NATIONAL TALENT SEARCH EXAMINATION (NTSE-2017) STAGE -1
MADHYA PARDESH : SAT

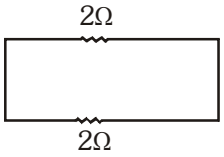
Date: 06/11/2016

Max. Marks: 100 **SOLUTIONS** **Time allowed: 90 mins**

1. A 4 Ω resistance wire is doubled by folding it, the new resistance is

(A) 1 Ω (B) 2 Ω (C) 3 Ω (D) None of these

Ans. ***(A)***



$$\frac{1}{R}=\frac{1}{2}+\frac{1}{2}$$

$R = 1\Omega$

2. Which of the following terms does not represent electrical power in a circuit:

(A) I^2R (B) IR^2 (C) V I (D) V^2/R

Ans. ***(B)***

$P = VI = I^2R = \frac{V^2}{R}$ So IR^2 is not power.

3. In a vernier calliper if 10 vernier scale divisions is equal to 8 main scale divisions (m.m.), then what is the least count of vernier calliper?

(A) 0.2 mm (B) 0.1 mm (C) 0.8 mm (D) 0.01 mm

Ans. ***(A)***

Least Count = 1Main sacle division – 1 vernier scale division

10VSD = 8mm

$1VSD = \frac{8}{10} = 0.8mm$

1MSD = 1mm

$\therefore$ LC = 1MSD – 1VSD

= 1 – 0.8

LC = 0.2 mm

4. If initial velcoity of an object is 'u' and acceleration is 'a' then find the distance travelled in nth second.

(A) $S_n = un + \frac{an^2}{2}$ (B) $S_n = un + an^2$ (C) $S_n = u + \frac{a}{2}(2n+1)$ (D) $S_n = \left(u + \frac{a}{2}\right)n^2$

Ans. ***(NA)***

Since distance travelled in n^{th} sec is

given by $S_n = u + \frac{a}{2}(2n-1)$

So none of the options given is correct.

5. What is the temperature which is identical in both Celsius and Fahrenhite temperature scale?

(A) $-40°$ (B) $-4°$ (C) $0°$ (D) None of the above

Ans. ***(A)***

$\frac{C}{5} = \frac{F-32}{9}$ when C = F

then $\frac{C}{5} = \frac{C-32}{9}$

$\Rightarrow \quad 9C = 5C - 160 -$

$\Rightarrow \quad 4C = -160$

$\Rightarrow \quad C = -40^o$

6. If a person goes from twon A to town B by a speed of 50 km/h and comes back with a speed of 150 km/h then average speed of the person is

(A) 100 km/h (B) 75 km/h (C) 0 km/h (D) 200 km/h

Ans. ***(B)***

$V_{av} = \frac{2V_1V_2}{V_1+V_2}$

$= \frac{2\times 50\times 150}{200}$

$V_{av} = 75 \text{ km / hr}$

7. Angle of elevation of pole star observed from any where on the Earth is approximately equal to

(A) longitude of the place (B) latitude of that place (C) constant (D) both longitude and latitude

Ans. ***(B)***

The position of pole star is close to the pole and coincides with the axis of rotation of earth.

So the angle of elevation of pole star at any place is nearly equal to latitude of that place.

8. If 3 resistances R_1, R_2 and R_3 are connected in series and is paralllel then their equivalent resistances are R_s and R_p respectively then correct relationship is $(R_1 > R_2 > R_3)$

(A) $R_s < R_3$, $R_p > R_1$ (B) $R_s = R_1 + R_2 + R_3$, $R_p \frac{R_1^2+R_2^2+R_3^2}{R_1+R_2+R_3}$

(C) $R_s < R_p$ (D) $R_s > R_1$, $R_p < R_3$

Ans. ***(D)***

Since $R_1 > R_2 > R_3$

& R_s is series combination of R_1, R_2 & R_3 so

$R_s > R_1$

& R_p is parallel combination of R_1, R_2 & R_3 so $R_p < R_3$

9. Between which 2 planets the orbit of seres lies

(A) Earth-Mars (B) Venus-Earth (C) Mars-Jupiter (D) Jupiter-Saturn

Ans. (C)

Between Mars & Jupiter

10. Dentists use to see large image of the teeth of patients using

(A) Convex mirror (B) Convex lens (C) Concave lens (D) Concave mirror

Ans. (D)

Because concave mirror forms virtual and enlarged image when object is placed between focus and pole.

11. A human being has a horizontal field of view of about _____ with one eye and of about _____ with both eyes

(A) 120°, 150° (B) 150°, 180° (C) 180°, 210° (D) 210°, 240°

Ans. (B)

Horizontal field of view with one eye = 150°

with both the eyes = 180°

12. To prevent electrical circuits from damage we use fuse wire of .....

(A) high resistance and low melting point (B) high resistance and high melting point

(C) low resistance and low melting point (D) low resistance and high melting point

Ans. (A)

In fuse : high resistance & Low melting point.

13. Biggest planet of the solar system is

(A) Mercury (B) Saturn (C) Jupiter (D) Uranus

Ans. (C)

Jupiter.

14. All the elements in a group have the -

(A) Same valency (B) Different valency (C) Variable valency (D) None of these

Ans. (A)

As they have same no. of electrons in valence shell

15. The atomic number of E, F, G, H are given below, which element belongs to zero group -

Element	Atomic number
(A) E	5
(B) F	7
(C) G	10
(D) H	16

Ans. (C)

Electronic configuration of G is 2, 8 as it is having complete octet.

16. Which of the following compounds is bad conductor of electricity?

(A) Ionic compound (B) Electrovalent compound (C) Covalent compound (D) None of these

Ans. (C)

As they generally do not gives ions.

17. The addition of oxygen to a substance is called -

(A) Redox (B) Oxidation (C) Reduction (D) None of these

Ans. ***(B)***

As addition of oxygen is known as oxidation.

18. The molecular formula of Sucrose is -

(A) CH_2O (B) $C_6H_{12}O_6$ (C) $C_{l2}H_{22}O_{11}$ (D) CH_3COOH

Ans. ***(C)***

Molecular formula of sucrose is $C_{12}H_{22}O_{11}$.

19. Coal is a fuel -

(A) Fossil fuel (B) Nuclear fuel (C) Bio fuel (D) None of these

Ans. ***(A)***

As it is formed by fossils.

20. Strong electrolytes is-

(A) NH_4OH (B) $Ca(OH)_2$ (C) H_2CO_3 (D) NaCl

Ans. ***(D)***

As it completely ionise in molten or aq. solution.

21. Chemical formula of Teflon is-

(A) $\left(-CF_2-CF_2-\right)_n$ (B) $\begin{pmatrix}\ldots CH_2-CH\\ \quad\quad\quad\quad\ |\\ \quad\quad\quad\quad Cl\end{pmatrix}_n$ (C) $\left(-CH_2-CH_2-\right)_n$ (D) None of these

Ans. (A)

As it is formed by polymerisation of $CF_2 = CF_2$ i.e. tetra flouro ethene.

22. The properties of the product are different from those of the constituents is called -

(A) Mixture (B) Element (C) Compound (D) Acid

Ans. ***(C)***

Properties of compound is different from properties of its constituent elements.

23. Which Vitamin is found in abundance inAmla?

(A) Vitamin -A (B) Vitamin - C (C) Vitamin - B (D) Vitamin - D

Ans. ***(B)***

Vitamin C is present in citrus fruit.

24. Dilute solution of alkaline potassium permanganate is known as

(A) Bayer's reagent (B) Tolleri's reagent (C) Fehling solution (D) Benedict solution

Ans. (A)

Alkaline dilute solution of $KMnO_4$ is known as Bayer's reagent.

25. The chemical formula of Plaster of Paris is

(A) Calcium Sulphate [$CaSO_4$] (B) Calcium Sulphate Hemihydrate [$CaSO_4$ ½H_2O]

(C) Barium Sulphate [$BaSO_4$] (D) None of these

Ans. ***(B)***

Formula of plaster of paris is $CaSO_4 . \frac{1}{2} H_2O$.

26. Bromine is a -

(A) Non-metal (B) Metal (C) Metalloids (D) None of these

Ans. (A)

Non-metal as it shows the properties of non-metal.

27. The study of interaction between living organism and environment is called -

(A) Ecology (B) Phytogeography (C) Psychology (D) Mycology

Ans. (A)

The study of interaction between living organism and enviroment is called ecology.

28. In how many parts human brain is divided

(A) 4 (B) 5 (C) 3 (D) 2

Ans. (C)

Human brain is divided into 3 parts : fore brain, mid brain, hind brain.

29. Chromosome number in the daughter cells after meiosis is

(A) 1/2 (B) 1/3 (C)1/4 (D) 1/5

Ans. (A)

In meiosis chromosome no. reduces to half.

30. The instrument for measuring blood pressure is called

(A) Manometer (B) Sphygmomanometer (C) Barometer (D) Potentiometer

Ans. (B)

Blood pressure is measured with the help of sphygmomanometer.

31. The anther contains

(A) Sepal (B) Carpel (C) Petal (D) Pollen grains

Ans. (D)

Anther is male reproductive part and it contains male gametes that are pollen grains.

32. The largest gland in human body is -

(A) Pituitary gland (B) Liver (C) Adrenal gland (D) Thyroid gland

Ans. (B)

Liver is the largest gland.

33. Which cell organelle is known as suicidal bag

(A) Ribosome (B) Centrosome (C) Lysosome (D) Peroxysome

Ans. (C)

Lysosome contain hydrolytic digestive enzymes which are released after the bursting of lysosome and this respondible for the digestion of self cell and hence called as suicidal bag.

34. Plant part used as medicine of Terminalia arjuna-

(A) Leaves (B) Fruits (C) Bark (D) Roots

Ans. (C)

Bark of Terminalia arjuna is used as a medicine for the cardiao vascular disorder.

35. Energy flow in an Ecosystem is-

(A) Unidirectional (B) Bidirectional (C) Bark (D) Roots

Ans. (A)

Energy always flows from producer to consumer and therefore the flow of energy is unidirectional.

36. World Environment Day is celerbated on-

(A) 5 June (B) 11 July (C) 16 October (D) 26 December

Ans. (A)

World environment day is celebrated on 5th June.

37. C_4 cycle mechanism is given by-

(A) Hill (B) Aman (C) Hatch & Slack (D) Celvin

Ans. (C)

C_4 cycle mechanism is given by hatch and slack.

38. Which pollutant is dangerous of Taj Mahal?

(A) Sulphur dioxide SO_2 (B) Carbon dioxides CO_2 (C) Carbon monooxide CO (D) All of these

Ans. (A)

SO_2 is responsible for acid rain and thus it corrodes monuments.

39. Which of the following is an example of Insectivorous plant-

(A) Amla (B) Baheda (C) Utricularia (D) Isoetes

Ans. (C)

Utricularia is an insectivorous plant which consumes insects to meet the requirement of nitrogen.

40. Which is prokaryotic cell amongst the following?

(A) Amoeba (B) Bacteria (C) Yeast (D) Volvox

Ans. (B)

Bacterial cell is the prokaryotic cell because it lacks membrane bound cell organelles and primitive nucleus.

HISTORY

41. Big Bath has been found in which of the Indus valley site?

(A) Harappa (B) Mohenjodaro (C) Lothal (D) Chahnudaro

Ans. (B)

The great bath is the most important public place made of bricks.

42. Which statement about the position of women in the Rig Vedic society is <u>not</u> true?

(A) They enjoyed high status in the society (B) Parda system and child marriages were prevalent.

(C) They and right to higher education (D) Dowry was not known

Ans. (B)

Women enjoyed a high status in the Rig Vedic Society. They received higher education. Social evils like dowry, purdah system and child marriages were not prevent.

43. When did the first urbanization take place?

(A) In the new stone age (B) In the Indus Valley civilization

(C) During he Mauryan period (D) During the Gupta period

Ans. (B)

The urban culture that developed in India and Pakistan's north western part in the Indus river basin is generally called the Indus Valley Civilisation.

44. Which ruler of ancient India is known as Devanam Priyadasi?

(A) Bindusar (B) Chandra Gupta Maurya

(C) Ashoka (D) Brihadatta

Ans. (C)

Most of the inscriptions of Ashoka describes him as Devanam Priyadasi which means favorite of the gods.

45. What are tripitakas?

(A) Vedic Literature (B) Compilation of Budda's sermons

(C) Main principles of Lord Mahavira (D) Compilation of account of Alexander's invasion into India

Ans. (B)

Buddhism has Tripitikas meaning three baskets - Vinay Pitika, Sutta Pitika and Abhidhamma Pitika.

46. Which ruler followed the policy of 'Blood and Iron' for strengthening administration?

(A) Balban (B) Rajiya (C) Iltutmish (D) Foroze-Shah-Tughlaq

Ans. (A)

Balban followed the policy of 'Blood and Iron' for regulating his administration.

47. Which king of the sultanate period is known as the 'made sultan'?

(A) Mohd-bin-Tughlaq (B) Feroze-Shah-Tughlaq (C) Jalal-ud-din-Khilji (D) Alauddin-Khilji

Ans. (A)

Due to his plans and torture of his subjects, he has been named mad, blood thirsty etc.

48. To which place of Madhya Pradesh Jungle Satyagraha related?

(A) Reewa (B) Indore (C) Chhatarpur (D) Seoni

Ans. (D)

In 1930, the Congress workers of Seoni, under the leadership of Durga Shankar Mehta carried out the Jungle Satyagraha.

49. Who was the Governor General of India in 1857?

(A) Dalhousie (B) William Bentick (C) Canning (D) Rippon

Ans. (C)

Lord Canning was the last Governor General of India and the first Viceroy.

50. Who gave the slogan of 'Do or Die' during the Indian freedom struggle?

(A) Vipin Chandra Pal (B) Lala Lajpat Rai (C) Mahatma Gandhi (D) Bal Gangadhar Tilak

Ans. (C)

Gandhiji said, "I am not going to accept anything less than total independence, we shall either do or die".

51. What was the main objective of British in dividing Bengal?

(A) To strengthen administrative system in Bengal (B) To suppress nationalist feelings

(C) To promote nationalist feelings (D) To help in promotion of language and culture

Ans. (B)

In order to supress nationalist feelings and to divide Hindus and Muslims.

52. Through which newspaper did Lala Lajpat Rai inspire the people of India of struggle for independence?

(A) Kesari (B) Samvad Kaumudi (C) Hindustan (D) Kayastha Samachar

Ans. (D)

Lala Lajpat Rai led the extremist movement in Punjab and inspire the people through the newspaper 'Kayasth Samachar'.

53. Communal electrorate was first introduced through which Act?

(A) 1773 Act (B) 1861 Act (C) 1909 Act (D) 1919 Act

Ans. (C)

By Govt. of India Act, 1909, seperate electorate was given to muslims.

54. Which Article of the Indian constitution gives a special status to the state of Jammu & Kashmir?

(A) 370 (B) 395 (C) 368 (D) 384

Ans. (A)

Art 370 gives special status to the state of Jammu & Kashmir.

55. How many times has National emergency been declared in India?

(A) One (B) Two (C) Three (D) Four

Ans. (C)

National Emergency was declared in India thrice - Chinese aggression, Pakistan aggression and Internal distrubances.

GEOGRAPHY

56. Oldest mountain in India is :

(A) Himalaya (B) Vindhyachal (C) Satpura (D) Aravali

Ans. (D)

Aravali is the oldest mountain range in India.

57. Where is Bharat Heavy Electricals Limited (BHEL) situated?

(A) Sagar (B) Bhopal (C) Indore (D) Jabalpur

Ans. (B)

BHEL is situated at Bhopal (M.P.)

58. Which of the following is the most important factor of determine the type of forest?

(A) Climate (B) Type of soil (C) Productivity of soil (D) Wind direction

Ans. (A)

Climate is the most important factor to determine the type of forests.

59. Which of the following is everlasting physical resources for power generation in India?

(A) Uranium (B) Coal (C) Petroleum (D) Water

Ans. (D)

Water is everlasting physical resource for power generation because water is renewable resource.

60. Madhya Pradesh is . . . . . largest state of India in term of area.

(A) Second (B) Third (C) First (D) Fourth

Ans. (A)

M.P. is the 2nd largest state of India in terms of area after Rajasthan.

61. The leading producer of coal in India.

(A) Jharkhand (B) Bihar (C) Rajasthan (D) Andhra Pradesh

Ans. (A)

Jharkhand is the leading producer of coal in India.

62. The highest rainfall in the world is received at

(A) Cherrapunji (B) Mawsynram (C) Shilong (D) Calicut

Ans. (B)

Mawsynram (Meghalaya) is the highest rainfall receiving area in the world.

63. Which of the following river does not fall in the Bay of Bengal-

(A) Narmada (B) Vanganga (C) Mahanadi (D) Krishan

Ans. (A)

Narmada falls in Arabian Sea.

64. Blue revolution is releated to -

(A) Fruit Production (B) Fish Production (C) Sheep rearing (D) Milk Production

Ans. (B)

Blue revolution is related to fish production.

65. How many railway zones are there in India?

(A) 9 (B) 16 (C) 14 (D) 15

Ans. (B)

There are total 16 railway zones in India.

66. Tropic of cancer does not pass through which of the following states?

(A) Gujarat (B) Rajasthan (C) West Bangal (D) Orissa

Ans. (D)

Tropic of Cancer only passes through Gujarat, Rajasthan, M.P., Chattisgarh, Jharkhand, West Bengal, Tripura, Mizoram.

67. The Nagarjun Sagar Dam is located on the river-

(A) Godavari (B) Krishna (C) Kaveri (D) Narmda

Ans. (B)

Nagarjuna Sagar Dam is located on the river Krishna.

68. Topographical Maps of India are prepared by-

(A) Geological Survey of India (B) Archaeological Survey of India

(C) Survey of India (D) National Geographical Survey of India

Ans. (C)

Topographical Maps of our country are made by Survey of India. Its head office is in Dehradun (Uttarakhand).

69. What is Bailadila famous for?

(A) Bauxite (B) Iron Ore (C) Copper (D) Coal

Ans. (B)

In Central Region, the mines of Bailadila are famous for Iron ore reserves.

70. In which region is the method of making contour bands used for soil conservation?

(A) Delta region (B) Plateau region (C) Hills (D) Plains

Ans. (C)

Contour bands are used for soil conservation in hilly slopes.

71. In a parliamentary from of Goverment, real powers of the State are vested in which body?

(A) President (B) Chief Justice of Supreme Court

(C) Prime - Minister (D) Parliament

Ans. (C)

Real power of the government vest in the Prime Minister because he is the head of the cabinet of ministers.

72. Which fundamental right of Indian Constitution has been deleted by the 44th Amendment Act?

(A) Right against exploitation (B) Right to property

(C) Right to liberty (D) Right to equality

Ans. (B)

Right to Property was omitted by 44th Amendment Act, 1978.

73. When is 'Human Right Day' celebrated?

(A) 10th November (B) 10th December (C) 10th January (D) 10th October

Ans. (B)

Human Right Day is celebrated on 10th December every year.

74. Who is known as the father of Indian Constitution?

(A) Dr. B.R. Ambedkar (B) Mahatma Gandhi (C) Jawaharlal Nehru (D) Sardar Patel

Ans. (A)

Dr. B.R. Ambedkar is known as father of Indian Consitution.

75. The term of member of the Rajya Sabha is-

(A) 5 years (B) 2 years

(C) 6 years (D) Same as that of the Lok Sabha

Ans. (C)

The term of member of the Rajya Sabha is 6 years.

76. Which is Barter System?

(A) Exchange of goods for dollars (B) Exchange of goods for rupees

(C) Exchange of goods for coins (D) Exchange of goods for goods

Ans. (D)

Goods are exchanged for goods in Bartar System.

77. On what basis the enterprise are classified in 'Public' and 'Private' sectors?

(A) Employment conditions (B) Nature of Economic activities

(C) Ownership of Enterprise (D) Number of workers employed

Ans. (C)

On the basis of ownership, enterprises are classified as Public and Private.

78. In ancient times, which countary was known as 'Golden Sparrow'?

(A) France (B) New Zealand (C) India (D) China

Ans. (C)

India was known as Golden Sparrow in ancient times.

79. In India, the first five-year plan started from which year?

(A) 1947 (B) 1951 (C) 1948 (D) 1950

Ans. (B)

First Five Year Plan - 1951-1956.

80. In which of the following sectors only services are produced?

(A) In private sector (B) In primary sector (C) In secondary sector (D) In tertiary sector

Ans. (D)

Tertiary sector provides services.

81. If in a right angled triangle ABC, $\cos A = \frac{9}{41}$, then the value of cotA and cosec A will be:

(A) $\frac{40}{9}, \frac{40}{41}$ (B) $\frac{9}{40}, \frac{41}{40}$ (C) $\frac{9}{41}, \frac{41}{9}$ (D) $\frac{9}{40}, \frac{40}{41}$

Ans. (B)

Sol. $\text{CosA} = \frac{9}{41} = \frac{\text{B}}{\text{H}}$

$\therefore$ P = 40

$\text{CotA} = \frac{B}{P} = \frac{9}{40}$, $\text{Cos ec A} = \frac{H}{P} = \frac{41}{40}$

82. In ΔABC, if $\angle B = 90°$, AB = 5, BC = 12, then sin C = ...

(A) $\frac{12}{13}$ (B) $\frac{5}{13}$ (C) $\frac{5}{12}$ (D) $\frac{13}{5}$

Ans. ***(B)***

Length of hypotenuse = 13 units

$\therefore$ Sin C = $\frac{5}{13}$

83. $(\sec\theta + \tan\theta)(1 - \sin\theta) =$ .....

(A) 0 (B) = 1 (C) $\cos\theta$ (D) $\sin\theta$

Ans. ***(C)*** $(\sec\theta + \tan\theta)(1 - \sin\theta) = \frac{(1+\sin\theta)(1-\sin\theta)}{\cos\theta}$

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

84. If $\tan\theta = \frac{1}{\sqrt{3}}$, then the value of $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$ is

(A) $\sqrt{3}$ (B) 1 (C) $\frac{1}{\sqrt{2}}$ (D) $\sqrt{2}$

Ans. ***(NA)***

Sol. $\tan\theta = \frac{1}{\sqrt{3}} = \frac{P}{B} \therefore H = 2$, $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta} = \frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta + \sin^2\theta} = \cos^2\theta - \sin^2\theta$

$= \left(\frac{B}{H}\right)^2 - \left(\frac{P}{H}\right)^2 = \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{1}{2}\right)^2 = \frac{3}{4} - \frac{1}{4} = \frac{1}{2}$

85. For what value of k, the question $3x^2 + 2x + k = 0$ will have real roots:

(A) $k \le \frac{1}{3}$ (B) $k \ge \frac{1}{3}$ (C) $k = \frac{2}{3}$ only (D) None of these

Ans. ***(A)***

Sol. $3x^2 + 2x + 5k = 0$

For real roots $D \geq 0$

$\Rightarrow b^2 - 4ac \ge 0$ $\Rightarrow 4 - 12k \ge 0$

$\Rightarrow 12k \le 4$ $\therefore k \le \frac{1}{3}$

86. The product of Meera's age 5 years ago and her age 8 years later is 30. Her percent age is-

(A) 11 years (B) 9 years (C) 7 years (D) 5 years

Ans. (C)

Sol. Let Meera's present age be x yrs.

Five year's ago her age was $(x-5)$

After 8 years $(x+8)$

$\therefore (x-5)(x+8)=30 \quad \Rightarrow x^2+3x-70=0$

$\Rightarrow (x-7)(x+10)=0 \quad \therefore x=7,\ x\neq -10$

87. The area of right angled is 96 sq. mtr. If base is three times the altituide, the length of base is-

(A) 24 mtr. (B) 20 mtr. (C) 18 mtr. (D) 15 mtr.

Ans. (A)

Sol. Let the length of altitude be 'x'

$\therefore$ base is $= 3x$

$\therefore \text{Area} = \frac{1}{2}b\times h \quad = 96 = \frac{1}{2}\times x\times 3x$

$\Rightarrow x^2=64 \quad \Rightarrow x=8$

$\therefore$ Base $= 24$ m

88. What is the probability that a leap year has 53 Sundays?

(A) $\frac{7}{53}$ (B) $\frac{7}{52}$ (C) $\frac{1}{7}$ (D) $\frac{2}{7}$

Ans. (D)

Sol. Total possible outcomes are $= 7$

Favourable outcomes $= 2$

$\therefore P(E) = 2/7.$

89. One card is drawn at random from a deck of 52 cards. The probability of getting a face card is:

(A) $\frac{3}{13}$ (B) $\frac{1}{26}$ (C) $\frac{3}{26}$ (D) $\frac{4}{13}$

Ans. (A)

Sol. Total possible outcomes are $= 52$

Favourable outcomes $= 12$

$\therefore P(E) = \frac{12}{52} = \frac{3}{13}.$

90. The perimeter of the rectangular field is 206 meter. What will be its area if its length is 23 meter more than its breadth?

(A) 1520 meter^2 (B) 2420 meter^2 (C) 2480 meter^2 (D) 2520 meter^2

Ans. (D)

Sol. Let breadth be x m

$\therefore$ Length be $(x+23)$m

$\therefore$ Perimeter $= 2(x+x+23) = 206$

$\Rightarrow x = \frac{80}{2} = 40$ = breadth

$\therefore \ell = 63$

Area = $\ell \times b = 40 \times 63 = 2520\,m^2$

91. The total surace area of a cube is 864 cm^2.

(A) 3456 cm^3 (B) 432 cm^3 (C) 1728 cm^3 (D) 3466 cm^3

Ans. (C)

Sol. Surface area = $6a^2 = 864\,cm^2$

$\therefore a = 12$

Now volume = $a^3 = 12^3 = 1728\ cm^3$

92. The length of the longest pole that can be kept in a room of size 12m × 9 m × 8m is:

(A) 29 m (B) 17 m (C) 21 m (D) 19 m

Ans. (B)

Sol. Length of longest pole = diagonal of room = $\sqrt{\ell^2 + b^2 + h^2}$

$= \sqrt{144 + 81 + 64} = \sqrt{289} = 17$ m

93. Which point on x-axis is equidistant from the point A(7, 6) and B (–3, 4)?

(A) (0, 4) (B) (–4, 0) (C) (3, 0) (D) (0, 3)

Ans. (C)

Sol. Let the co-ordinate of point on x-axis be (x, 0)

$(x-7)^2 + (6)^2 = (x+3)^2 + (4)^2 \quad \Rightarrow 20x = 60$

$\Rightarrow x = 3$

So point is (3, 0).

94. The point A(0, 6), B (–5, 3) and C (3, 1) are the vertices of a triangle which is:

(A) Isosceles (B) Equilateral (C) Rightangled (D) None of these

Ans. (A/C/D)

Sol. Length of AB = $\sqrt{34}$

Length of BC = $\sqrt{68}$

Length of AC = $\sqrt{34}$

So it is an isosceles right angled triangle.

95. The x-axis is divides the line joining (2, –3) and B(7, 4) in the ratio:

(A) 2 : 1.5 (B) 2 : 3 (C) 3 : 2 (D) 1 : 2

Ans. (NA)

Sol. The point on x-axis be (x, 0) which divides the point A (2, –2) and B(7, 4) in the ratio $\lambda : 1$

$\therefore 0 = \frac{4\lambda - 3}{\lambda + 1} \qquad \Rightarrow \lambda = \frac{3}{4}$

$\therefore$ ratio is 3 : 4.

96. If A and B are two non empty sets, then $A \cup B =$

(A) $\{x \mid x \in A \text{ and } x \in B\}$ (B) $\{x \mid x \in A \text{ or } x \in B\}$ (C) $\{x \mid x \in A \text{ and } x \notin B\}$ (D) $\{x \mid x \notin A \text{ and } x \in B\}$

Ans. ***(B)***

Sol. By the definition of union.

97. If A is a non empty set, ϕ is empty set $\cup$ and is universal set, then $A \cap \phi =$

(A) $\cup$ (B) A (C) ϕ (D) A'

Ans. ***(C)***

Sol. By the definition of intersection.

98. Selling price of one thing is $\frac{3}{2}$ times of its cost price. What will be the percentage of profit?

(A) $20\frac{1}{2}$ (B) $25\frac{1}{4}$ (C) $33\frac{1}{3}$ (D) 50

Ans. ***(D)***

Sol. Let C.P. of be x.

$$\therefore \text{Profit \%} = \frac{\text{Profit}}{\text{C.P.}} \times 100 = \frac{3/2 x - x}{x} \times 100 = \frac{1}{2} \times 100 = 50\%$$

99. A sold a bicycle to B on 20% profit. B sold it to C on 25% profit. If C paid Rs. 225 for it, then what was the cost price of bicycle to A?

(A) 110 (B) 125 (C) 120 (D) 150

Ans. ***(D)***

Sol. Let C.P. be x.

$$\text{S.P. for A} = \frac{x + 20x}{100} = \frac{6x}{5} \text{ (C.P. for B)}$$

$$\text{Now, C.P. for C} = \frac{6}{5}x + \frac{25}{100} \times \frac{6}{5}x = 225$$

$\therefore x = 150 \cdot$

100. The height of a cylinder is 14 cm and its curved surface area is 264 cm^2, the volume of cylinder is:

(A) 308 cm^3 (B) 396 cm^3 (C) 1232 cm^3 (D) 1848 cm^3

Ans. ***(B)***

Sol. h = 14 cm

CSA of cylinder = $2\pi rh = 264$

$$\Rightarrow \pi rh = 132, \; r = \frac{132}{\pi h} = 3 \text{ cm}$$

$$\Rightarrow V = \pi r^2 h = \frac{22}{7} \times 9 \times 14 = 396 \, cm^3$$