

Sample Questions for Maths –

1. Consider the following relations :

(1) $A - B = A - (A \cap B)$

(2) $A = (A \cap B) \cup (A - B)$

(3) $A - (B \cup C) = (A - B) \cup (A - C)$

which of these is/are correct

(a) 1 and 3

(b) Only 2

(c) 2 and 3

(d) 1 and 3

2. $\int \sqrt{1 + \cos x} dx$ is equal to

(a) $2\sqrt{2} \sin \frac{x}{2} + c$

(b) $-2\sqrt{2} \sin \frac{x}{2} + c$

(c) $-2\sqrt{2} \cos \frac{x}{2} + c$

(d) $2\sqrt{2} \cos \frac{x}{2} + c$

3. The solution of $\frac{dy}{dx} + \frac{y}{3} = 1$ is

(a) $y = 3 + ce^{x/3}$

(b) $y = 3 + ce^{-x/3}$

(c) $3y = c + e^{x/3}$

(d) $3y = c + e^{-x/3}$

4. $\frac{d}{dx} \log |x| = \dots, (x \neq 0)$

(a) $\frac{1}{x}$

(b) $-\frac{1}{x}$

(c) x

(d) $-x$

5. The relation R defined on the set of natural numbers as $\{(a, b) : a \text{ differs from } b \text{ by } 3\}$, is given by

(a) $\{(1, 4), (2, 5), (3, 6), \dots\}$

(b) $\{(4, 1), (5, 2), (6, 3), \dots\}$

(c) $\{(1, 3), (2, 6), (3, 9), \dots\}$

(d) None of these

6. The solution of $\frac{dy}{dx} + p(x)y = 0$ is

(a) $y = ce^{\int p dx}$

(b) $x = ce^{-\int p dy}$

(c) $y = ce^{-\int p dx}$

(d) $x = ce^{\int p dy}$

$$f(x) = \begin{cases} \frac{1}{x} \sin x^2, & x \neq 0 \\ 0, & x = 0 \end{cases}, \text{ then}$$

7. If

(a) $\lim_{x \rightarrow 0^+} f(x) \neq 0$

(b) $\lim_{x \rightarrow 0^-} f(x) \neq 0$

(c) $f(x)$ is continuous at $x=0$

(d) None of these

8. If $y = e^{x+e^{x+e^{x+\dots\infty}}}$, then $\frac{dy}{dx}$ is equal to-

(a) $\frac{y}{1-y}$

(b) $\frac{1}{1-y}$

(c) $\frac{y}{1+y}$

(d) $\frac{y}{y-1}$

9. Let $A = \{a, b, c\}$, $B = \{b, c, d\}$, $C = \{a, b, d, e\}$, then $A \cap (B \cup C)$ is

(a) $\{b, c\}$

(b) $\{b, c, d\}$

(c) $\{b, d, e\}$

(d) $\{e\}$

10. If $f: R \rightarrow S$ defined by $f(x) = \sin x - \sqrt{3} \cos x + 1$ is onto, then the interval of S is

(a) $[-1, 3]$

(b) $[1, 1]$

(c) $[0, 1]$

(d) $[0, -1]$

11. $\lim_{x \rightarrow 0} \frac{x \cdot 2^x - x}{1 - \cos x}$ is equal to-

(a) 0

(b) $\log 4$

(c) $\log 2$

(d) None of these

12. Let $3f(x) - 2f(1/x) = x$, then $f'(2)$ is equal to

(a) $2/7$

(b) $1/2$

(c) 2

(d) $7/2$

13. Let R be a relation on N defined by $x + 2y = 8$. The domain of R is

(a) $\{2, 4, 8\}$

(b) $\{2, 4, 6, 8\}$

(c) $\{2, 4, 6\}$

(d) $\{1, 2, 3, 4\}$

14. Let $f(x) = \sin x + \cos x$, $g(x) = x^2 - 1$. Thus $g(f(x))$ is invertible for $x \in$

(a) $\left[-\frac{\pi}{2}, 0\right]$

(b) $\left[-\frac{\pi}{2}, \pi\right]$

(c) $\left[-\frac{\pi}{2}, \frac{\pi}{4}\right]$

(d) $\left[0, \frac{\pi}{2}\right]$

15. If $f(x) = \begin{cases} \frac{x^2-1}{x+1}, & \text{when } x \neq -1 \\ -2, & \text{when } x = -1 \end{cases}$, then

(a) $\lim_{x \rightarrow (-1)^-} f(x) = -2$

(b) $\lim_{x \rightarrow (-1)^+} f(x) = -2$

(c) $f(x)$ is continuous at $x = -1$

(d) All the above are correct

16. Derivative of the function $f(x) = \log_5(\log_7 x)$, $x > 7$ is

(a) $\frac{1}{x(\ln 5)(\ln 7)(\log_7 x)}$

(b) $\frac{1}{x(\ln 5)(\ln 7)}$

(c) $\frac{1}{x(\ln x)}$

(d) None of these

17. If two sets A and B are having 99 elements in common, then the number of elements common to each of the sets $A \times B$ and $B \times A$ are

(a) 2^{99}

(b) 99^2

(c) 100

(d) 18

18. The composite mapping $f \circ g$ of the map $f: R \rightarrow R$, $f(x) = \sin x$, $g: R \rightarrow R$, $g(x) = x^2$ is

(a) $\sin x + x^2$

(b) $(\sin x)^2$

(c) $\sin x^2$

(d) $\frac{\sin x}{x^2}$

19. If $f(x) = \begin{cases} \frac{5}{2} - x, & \text{when } x < 2 \\ 1, & \text{when } x = 2 \\ x - \frac{3}{2}, & \text{when } x > 2 \end{cases}$, then

(a) $f(x)$ is continuous at $x = 2$

(b) $f(x)$ is discontinuous at $x = 2$

(c) $\lim_{x \rightarrow 2} f(x) = 1$

(d) None of these

20. If $2^x + 2^y = 2^{x+y}$, then $\frac{dy}{dx}$ is equal to-

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

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

(c) $\frac{2^x + 2^y}{2^x - 2^y}$

(d) None of these

21. A relation R is defined from $\{2, 3, 4, 5\}$ to $\{3, 6, 7, 10\}$ by $xRy \Leftrightarrow x$ is relatively prime to y . Then domain of R is

(a) $\{2, 3, 5\}$

(b) $\{3, 5\}$

(c) $\{2, 3, 4\}$

(d) $\{2, 3, 4, 5\}$

22. Let $f(x) = ax + b$ & $g(x) = cx + d$, $a \neq 0, c \neq 0$. Assume $a = 1, b = 2$. If $(f \circ g)(x) = (g \circ f)(x)$ for all x , what can you say about c and d

(a) c and d both arbitrary

(b) $c = 1, d$ arbitrary

(c) c arbitrary

(d) $c = 1, d = 1$

23. The differential coefficient of $\tan^{-1} \left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right)$ is

(a) $\sqrt{1-x^2}$

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

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

(d) x

24. If $f(x) = \frac{x^2 - 10x + 25}{x^2 - 7x + 10}$ for $x \neq 5$ and f is continuous at $x = 5$, then $f(5)$ is equal to-

(a) 0

(b) 5

(c) 10

(d) 25

25. The domain of the function $f(x) = \sin^{-1}\{(1+e^x)^{-1}\}$ is

(a) $\left(\frac{1}{4}, \frac{1}{3}\right)$

(b) $[-1, 0]$

(c) $[0, 1]$

(d) $[-1, 1]$

Sample Questions for Physics –

1. The “Newton - metre” is the unit of:

(a) Momentum

(b) Power

- (c) Work (d) Gravitational intensity

2. The temperature difference determines the direction of:

- (a) Gross kinetic energy (b) Intermolecular kinetic energy
(c) Gross potential energy (d) Intermolecular potential energy

3. The unit of thrust is:

- (a) Nm^{-1} (b) Nm^{+2}
(c) Nm^{-2} (d) newton

4. The running of fan makes us comfortable during summer because it:

- (a) cools the air (b) increases the conductivity of the air
(c) reduces the thermal radiations (d) Enhances the rate of evaporation of perspiration.

5. Moon has no atmosphere, because

- (a) there is no vegetation on it (b) it is far away from the earth
(c) it is not a planet (d) the escape velocity on it is small

6. The emissive power of a surface depends upon:

- (a) Area (b) Time of observation
(c) Temperature (d) None of the above

7. The surface tension can be expressed in:

- (a) Nm^{-2} (b) Jm^{-2}
(c) Nm (d) Nm^2

8. If a gas is heated at constant pressure, its isothermal compressibility:

- (a) Remains constant (b) Increases linearly with temperature
(c) Decreases linearly with temperature (d) Decreases inversely with temperature

9. The Young's modulus is numerically equal to the stress that arises in a wire when its length changes from l to:

- (a) $1.25l$ (b) $1.50l$
(c) $1.75l$ (d) $2.00l$

10. Specific heat is defined as the heat required raising the temperature of 1 kg substance through 1 Kelvin. The unit of specific heat in SI is:
- (a) J kg K (b) J kg⁻¹ K
(c) J kg⁻¹ K⁻¹ (d) J⁻¹ kg K
11. One of the unit earlier used for expressing pressure was called bar. 1 bar is equivalent to:
- (a) 10⁴ Pa (b) 10⁵ Pa
(c) 10⁶ Pa (d) 10⁷ Pa
12. The top of a lake is frozen as the atmospheric temperature is -10°C. the temperature at the bottom of the lake is most likely to be:
- (a) 4°C (b) 0°C
(c) -4°C (d) -10°C
13. The critical velocity for a non viscous liquid is:
- (a) Zero (b) Small but not zero
(c) Infinity (d) None of the above
14. Wien's displacement law is valid for:
- (a) high temperature (b) large wavelength
(c) small temperature (d) short wavelength
15. What enables us to write on the black board with chalk?
- (a) Gravity (b) Cohesion
(c) Adhesion (d) None of the above
16. Isothermal is a process represented by the equation:
- (a) $pV = \text{a constant}$ (b) $p/V = \text{a constant}$
(c) $p/t = \text{a constant}$ (d) $p/V^\square = \text{constant}$
17. How does the Young's modulus vary with the increase of temperature?
- (a) Decrease (b) Increase
(c) Remains constant (d) First increases and then decreases
18. Magnitude of 1 calorie work is equivalent to what amount of heat in SI is:
- (a) 4.2×10^7 (b) 4.2×10^5
(c) 4.2 (d) 1

19. A boat carrying steel balls is floating on the surface of water in a tank. If the balls are thrown into the tank one by one, how will it affect the level of water?
- (a) It will remain unchanged (b) It will rise
(c) It will fall (d) First it will first rise and then fall.
20. A beaker is completely filled with water at 4°C . It will overflow :
- (a) When heated but not when cooled (b) When cooled but not when heated
(c) Both when heated or cooled (d) Neither when heated nor when cooled.
21. The maximum velocity of liquid up to which the flow is streamlined **does not** depend upon:
- (a) Density of the liquid (b) Radius of tube
(c) Viscosity of liquid (d) Pressure of the liquid
22. How is the velocity of thermal radiations (v) related to the velocity of light (c)?
- (a) $v > c$ (b) $v = c$
(c) $v < c$ (d) The relation depends upon the wavelength of the radiations
23. If the degree of freedom of a gas is f , then the ratio of two specific heats C_p/C_v is given by?
- (a) $\frac{2}{f} + 1$ (b) $1 - \frac{2}{f}$
(c) $1 + \frac{1}{f}$ (d) $1 - \frac{1}{f}$
24. During an adiabatic expansion of 5 moles of gas, the internal energy decreases by 75 J. The work done during the process is:
- (a) Zero (b) 15 J
(c) -75 J (d) + 75 J
25. Rate of flow of water through a tube of radius 2 mm is $8 \text{ cm}^3 \text{ s}^{-1}$. Under similar conditions, the rate of flow of water through a tube of radius 1 mm will be:
- (a) $4 \text{ cm}^3 \text{ s}^{-1}$ (b) $2 \text{ cm}^3 \text{ s}^{-1}$
(c) $1 \text{ cm}^3 \text{ s}^{-1}$ (d) $0.5 \text{ cm}^3 \text{ s}^{-1}$

Sample Questions for English –

1. Choose the appropriate meaning of given idiom/phrase:-

‘To rise to the occasion’

- (a) To act as the occasion demands (b) To escape (c) To make full utilization (d) To show suspicion

2. Give one-word substitution for the following expression:-

Government by one

- (a) Monocracy (b) Autocracy (c) Monarchy (d) Oligarchy

SPOTTING ERRORS

Directions: Each item in this section has a sentence which is divided into four parts labelled (a), (b), (c) and (d). Read each sentence to find out whether there is any error in any part and indicate your answer in the Answer Sheet against the corresponding letter i.e., (a) or (b) or (c). If you find no error, your response should be indicated as (d).

3. He introduced (a)/ to the (b)/ Chief Minister. (c)/ No error. (d)
4. All said and done It is (a)/ the basic values that are most important (b)/ and help you in the long run. (c)/ No error. (d)
5. He did not confirmed (a)/ whether he would attend the meeting (b)/ or not (c)/ No error. (d)
6. In his speech the finance minister stated (a)/ that the new tax law will be (b)/ applicable from April 1, 2010. (c)/ No error (d)

FILL IN THE BLANKS

Directions: Each of the following sentences in this section has a blank space and four words or group of words given after the sentence. Select whichever word or group of words you consider most appropriate for the blank space and indicate your response on the Answer Sheet accordingly.

7. You are as good a batsman as ____ .
(a) him (b) he (c) her (d) None of these
8. The people of Pakistan are poorer than ____ of India.
(a) those (b) that (c) this (d) None of these
9. The post office is ____ to my house.
(a) next (b) nearest (c) near (d) None of these
10. His is the proof of his discriminating mind and pragmatic approach.
(a) advise (b) advice (c) advices (d) None of these
11. He has to sell his to pay off his debts.
(a) immovable (b) immovables's (c) immovables (d) None of these

SENTENCE IMPROVEMENT

Directions: Look at the underlined part of each sentence. Below each sentence are given three possible substitutions for the underlined part. If one of them, (a), (b) or (c), is better than the underlined part, indicate your response on the Answer Sheet against the corresponding letter (a), (b) or (c). If none of the substitutions improve the sentence, indicate (d) as your response on the Answer Sheet. Thus a 'No improvement' response will be signified by the letter (d).

12. Everyone should take care of one's house.
(a) their (b) his (c) its (d) No improvement
13. I met the two girls, whom I believe are twin-sisters.
(a) who I believe are (b) who I believe to be (c) who to my belief (d) No improvement

are

14. She is becoming much and more beautiful.
(a) very (b) more (c) many (d) No improvement.
15. I was able to correctly identify the error in the sentence by looking at the sentence close.
(a) by looking at the sentence closed (b) by looking close at the sentence (c) by looking at the sentence closely (d) No improvement.
16. A thing of beauty is Joy forever.
(a) is the joy (b) is a joy (c) is joyous (d) No improvement

SYNONYMS

17. ALERT
(a) Smart (b) Active (c) Watchful (d) Live
18. INDUSTRIOUS
(a) Indolent (b) Industrial (c) Hard-working (d) Economic

ANTONYMS

19. PROFESSIONAL
(a) Amateur (b) Tradesman (c) Labour (d) Customer
20. PRONE TO
(a) Prior to (b) Preceding (c) Immune to (d) Vulnerable to

ORDERING OF WORDS IN A SENTENCE

Directions: Each of the following items in this section consists of a sentence the parts of which have been jumbled. These parts have been labelled P, Q, R and S. Given below each sentence are four sequences namely (a), (b), (c) and (d). You are required to re-arrange the jumbled parts of the sentence and select the correct sequence.

21. Mohandas Karamchand Gandhi was born

P: in a well to do family

Q: Porbander

R: in Saurashtra Guj

S: on October 2, 1869 at

The proper sequence should be:

- (a) SQRP (b) QRPS (c) RPSQ (d) PSQR

22. I enclose

P: and the postage

Q: a postal order

R: the price of books

S: which will cover

The proper sequence should be:

- (a) RPSQ (b) QSPR (c) QSRP (d) QPSR

COMPREHENSION

Directions: In this section, there is one short passage. After the passage, you will find a few questions each based on what is stated or implied in the passage. First read the passage and then answer the questions following it.

PASSAGE

One day a tea contractor, Mr. Sharma was working on an estate with his wife and daughter. He noticed a light movement on the edge of the jungle, so he stopped to watch for a moment. To his astonishment a large tigress appeared and came towards Mr. Sharma. The tea contractor was a very brave man. He told his wife and daughter to run towards a nearby road, while he stepped to fight the tigress with a knife.

The tigress sprang at Mr. Sharma and knocked him down, but he managed to wound it with his knife. As a result, the tigress and Mr. Sharma knocked each other unconscious. Luckily for Mr. Sharma, a friend heard the noise of the fight and came to investigate. He found Mr. Sharma and carried him to the road. Then he stopped a car and sent the injured man to a hospital, where he eventually recovered.

The tigress disappeared for a few days but was later hunted down and shot by a Game Ranger. The Game Ranger discovered that the tigress had injured her paw in a wire trap and had been unable to hunt wild animals in its normal manner.

- 23.** When did Mr. Sharma's friend go to see what was wrong?
- (a) When he saw the tigress attacking his friend
(b) Just before the tigress was knocked down
(c) When the friend was knocked down
(d) When he heard something unusual
- 24.** Mr. Sharma stayed on to fight the tigress for
- (a) he wanted to try to protect his wife and daughter
(b) he was a strong man who loved fighting
(c) he couldn't run as quickly as his wife
(d) the tigress caught him before he could run
- 25.** When Mr. Sharma saw the tigress, he was
- (a) surprised
(b) afraid
(c) nervous
(d) angry

Sample Questions for General Knowledge –

1. Where is Indian Statistical Organisation situated?
- (a) New Delhi
(b) Mumbai
(c) Chennai
(d) Kolkata
2. Where is National Rural Development Institute situated?
- (a) Shimla
(b) Hyderabad
(c) Patna
(d) New Delhi
3. NABARD was established in which year?
- (a) 1992
(b) 1982
(c) 1962
(d) 1952

4. Which is the highest civilian award?
- (a) Padam Bhushan (b) Padma Shree
(c) Bharat Ratna (d) Padma Vibhushan
5. Garba is the folk dance of which state?
- (a) Rajasthan (b) Manipur
(c) Gujarat (d) Asam
6. Church is the worship place of which religion?
- (a) Hindu (b) Cristian
(c) Parsi (d) Jews
7. The most urbanised state of India is :
- (a) Gujarat (b) Maharashtra
(c) Tamil Nadu (d) Goa
8. Reserve Bank of India was established in :
- (a) 1935 (b) 1940
(c) 1930 (d) 1950
9. Nobel Prize is given by which country?
- (a) Sweden (b) France
(c) U.S.A. (d) Spain
10. Arjun Award is given in which field?
- (a) Sports (b) Social Service
(c) Science (d) Literature
11. In India, first population census was held in:
- (a) 1861 AD (b) 1872 AD
(c) 1881 AD (d) 1882 AD
12. In India the systematic estimation of population is being held after every Ten year regularly from which year?
- (a) 1872 AD (b) 1881 AD
(c) 1891 AD (d) 1901 AD
13. Bhil tribe chiefly resides in
- (a) Rajasthan (b) Gujarat
(c) Madhya Pradesh (d) In the border areas of all the these

three states

14. What is the National game of USA?
(a) Volleyball (b) Baseball
(c) Handball (d) Football
15. Battle of Thagla Ridge fought between:
(a) India - China (b) North Korea -South Korea
(c) Myanmar-Thailand (d) USA-Iraq
16. What is the national game of China?
(a) Ice Hockey (b) Table Tennis
(c) Baseball (d) Volley ball
17. Census in India was held for the first time in whose Ruling period?
(a) Lord Lytton (b) Lord Rippon
(c) Lord Mayo (d) Lord Northbrook
18. Rajiv Gandhi Khel Ratna Award is given in which field?
(a) Sports (b) Social Service
(c) Science (d) Literature
19. How many players are in Hockey?
(a) 9 (b) 10
(c) 11 (d) 12
20. Thomas Cup Award is given in which field?
(a) Literature (b) Science
(c) Social Service (d) Sports
21. The Planning Commission of India makes the use of which organisation to measure poverty at the national and the state level?
(a) National Sample Survey office (b) Central Statistical organisation
(c) Indian Reserve Bank (d) World Bank
22. Which system has been adopted to circulate the currency notes?
(a) Maximum Reserve System (b) Minimum Reserve System
(c) Proportional Reserve System (d) Fixed Reserve System
23. Who is benefited in Inflation?
(a) Creditor (b) Debtor

(c) Bank

(d) Citizen

24. Which of the following is an Indirect Tax?

(a) Property Tax

(b) Capital Gain Tax

(c) Excise Tax

(d) Corporation

25. What is National Income?

(a) Net National Product at Market Price

(b) Net National Product at Factor Cost

(c) Net Domestic Product at Market Price

(d) Net Domestic Product at Factor Cost.

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