 = 3l_1 \text{ then } A_2 = \frac{A_1}{3}$$

$$\Rightarrow R' = \frac{\rho \times 3l}{\frac{A}{3}}$$

$$R' = 9R$$

10. Galaxy in which we live is :

- (A) Milky way (B) radio galaxy (C) circular galaxy (D) irregular galaxy

Ans. (A)

Sol. Milky way

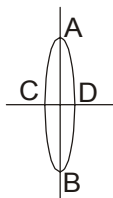
11. Vision problem occurring in old age is known as :

- (A) Myopia (B) Presbyopia (C) Hypermetropia (D) Anopia

Ans. (B)

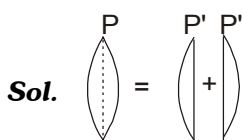
Sol. Presbyopia

12. The focal length of each half, if the symmetrical lens of focal length f cut along AB:



- (A) f (B) $\left(\frac{1}{2}\right)f$ (C) $2f$ (D) zero

Ans. (C)



Sol.

$$P = P_1 + P_2$$

$$P = 2P' \quad \text{(by symmetry)}$$

$$P' = P/2 \dots\dots\dots (A)$$

$$\text{but } (P = \frac{1}{f})$$

$$\text{So, } f' = 2f$$

13. Two bodies of unequal masses possess the same momentum. The K.E. of the heavier mass will be the K.E. of the lighter mass.

- (A) same as (B) greater than (C) less than (D) much greater than

Ans. (C)

Sol. We know that relation between K.E. and momentum is

$$\frac{P^2}{2m} = K.E.$$

As P is constant,

$$\text{K.E.} \propto \frac{1}{\text{mass}}$$

so, lighter mass will have more kinetic energy

14. Electron was discovered by:

- (A) J.J. Thomson (B) Chadwick (C) E. Goldstein (D) Rutherford

Ans. (A)

Sol. J.J. Thomson

15. The chemical formula of Gypsum is:

- (A) $\text{CaCO}_3 \cdot 5\text{H}_2\text{O}$ (B) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (C) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ (D) $\text{CaCO}_3 \cdot \frac{1}{2}\text{H}_2\text{O}$

Ans. (B)

Sol. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

16. The process in which the red hot cast iron is cooled immediately in cold water is known as:

- (A) Tempering (B) Quenching (C) Annealing (D) Bleaching

Ans. (B)

Sol. Quenching

17. Electronic configuration of Na^+ is:

- (A) 2, 8, 1 (B) 2, 8, 8 (C) 2, 8 (D) 2, 8, 8, 1

Ans. (C)

Sol. 2, 8

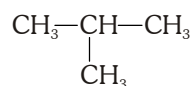
18. Valency of Sulphur atom in SO_2 is:

- (A) 3 (B) 2 (C) 4 (D) 6

Ans. (C)

Sol. 4 (double the number of oxygen atoms)

19. Write IUPAC name of:



- (A) 2, 2 dimethyl propane (B) 2, methyl butane
(C) 2, 2 dimethyl ethane (D) 2, methyl propane

Ans. (D)

Sol. 2 methyl propane (longest chain of 3 carbon atoms & methyl attached to second carbon)

20. Stainless steel contains :

- (A) Fe, Ni, Cr (B) Fe, Ni, Sn (C) Fe, C, S (D) Fe, P, Cr

Ans. (A)

Sol. Fe, Ni, Cr (Iron, Nickel, Chromium)

21. If there 12 neutrons in an atom and its atomic number is 11. Then how many electrons are present in it :

- (A) 23 (B) 12 (C) 10 (D) 11

Ans. (D)

Sol. 11 (as atom is neutral, therefore number of electrons is same as atomic number)

22. What is the electronic configuration of elements of IIIrd group :

- (A) $1s^2, 2s^2 2p^3$ (B) $1s^2, 2s^2 2p^6, 3s^2 3p^1$ (C) $1s^2, 2s^2 2p^6$ (D) $1s^2, 2s^2 2p^6, 3s^1$

Ans. (B)

Sol. $(1s^2 2s^2 2p^6 3s^2 3p^1)$. As it is p block element therefore the group is $12 + 1 = 13$ (III A group)

23. The gas produced on addition of dilute Sulphuric acid on powdered zinc is :

- (A) SO_2 (B) S (C) H_2 (D) O_2

Ans. (C)

Sol. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2 \uparrow$

24. Name of functional group $\begin{array}{c} O \\ || \\ -C-OH \end{array}$

- (A) Aldehyde (B) Ketone (C) Alcohol (D) Carboxylic acid

Ans. (D)

Sol. $-COOH$ (Carboxylic acid)

25. Type of bond present between carbon-carbon atoms in Ethene is :

- (A) Single covalent bond (B) double covalent bond (C) Triple covalent bond (D) Electrovalent bond

Ans. (B)

Sol. Double covalent bond $CH_2 = CH_2$

26. Structure of PVC is :

- (A) $\begin{array}{c} -[CH_2-CH]_n \\ | \\ Cl \end{array}$ (B) $-(CH_2-CH_2)_n$ (C) $-(CF_2-CF_2)_n$ (D) $\begin{array}{c} -(CH_2-CH)_n \\ | \\ CH_3 \end{array}$

Ans. (A)

Sol. $n(CH_2=CH) \xrightarrow{\text{Polymerisation}} -(CH_2-CH)_n$
 $\begin{array}{c} | \\ Cl \end{array}$ $\begin{array}{c} | \\ Cl \end{array}$
(Vinyl Chloride) (PVC)

27. Who proposed the term Ecosystem :

- (A) A.G. Tensely (B) E.P. Odum (C) Carl Mobius (D) Earnst Haeckel

Ans. (A)

Sol. The term ecosystem was coined by A.G. Tensely (a British ecologist)

28. In the process of Photosynthesis, the source of Oxygen is :

- (A) CO_2 (B) H_2O (C) $C_6H_{12}O_6$ (D) None of these

Ans. (B)

Sol. During photosynthesis, in light reaction water molecule split into hydrogen and oxygen (photosynthesis). Hence, water is the source of oxygen.

29. Which component is formed by plants in the ecosystem :

- (A) Decomposer (B) Consumer (C) Producer (D) All of the above

Ans. (C)

Sol. Producer : In ecosystem all green plants occupy first trophic level.

30. Which of the following is a plant hormone :

- (A) Insulin (B) Cytokinin (C) Thyroxine (D) Oestrogen

Ans. (B)

Sol. Cytokinin is a plant hormone (phytohormone) which help in cell division and cell differentiation.

31. Power house of cell is known as :

- (A) Golgi bodies (B) Mitochondria (C) Ribosome (D) Lysosome

Ans. (B)

Sol. Mitochondria is responsible for the production of ATP.

32. F₂ ratio in Dihybrid cross is :

- (A) 1 : 2 : 1 (B) 7 : 3 : 6 (C) 9 : 3 : 3 : 1 (D) 3 : 1

Ans. (C)

Sol. Phenotypic ratio in F₂ generation is 9 : 3 : 3 : 1 in dihybrid cross.

33. Which organ is known as "Blood bank" :

- (A) Heart (B) Liver (C) Spleen (D) Kidney

Ans. (C)

Sol. Spleen is a reservoir of RBC.

34. Which blood group is called "Universal donor" :

- (A) A (B) B (C) AB (D) O

Ans. (D)

Sol. "O" often called universal donor because it can be donated to all the blood groups (A, AB, B, O)

35. Oxygen in our blood is transported by a Protein, named :

- (A) Keratin (B) Collagen (C) Haemoglobin (D) Myoglobin

Ans. (C)

Sol. Haemoglobin is a respiratory pigment (type of protein) is present in RBC of blood and helps in transport of oxygen.

36. The end product of glycolysis is :

- (A) Phosphoric acid (B) Malic acid (C) Pyruvic acid (D) Fumaric acid

Ans. (C)

Sol. Pyruvic acid : The end product of glycolysis is pyruvic acid. Glycolysis occurs in cytoplasm of cell in which 1 molecule of glucose is broken down into 2 molecules of pyruvic acid.

37. Which of the following gases related with acid rain :

- (A) NO₂ and CO₂ (B) CH₄ and SO₂ (C) CO₂ and SO₂ (D) SO₂ and NO₂

Ans. (D)

Sol. SO₂ & NO₂ : Burning of fossil fuels releases oxides of sulphur and nitrogen, SO₂ and NO₂ react with water and oxygen and other chemicals to form sulphuric acid and nitric acid.

38. The Grana and Stroma are the parts of which cell organelles :

- (A) Mitochondria (B) Chloroplast (C) Ribosome (D) Golgi bodies

Ans. (B)

Sol. Chloroplast : Grana and stroma are the parts of chloroplast of plant cell.

39. Reproduction in Bryophyllum takes place by :

- (A) Root (B) Leaf (C) Stem (D) None of these

Ans. (B)

Sol. Leaf : Reproduction in bryophyllum takes place by leaf bud which is the method of vegetative propagation.

40. Botanical name of Tulsi is :

- (A) Saraca indica (B) Ficus benghalensis (C) Phyllanthus emblica (D) Ocimum sanctum

Ans. (D)

Sol. Ocimum sanctum is the botanical name of Tulsi.

41. Sanchi Stupa is related to which religion?

- (A) Jain (B) Buddhism (C) Bhagvat (D) Shakt

Ans. (B)

Sol. Sanchi Stupa is known for the religion Buddhism.

42. Mohanjodaro (Saraswati Sindhu) Civilization is discovered by

- (A) Rai Bahadur Sahni (B) Rakhhal Das Banerjee (C) Ram Chaudhary (D) V. D. Mahajan

Ans. (B)

Sol. Mohanjodaro a major site of Indus Valley Civilisation was excavated by Rakhhal Das Banerjee in the year 1922.

43. Buddhism is started by

- (A) Dr. B. R. Ambedkar (B) Mahaveer Swami (C) Mahatma Buddha (D) Samrat Ashok

Ans. (C)

Sol. Buddhism was founded by Mahatma Buddha (563 BC –483 BC)

44. Samrat Ashok was ruler of

- (A) Bhopal (B) Patliputra (C) Delhi (D) Vidisha

Ans. (B)

Sol. Samrat Ashoka ruled Magadh, capital Patliputra.

45. Most powerful ruler of Gupta dynasty was :

- (A) Shree Gupt (B) Kumar Gupt (C) Skand Gupt (D) Samudra Gupt

Ans. (D)

Sol. Most powerful ruler of Gupta Dynasty was Samudra Gupta, also known as Indian Napoleon.

46. Who was the founder of the kingdom of Vijay Nagar ?

- (A) Harihar and Bukka (B) Krishnadev Roy (C) Dev Roy II (D) Harihar II

Ans. (A)

Sol. Kingdom of Vijaynagar was founded by Harihar and Bukka in 1336.

47. Mehrauli situated Kutubminar of Delhi is constructed by :

- (A) Shahjahan (B) Aaram Shah (C) Kutubuddin Ebak (D) Babar

Ans. (C)

Sol. Construction of Kutub Minar was initiated by Kutubuddin Ebak of Slave dynasty.

48. Which Sultan is known as Mad (Sanki) Sultan in history :

- (A) Allauddin Khilji (B) Balban (C) Muhammad Tughlak (D) Ferozshah Tughlak

Ans. (C)

Sol. Mohammad Bin Tughlaq was entitled as 'Mad Sultan' because of his several unnecessary policies.

49. Tajmahal is situated at :

- (A) Chattarpur (B) Patna (C) Agra (D) Mumbai

Ans. (C)

Sol. Taj Mahal is situated in Agra, constructed by Shahjahan.

50. Shivaji's mother name was :

- (A) Jijabai (B) Baijabai (C) Chandbiwi (D) Tarabai

Ans. (A)

Sol. Jija Bai was mother of Shivaji Maharaj.

51. Founder of Azad Hind Fauz was :

- (A) Pt. Jawahar Lal Nehru (B) Mohan Das Karamchand Gandhi
(C) Subhash Chandra Bose (D) Sir Saiyad Ahmed Khan

Ans. (C)

Sol. Subhash Chandra Bose founded Azad Hind Fauz in 1942, during 2nd World War.

52. Chandrashekhar Azad was born at :

- (A) Madhya Pradesh (B) Bihar (C) Delhi (D) Bengal

Ans. (A)

Sol. Chandra Shekhar Azad was born at Bhabra (Jhabua), Madhya Pradesh.

53. Quit India Movement is started by :

- (A) Indira Gandhi (B) Ballabh Bhai Patel
(C) D.P. Mishra (D) Mohan Das Karamchand Gandhi

Ans. (D)

Sol. Quit India Movement was started by Mahatma Gandhi in August, 1942.

54. Rashtriya Swayam Sewak Sangh was established in :

- (A) Vijaydashmi - 1925 A.D. (B) Vijaydashmi - 1930 A.D.
(C) Deepawali - 1942 A.D. (D) Deepawali - 1947 A.D.

Ans. (A)

Sol. Rashtriya Swayam Sewak Sangh was established in 1925 A.D. by Keshav Baliram Hedgewar.

55. Founder of Rashtriya Swayam Sewak Sangh was

- (A) Guru Golwalker (B) Keshav Baliram Hedgewar
(C) Lala Lajpat Rai (D) Atal Bihari Vajpayee

Ans. (B)

Sol. As mentioned in Q. 54.

56. Coal, Petrol are the type of resources :

- (A) Non Renewable resources (B) Renewable resources
(C) Frequently used resources (D) Eternal Natural resources

Ans. (A)

Sol. Coal, Petrol are termed as fossil fuels and are non-renewable resources on the basis of exhaustibility.

57. Why red soil has red colour?

- (A) because it contains phosphoric acid (B) because it contains Humus
(C) because it contains Nitrogen (D) because it contains Iron

Ans. (D)

Sol. Red soil has red colour because it contain iron and it appears yellow in hydrated form.

58. The name of operation flood is known :

- (A) Yellow revolution (B) Blue revolution (C) White revolution (D) Pink revoltuion

Ans. (C)

Sol. Operation flood is synonymous to white revolution, associated with milk and milk products.

59. Which is not a variety of coal?

- (A) Anthracite (B) Bituminous (C) Lemonite (D) Lignite

Ans. (C)

Sol. Coal is categorised into Peat, Lignite, Bituminous and Anthracite.

60. Which is the most cheapest means of transport :
(A) Water transport (B) air transport (C) rail transport (D) road transport

Ans. (A)

Sol. Water transportation is the most cheapest means of transportation.

61. What is Knot?
(A) Unit of measuring wind velocity (B) Unit of measuring air pressure
(C) Unit of measuring temperature (D) Condition of sky

Ans. (A)

Sol. Knot is a unit to measure wind velocity or speed. 1 Knot = 1.85 km (1 Nautical Mile)

62. Which crop is mostly grown in India?
(A) Wheat (B) Pulses (C) Rice (D) Bajra

Ans. (C)

Sol. Rice is most abundantly grown crop in India.

63. Which is not forest based Industry:
(A) Paper Industry (B) Wood Industry (C) Rubber Industry (D) Sugar Industry

Ans. (D)

Sol. Sugar Industry is an agro based industry.

64. Bhilai iron and steel industry situated in which state of India :
(A) Chattisgarh (B) Karnataka (C) West Bengal (D) Odisha

Ans. (A)

Sol. Bhilai Iron and Steel Industry is situated in Bhilai, Chhatisgarh.

65. Weather maps are published in India from :
(A) Mumbai (B) Pune (C) Delhi (D) Dehradun

Ans. (B)

Sol. Weather maps are published in India from Pune (Maharashtra). Publication of weather maps started from the year 1875.

66. Which type of disaster in Bhopal gas tragedy :
(A) Natural disaster (B) Industrial disaster (C) Chemical disaster (D) All of the above

Ans. (B & C)

Sol. Bhopal gas tragedy can be considered as Industrial-Chemical disaster, as mentioned in M.P. Board, Class X, Chapter - Natural Disaster and Disaster Management (Page No. 117).

67. In which state in India Tuticorin port is situated?
(A) Tamilnadu (B) Karnataka (C) Andhra Pradesh (D) Kerala

Ans. (A)

Sol. Tuticorin port is the extreme south eastern port of India, located in Tamil Nadu.

68. Tsunami is :
(A) Cyclone (B) Anticyclone (C) High Oceanic waves (D) All of the above

Ans. (C)

Sol. Tsunami are earth quake affected high oceanic or tidal waves.

69. Which country is biggest contributor of trade in India:
(A) United State of America (B) United Kingdom
(C) Belgium (D) Germany

Ans. (A)

Sol. USA is the biggest contributor of trade in India.

70. To all those customer who do not have computers or internet to them they are provided telecommunication through:

- (A) Vyaparik Channel (B) Speed Post (C) e-Post (D) e-Bill post

Ans. (C)

Sol. E-Post has been started for consumers who don't have computer or internet of their own.

71. Indian National Congress was formed in the year:

- (A) 1885 (B) 1990 (C) 1920 (D) 1947

Ans. (A)

Sol. Indian National Congress was formed in Dec., 1885 at Bombay.

72. Who was the president of the drafting committee?

- (A) Rajendra Prasad (B) Ambedkar (C) Gandhi ji (D) Nehru ji

Ans. (B)

Sol. Dr. Ambedkar was the President of the drafting committee. He is also known as Father of Indian Constitution.

73. Who was the first president of Indian National Congress?

- (A) A.O. Hume (B) Surendranath Banerjee
(C) Wyomesh Chandra Banerjee (D) Mahatma Gandhi

Ans. (C)

Sol. First President of Indian National Congress was Wyomesh Chandra Banerjee.

74. Who sefeguards the fundamental rights?

- (A) Prime Minister (B) President (C) Parliament (D) Supreme Court

Ans. (D)

Sol. Supreme Court is the protector of Fundamental Rights.

75. What is the minimum age to become a member of Legislative Assembly?

- (A) 21 years (B) 25 years (C) 30 years (D) 35 years

Ans. (B)

Sol. The minimum age to become member of Legislative Assembly (Vidhan Sabha) is 25 years.

76. Per capital income refers to which of the following?

- (A) Whole income (B) Average income (C) National income (D) Net income

Ans. (B)

Sol. Per Capital Income is known as Average income

$$\text{P.C.I.} = \frac{\text{National Income}}{\text{Total Population}} = \text{Average Income}$$

77. Which of the following is the criteria of measurement of economic development?

- (A) National Income (B) Economic Welfare (C) Social Welfare (D) All the above

Ans. (A)

Sol. National Income is the major criteria of measurement of Economic Development.

78. 'Education and Health' belong to which of the following?

- (A) Social infrastructure (B) Economic infrastructure
(C) Physical infrastructure (D) All the above

Ans. (A)

Sol. Education and Health belongs to social infrastructure.

- 79.** In which of the following year India has adopted the 'New Economic Polity'?
- (A) 1990 (B) 1991 (C) 1992 (D) 1993

Ans. (B)

Sol. New Economic Policy was adopted by India in 1991, starting of economic reforms.

- 80.** Multi-national Company means :
- (A) A company whose work relates to production.
 (B) A company whose work relates to sale.
 (C) A company whose business is spread over several countries.
 (D) A company whose shareholders are spread in whole world.

Ans. (C)

Sol. Multi-National Company means a company whose business is spread over several countries.

- 81.** The value of $\frac{\cos^2 \theta + \tan^2 \theta - 1}{\sin^2 \theta}$ is :
- (A) $\sin^2 \theta$ (B) $\cos^2 \theta$ (C) $\cot^2 \theta$ (D) $\tan^2 \theta$

Ans. (D)

Sol.
$$\frac{\cos^2 \theta + \tan^2 \theta - 1}{\sin^2 \theta}$$

$$= \frac{\tan^2 \theta - \sin^2 \theta}{\sin^2 \theta} = \frac{\tan^2 \theta}{\sin^2 \theta} - 1$$

$$= \sec^2 \theta - 1 = \tan^2 \theta$$

- 82.** Value of $\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 59^\circ + \sin^2 31^\circ}$ is
- (A) 0 (B) 1 (C) $\frac{1}{2}$ (D) -1

Ans. (B)

Sol.
$$\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 59^\circ + \sin^2 31^\circ} = \frac{\cos^2 20^\circ + \sin^2 20^\circ}{\sin^2 59^\circ + \cos^2 59^\circ} = \frac{1}{1} = 1$$

- 83.** Which value of m, equation

$$2x + my - 4 = 0,$$

$$3x - 7y - 10 = 0$$

has no solution?

- (A) $\frac{2}{3}$ (B) $\frac{4}{10}$ (C) $-\frac{14}{3}$ (D) $\frac{14}{3}$

Ans. (C)

Sol. For no solution :

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{2}{3} = \frac{m}{-7}; m = -\frac{14}{3}$$

84. Zeroes of the polynomial $x^3 - 4x^2 - 7x + 10$ are :

- (A) 1, 5, -2 (B) 1, -5, 2 (C) -1, 5, 2 (D) 1, -5, -2

Ans. (A)

Sol. $x^3 - 4x^2 - 7x + 10$

$$= (x-1)(x-5)(x+2)$$

zeros are : 1, 5, -2

85. Which rational expression should be added to $\frac{x-x^2+2}{x(x^2-1)}$ to get $\frac{x+1}{x^2-1}$?

- (A) $\frac{x}{2}$ (B) $\frac{2}{x}$ (C) $2x$ (D) x^2

Ans. (B)

Sol. $y = \frac{x+1}{x^2-1} - \left(\frac{x-x^2+2}{x(x^2-1)} \right)$

$$= \frac{x^2+x-x+x^2-2}{x(x^2-1)} = \frac{2x^2-2}{x(x^2-1)}$$

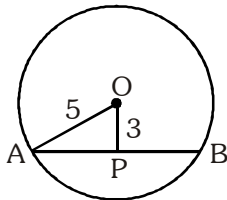
$$= \frac{2(x^2-1)}{x(x^2-1)} = \frac{2}{x}$$

86. Length of Chord which is at a distance of 3 cm. from the centre of circle of radius 5 cm. is :

- (A) 4 cm. (B) 6 cm. (C) 8 cm. (D) 10 cm.

Ans. (C)

Sol.



$$AP^2 = 5^2 - 3^2 = 4^2 \quad : AP = 4\text{cm}$$

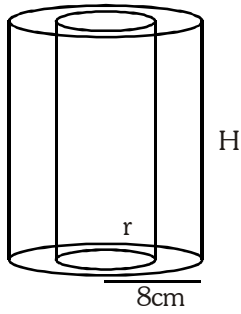
$$AB = 8\text{cm}$$

87. The height of a hollow cylinder is 14 cm. If external diameter is 16 cm and total curved surface area of the hollow cylinder is 1320 sq. cm., then its internal diameter is :

- (A) 14 cm. (B) 16 cm. (C) 7 cm. (D) 8 cm.

Ans. (A)

Sol.



$$2\pi RH + 2\pi rH = 1320$$

$$2\pi(14)(8 + r) = 1320$$

$$8 + r = 15 ; r = 7$$

$$2r = 14$$

88. The angle of elevation of the sun when the length of the shadow of a tower is equal to its height is :

(A) 30°

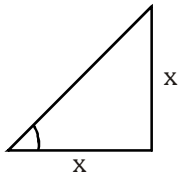
(B) 45°

(C) 60°

(D) 90°

Ans. (B)

Sol.



$$\tan \theta = \frac{x}{x} = 1 ; \theta = 45^\circ$$

89. The value of $\sin \theta (\operatorname{cosec} \theta - \sin \theta)$ is :

(A) $\sin^2 \theta$

(B) $\tan^2 \theta$

(C) $\cot^2 \theta$

(D) $\cos^2 \theta$

Ans. (D)

Sol. $\sin \theta (\operatorname{cosec} \theta - \sin \theta)$

$$\sin \theta \left(\frac{1}{\sin \theta} - \sin \theta \right)$$

$$= \cancel{\sin \theta} \frac{\cos^2 \theta}{\cancel{\sin \theta}} = \cos^2 \theta.$$

90. Two coins are tossed simultaneously, then the probability of getting head on one coin and tail on another coin is :

(A) 2

(B) $1/2$

(C) 4

(D) $1/4$

Ans. (B)

Sol. $S = \{HH, HT, TH, TT\}$

$$P = \frac{2}{4} = \frac{1}{2}$$

91. Sita and Geta are friends, what is the probability that both will have different birthdays (ignoring a leap year) :

- (A) $\frac{1}{365}$ (B) $\frac{1}{364}$ (C) $\frac{364}{365}$ (D) None of these

Ans. (C)

Sol. $P = \frac{365 \times 364}{365 \times 365} = \frac{364}{365}$

92. Five years ago age of Sunita was thrice the age of Vineeta. After 10 years Sunita's age will be twice the age of Vinita, what is the present age of Sunita?

- (A) 50 years (B) 20 years (C) 70 years (D) 30 years

Ans. (A)

Sol. Let the present age of sunita be x years & vineeta be y years

5 years ago

$$(x - 5) = 3(y - 5)$$

$$x = 3y - 15 + 5$$

$$x = 3y - 10 \quad \dots(i)$$

10 years hence

$$(x + 10) = 2(y + 10)$$

$$x = 2y + 20 - 10$$

$$x = 2y + 10 \quad \dots(ii)$$

By (i) & (ii)

$$3y - 10 = 2y + 10$$

$$y = 20 ; x = 3 \times 20 - 10 \quad \boxed{x = 50}$$

93. How many two-digit numbers are divisible by 2 :

- (A) 30 (B) 40 (C) 45 (D) 50

Ans. (C)

Sol. a = 10 ; l = 98

$$98 = 10 + (n-1)2$$

$$88 = (n-1)2$$

$$44 = (n-1)$$

$$n = 45$$

94. If A and B are two non empty sets then $(A \cup B)^c =$

- (A) $A^c \cup B^c$ (B) $A^c \cap B^c$ (C) $A \cup B^c$ (D) $A^c \cap B$

Ans. (B)

Sol. $(A \cup B)^c = A^c \cap B^c$

By demorgan's law

95. How many spheres of iron having radius 1 cm. can be made by melting a sphere of iron having 8 cm. radius?

- (A) 64 (B) 128 (C) 356 (D) 512

Ans. (D)

Sol. $n = \frac{\frac{4}{3}\pi R^3}{\frac{4}{3}\pi r^3}$

$$n = \frac{R^3}{r^3}$$

$$n = \frac{(8)^3}{(1)^3}$$

$$n = 512$$

96. Value of $\left[\frac{\sin 49^\circ}{\cos 41^\circ} + \frac{\cos 41^\circ}{\sin 49^\circ} \right]^2$ is :

(A) 2

(B) 4

(C) 1

(D) None of these

Ans. (B)

Sol. $\left[\frac{\sin 49^\circ}{\cos(90^\circ - 49^\circ)} + \frac{\cos 41^\circ}{\sin(90^\circ - 41^\circ)} \right]^2$

$$\left[\frac{\sin 49^\circ}{\sin 49^\circ} + \frac{\cos 41^\circ}{\cos 41^\circ} \right]^2$$

$$[1 + 1]^2 = 4$$

97. A quadratic equation $ax^2 + bx + c = 0$ has no real roots, if :

(A) $b^2 - 4ac = 0$

(B) $b^2 > 4ac$

(C) $b^2 < 4ac$

(D) $b^2 + 4ac = 0$

Ans. (C)

Sol. For no real roots

$$b^2 - 4ac < 0$$

$$b^2 < 4ac$$

98. The sum of pairs of opposite angles of a cyclic quadrilateral is :

(A) 90°

(B) 180°

(C) 270°

(D) 360°

Ans. (B)

Sol. Sum of pair of opposite angles of a cyclic quadrilateral is 180° .

99. The sum of first 20 terms of AP : 8, 3, -2, is :

(A) -790

(B) -970

(C) -979

(D) -779

Ans. (A)

Sol. $a = 8$

$$d = 3 - 8 = -5$$

$$S_{20} = \frac{20}{2} [2 \times 8 + (20 - 1) \times -5]$$

$$= 10 \times -79$$

$$= -790$$

100. The diameter of a cycle wheel is 1.6 m. The wheel revolves 21 times in one minute, then how much distance will the cycle cover in one hour :

(A) 3.636 km.

(B) 6.336 km.

(C) 6.633 km.

(D) 2.640 km.

Ans. (B)

Sol. $D = 1.6 \text{ m}$

$$r = \frac{1.6}{2} = 0.8 \text{ m}$$

$$C = 2\pi r$$

$$C = 2 \times \frac{22}{7} \times 0.8$$

$$C = 5.028 \text{ m}$$

in 1 min = 21 revolution

\therefore in 1 hr

$$= 21 \times 60 \times 5.028$$

$$= 6336 \text{ m}$$

$$= 6.336 \text{ km}$$