MATHEMATICS

1. Inverse of the function $f(x) = \frac{10^x - 10^{-x}}{10^x + 10^{-x}}$ is

(a) $\log_{10}(2-x)$ (b) $\frac{1}{2}\log_{10}\left(\frac{1+x}{1-x}\right)$

(c) $\frac{1}{2}\log_{10}(2x-1)$ (d) $\frac{1}{4}\log_{10}\left(\frac{2x}{2-x}\right)$

Ans: b

2. Let a, b, c be distinct non-negative numbers. If the vectors $a\hat{\imath} + a\hat{\jmath} + c\hat{k}, \hat{\imath} + \hat{k}$ and $c\hat{\imath} + c\hat{\jmath} + b\hat{k}$ lie in a plane, then c is

(a) The Arithmetic Mean of a and b

(b) The Geometric Mean of a and b

(c) The Harmonic Mean of a and b

(d) Equal to zero

Ans: b

3. The correct expression for $\cos^{-1}(x-)$ is

(a) $\frac{\pi}{2} - \cos^{-1} x$ (b) $\pi - \cos^{-1} x$

(c) $\pi + \cos^{-1} x$ (d) $\frac{\pi}{2} + \cos^{-1} x$

Ans: b

4. Suppose that the temperature at a point (x, y) on a metal plate is $T(x, y) = 4x^2 - 4xy + y^2$, An ant, walking on the plate, traverses a circle of radius 5 centered at the origin. What is the highest temperature encountered by the ant?

(a) 125 (b) 120

(c) 0 (d) 25

Ans: a

5. The 10^{th} and 50^{th} percentiles of the observation 32, 49, 23, 29, 118 respectively are

(a) 21, 32 (b) 23, 32

(c) 23, 33 (d) 22, 31

Ans: b

6. Angles of elevation of the top of a tower from three points (collinear) A, B and C on a road leading to the foot of the tower are 30°, 45° and 60° respectively. The ratio of AB and BC is

(a) $\sqrt{3}:1$ (b) $\sqrt{3}:2$

(c) $1:2$ (d) $2:\sqrt{3}$

Ans: a

7. If the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ are coincide, then the value of b^2 is

(a) 25 (b) 16

(c) 64 (d) 49

Ans: b

8. A particle is at rest at the origin. It moves along the $x-$axis with an acceleration $x - x^2$, where x is the distance of the particle at time t. The particle next comes to rest after it has covered a distance

(a) 1 (b) $\frac{1}{2}$

(c) $\frac{3}{2}$ (d) 2

Ans: c

9. If $a < b$, then $\int_a^b (|x-a| + |x-b|)\,dx$ is equal to

(a) $\frac{(b-a)^2}{2}$ (b) $\frac{(b^2-a^2)}{2}$

(c) $\frac{(a^3-b^3)}{2}$ (d) $(b-a)^2$

Ans: d

10. The domain of the function $f(x) = \frac{\cos^{-1} x}{[x]}$ is

(a) $[-1,0) \cup \{1\}$ (b) $[-1,1]$

(c) $[-1,1)$ (d) None of the above

Ans: a

11. If the volume of the parallelepiped whose adjacent edges are $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} + 4\hat{k}, \vec{b} = \hat{\imath} + a\hat{\jmath} + 2\hat{k}, \vec{c} = \hat{\imath} + 2\hat{\jmath} + a\hat{k}$ is 15, then α is equal to

(a) 1 (b) 5/2

(c) 9/2 (d) 0

Ans: c

12. Let a be the distance between the lines $-2x + y = 2$ and $2x - y = 2$, and b be the distance between the lines $4x - 3y = 5$ and $6y - 8x = 1$, then

(a) $40b = 11\sqrt{5}a$ (b) $40\sqrt{2}a = 11b$

(c) $11\sqrt{2}b = 40a$ (d) $11\sqrt{2}a = 40b$

Ans: a

13. If $cosec\,\theta - \cot\theta = 2$, then the value of $cosec\,\theta$ is

(a) $\frac{5}{3}$ (b) $\frac{3}{5}$

(c) $\frac{4}{5}$ (d) $\frac{5}{4}$

Ans: d

14. The solutions of the equation $4\cos^2 x + 6\sin^2 x = 5$ are

(a) $x = n\pi \pm \frac{\pi}{4}$ (b) $x = n\pi \pm \frac{\pi}{3}$

(c) $x = n\pi \pm \frac{\pi}{2}$ (d) $x = n\pi \pm \frac{2\pi}{3}$

Ans: a

15. The function $f(x) = \begin{cases} (1+2x)^{\frac{1}{x}}, & x \neq 0 \\ e^2, & x = 0 \end{cases}$, is
(a) Differentiable at $x = 0$
(b) Continuous at $x = 0$
(c) Discontinuous at $x = 0$
(d) Not differentiable at $x = 0$
Ans: b

16. Which term of the series $\frac{\sqrt{5}}{3}, \frac{\sqrt{5}}{4}, \frac{1}{\sqrt{5}}, \ldots$. is $\frac{\sqrt{5}}{13}$?
(a) 12 (b) 11
(c) 10 (d) 9
Ans: b

17. Let $\hat{a} = 2i + 2j + k$ and $\hat{b}$ be another vector such that $\hat{a}.\hat{b} = 14$ and $\hat{a} \times \hat{b} = 3i + j - 8k$ the vector $\hat{b} =$
(a) $5i + j + 2k$ (b) $5i - j - 2k$
(c) $5i + j - 2k$ (d) $3i + j + 4k$
Ans: a

18. The first three moments of a distribution about 2 are 1, 16, -40 respectively. The mean and variance of the distribution are
(a) (2, 16) (b) (2, 15)
(c) (3, 15) (d) (1, 16)
Ans: c

19. A survey is done among a population of 200 people who like either tea or coffee. It is found that 60% of the population like tea and 72% of the population like coffee. Let x be the number of people who like both tea & coffee. Let $m \leq x \leq n$, then choose the correct option.
(a) $n - m = 56$ (b) $n - m = 28$
(c) $n - m = 32$ (d) $n + m = 92$
Ans: a

20. The value of $\cot\left(cosec^{-1}\frac{5}{3} + \tan^{-1}\frac{2}{3}\right)$ is
(a) 6/17 (b) 3/17
(c) 4/17 (d) 5/17
Ans: a

21. If $0 < P(A) < 1$ and $0 < P(B) < 1$, and $P(A \cap B) = P(A)P(B)$, then
(a) $P(B|A) = P(B) - P(A)$
(b) $P(A^C - B^C) = P(A^C) - P(B^C)$
(c) $P(A \cup B)^C = P(A^C)P(B^C)$
(d) $P(A|B) = P(A) - P(B)$
Ans: c

22. Which of the following is NOT true?
(a) $\lim_{x\to\infty} \frac{x}{e^x} = 0$ (b) $\lim_{x\to 0+} \frac{1}{xe^{\frac{1}{x}}} = 0$
(c) $\lim_{x\to 0+} \frac{\sin x}{1+2x} = 0$ (d) $\lim_{x\to 0+} \frac{\cos x}{1+2x} = 0$
Ans: d

23. $f(x) = x + |x|$ is continuous for
(a) $x \in (-\infty, \infty)$ (b) $x \in (-\infty, \infty) - \{0\}$
(c) only $x > 0$ (d) No value for x
Ans: a

24. If $a_1, a_2, \ldots . a_n$ are any real numbers and n is any positive integer, then
(a) $n\sum_{i=1}^{n} a_i^2 < \left(\sum_{i=1}^{n} a_i\right)^2$
(b) $n\sum_{i=1}^{n} a_i^2 \geq \left(\sum_{i=1}^{n} a_i\right)^2$
(c) $\sum_{i=1}^{n} a_i^2 \geq \left(\sum_{i=1}^{n} a_i\right)^2$
(d) None of the above
Ans: b

25. If $D = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 2+x & 1 \\ 1 & 1 & 2+y \end{vmatrix}$ for $x \neq 0, y \neq 0$, then D is
(a) Divisible by x and y
(b) Divisible by x but not by y
(c) Divisible by $(1 + x)$ and $(1 + y)$
(d) Divisible by $(1 + x)$ but not $(1 + y)$
Ans: c

26. Area of the parallelogram formed by the lines $y = 4x, y = 4x + 1, x + y = 0$ and $x + y = 1$ is
(a) $\frac{1}{5}$ (b) $\frac{2}{5}$
(c) 5 (d) 10
Ans: a

27. A four-digit number is formed using the digits 1, 2, 3, 4, 5 without repetition. The probability that is divisible by 3 is
(a) $\frac{1}{3}$ (b) $\frac{1}{4}$
(c) $\frac{1}{5}$ (d) $\frac{1}{6}$
Ans: c

28. For $a \in R$ (the set of all real numbers), $a \neq -1$, $\lim_{n\to\infty} \frac{(1^a+2^a+\cdots+n^a)}{(n+1)^{a-1}[(na+1)+(na+2)+\cdots+(na+n)]} = \frac{1}{60}$. Then one of the values of a is
(a) 5 (b) 8
(c) $-\frac{15}{2}$ (d) $-\frac{17}{2}$
Ans: d

29. If $\hat{a} = \lambda\hat{\imath} + \hat{\jmath} - 2\hat{k}, \hat{b} = \hat{\imath} + \lambda\hat{\jmath} - 2\hat{k}, \hat{c} = \hat{\imath} + \hat{\jmath} + \hat{k}$ and $[\hat{a}\hat{b}\hat{c}] = 7$, then the values of λ are
(a) 2, -6 (b) 6, -2
(c) 4, -2 (d) -4, 2
Ans: a

30. The function $f(x) = \log\left(x + \sqrt{x^2 + 1}\right)$ is
(a) an even function
(b) an odd function
(c) a periodic function
(d) neither an even nor an odd function
Ans: b

31. The mean of 25 observations was found to be 38. It was later discovered that 23 and 38 were misread as 25 and 36, then the mean is
(a) 32 (b) 36
(c) 38 (d) 42
Ans: c

32. The area enclosed within the curve $|x| + |y| = 2$ is
(a) 16 sq.unit (b) 24 sq.unit
(c) 32 sq.unit (d) 8 sq.unit
Ans: d

33. If $\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 = 1, (a > b)$ and $x^2 - y^2 = c^2$ cut at right angles, then
(a) $a^2 + b^2 = 2c^2$ (b) $b^2 - a^2 = 2c^2$
(c) $a^2 - b^2 = 2c^2$ (d) $a^2 - b^2 = c^2$
Ans: c

34. If α, β are the roots of $x^2 - x - 1 = 0$, and $A_n = \alpha^n + \beta^n$, then Arithmetic mean of A_{n-1} and A_n is
(a) $2A_n - 1$ (b) $\frac{1}{2}A_{n+1}$
(c) $2A_n - 2$ (d) None of the above
Ans: b

35. If $a_1, a_2, \ldots a_n$, are in Arithmetic Progression with common difference d, then the sum $(\sin d)\,(cosec\ a_1.cosec\ a_2 + cosec\ a_2.cosec\ a_3 + \cdots + cosec\ a_{n-1}.cosec\ a_n)$ is equal to
(a) $\cot a_1 - \cot a_n$ (b) $\sin a_1 - \sin a_n$
(c) $cosec\ a_1 - cosec\ a_n$ (d) $a_1 - a_n$
Ans: a

36. Solutions of the equation $\tan^{-1}\sqrt{x^2 + x} + \sin^{-1}\sqrt{x^2 + x + 1} = \frac{\pi}{2}$ are
(a) 0, 1 (b) 1, -1
(c) 0, -1 (d) 0, -2
Ans: c

37. In a Harmonic Progression, p^{th} term is q and the q^{th} term is p. Then pq^{th} term is
(a) 0 (b) 1
(c) pq (d) $pq(p + q)$
Ans: b

38. If the roots of the quadratic equation $x^2 + px + q = 0$ are $\tan 30°$ and $\tan 15°$ respectively, then the value of $2 + p - q$ is
(a) 3 (b) 0
(c) 1 (d) 2
Ans: c

39. A straight line through the point $(4, 5)$ is such that its intercept between the axes is bisected at A, then its equation is
(a) $3x + 4y = 20$ (b) $3x - 4y + 7 = 0$
(c) $5x - 4y = 40$ (d) $5x + 4y = 40$
Ans: d

40. The value of $\int \frac{(x^2-1)dx}{x^3\sqrt{2x^4-2x^2+1}}$ is
(a) $2\sqrt{2 - \frac{2}{x^2} + \frac{1}{x^4}} + C$ (b) $2\sqrt{2 + \frac{2}{x^2} + \frac{1}{x^4}} + C$
(c) $\frac{1}{2}\sqrt{2 - \frac{2}{x^2} + \frac{1}{x^4}} + C$ (d) None of the above
Ans: c

41. Coordinate of focus of the parabola $4y^2 + 12x - 20y + 67 = 0$ is
(a) $\left(-\frac{5}{4}, \frac{17}{2}\right)$ (b) $\left(-\frac{17}{2}, \frac{5}{4}\right)$
(c) $\left(-\frac{17}{4}, \frac{5}{2}\right)$ (d) $\left(-\frac{5}{2}, \frac{17}{4}\right)$
Ans: c

42. There are two circles in xy −plane whose equations are $x^2 + y^2 - 2y = 0$ and $x^2 + y^2 - 2y - 3 = 0$. A point (x, y) is chosen at random inside the larger circle. Then the probability that the point has been taken from smaller circle is
(a) $\frac{1}{3}$ (b) $\frac{2}{3}$
(c) $\frac{1}{2}$ (d) $\frac{1}{4}$
Ans: d

43. In a triangle ABC, if the tangent of half the difference of two angles is equal to one third of the tangent of half the sum of the angles, then the ratio of the sides opposite to the angles is
(a) 2 : 1 (b) 1 : 2
(c) 3 : 1 (d) 1 : 1
Ans: a

44. If $x^m y^n = (x+y)^{m+n}$, then $\frac{dy}{dx}$ is
(a) $\frac{x+y}{xy}$ (b) xy
(c) $\frac{x}{y}$ (d) $\frac{y}{x}$
Ans: d

45. If $\cos^{-1}\frac{x}{2} + \cos^{-1}\frac{y}{3} = \phi$, then $9x^2 - 12xy\cos\phi + 4y^2$ is equal to
(a) $-36\sin^2\phi$ (b) $36\sin^2\phi$
(c) $36\cos^2\phi$ (d) 36
Ans: b

46. The value of $3^{3-\log_3 5}$ is
(a) $\frac{5}{27}$ (b) $\frac{27}{5}$
(c) $\frac{9}{5}$ (d) $\frac{5}{9}$
Ans: b

47. There are two sets A and B with $|A| = m$ and $|B| = n$. If $|P(A)| - |P(B)| = 112$ then choose the wrong option (where $|A|$ denotes the cardinality of A, and $P(A)$ denotes the power set of A)
(a) $m + n = 11$ (b) $2n - m = 1$
(c) $2m - n = 1$ (d) $3n - m = 5$
Ans: c

48. The eccentricity of an ellipse, with its center at the origin is $\frac{1}{3}$. If one of the directrices is $x = 9$, then the equation of ellipse is:
(a) $9x^2 + 8y^2 = 72$ (b) $8x^2 + 9y^2 = 72$
(c) $8x^2 + 7y^2 = 56$ (d) $7x^2 + 8y^2 = 56$
Ans: b

49. If the angle of elevation of the top of a hill from each of the vertices A, B and C of a horizontal triangle is a, then the height of the hill is
(a) $\frac{1}{2}b\tan a\sec B$ (b) $\frac{1}{2}b\tan a\ cosec\ A$
(c) $\frac{1}{2}c\tan a\sin C$ (d) $\frac{1}{2}a\tan a\ cosec\ A$
Ans: d

50. If $(\hat{a}\times\hat{b})\times\hat{c} = \hat{a}\times(\hat{b}\times\hat{c})$, then
(a) $\hat{a}$ and $\hat{b}$ are collinear
(b) $\hat{a}$ and $\hat{b}$ are perpendicular
(c) $\hat{a}$ and $\hat{c}$ are collinear
(d) $\hat{a}$ and $\hat{c}$ are perpendicular
Ans: c

ANALYTICAL ABILITY AND LOGICAL REASONING

1. Today is Wednesday. What would be the day after 61 days?
(a) Tuesday (b) Monday
(c) Sunday (d) Saturday
Ans: b

2. Identify the fifth number in the series:
122, 144, 166, 188, ?
(a) 234 (b) 210
(c) 345 (d) 310
Ans: b

3. Which of the following is the odd one from the given alternatives?
(a) Driving (b) Swimming
(c) Sailing (d) Diving
Ans: a

4. Fill in the blank:
HEC, JGE, LIG, NKI, _____
(a) ONM (b) PMK
(c) HGF (d) KMP
Ans: b

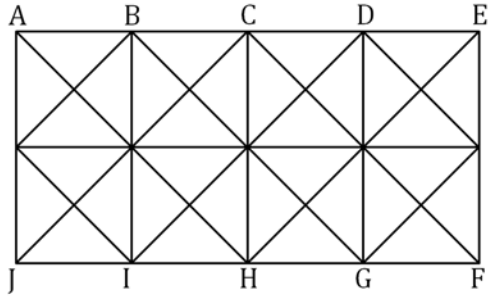
5. Choose the word opposite in meaning to the given word:
MITIGATE
(a) Alleviate (b) Tranquilize
(c) Intensify (d) Abate
Ans: c

6. DNN, FQQ, HTT, _____, LZZ
(a) JXX (b) JVV
(c) JWW (d) IWW
Ans: c

7. Select the pair of words, which are related in the same way as the capitalized words are related to each other.
BUTTERFLY : FREEDOM
(a) Horse : Speed
(b) Self-reliant : Buoyant
(c) Chicken : Rooster
(d) Frog : Water
Ans: a

8. Select the pair of words, which are related in the same way as the capitalized words are related to each other.
Frugal : Extravagant
(a) Predecessor : Precursor
(b) Hermit : Philosopher
(c) Teacher : Philanthropist
(d) Criticise : Advocate
Ans: d

9. In the following figure, find the total number of squares.



(a) 18 (b) 24
(c) 36 (d) 20
Ans: b

10. Deepak, Rahul, Manoj, and Vinod are brothers.

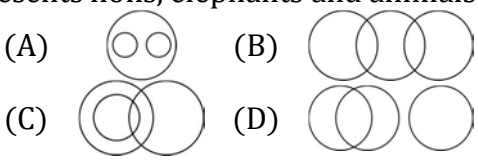
Who is the heaviest?

I. Rahul is heavier than Deepak and Vinod, but lighter than Manoj.

II. Deepak is lighter than Rahul and Manoj, but heavier than Vinod.

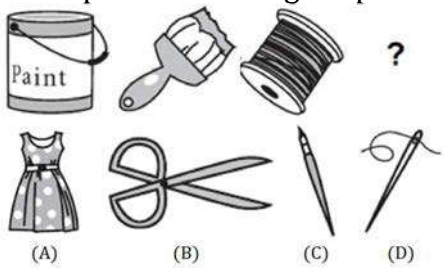
(a) Either I or II is sufficient
(b) Statement II alone is sufficient, but statement I alone is not sufficient
(c) Statement I alone is sufficient, but statement II alone is not sufficient
(d) Data in both the statements together are not sufficient
Ans: c

11. Which of the following diagrams correctly represents lions, elephants and animals?



(a) D (b) C
(c) A (d) B
Ans: c

12. Replace the question mark with an appropriate image to complete the analogous pair.



(a) D (b) C
(c) A (d) B
Ans: a

13. Fill in the blank:
JAK, KBL, LCM, MDN, _____
(a) NEO (b) PEQ
(c) OEP (d) MEN
Ans: a

14. Find the synonym that is most nearly similar in meaning to the word:
DEBACLE
(a) Dandy (b) Corker
(c) Catastrophe (d) Opulence
Ans: c

15. If in a certain language, KOLKOTA is coded as LPMLPUB, how is MUMBAI coded in that code?
(a) NVNBCJ (b) NVNCBJ
(c) NUNBCH (d) OVNBBH
Ans: b

16. Select the related word from the given alternatives.
MELT : LIQUID : : FREEZE : ?
(a) SOLID (b) PUSH
(c) ICE (d) CONDENSE
Ans: a

17. Looking at the portrait of a man, Manu said, "Her mother is the wife of my father's son and I have no brother and sister." Whose portrait was Manu looking at?
(a) His son (b) His father
(c) His nephew (d) His daughter
Ans: d

18. Identify the sixth number in the series:
6, 11, 21, 36, 56, ?
(a) 52 (b) 21
(c) 81 (d) 82
Ans: c

19. U, V, W, X and T are sitting on a bench. T is sitting next to U, V is sitting next to W, W is not sitting with X who is on the left end of the bench. V is in the second position from the right. T is to the right of U and X. T and V are sitting together. In which position T is sitting?
(a) Between V and X (b) Between U and V
(c) Between U and W (d) Between X and W
Ans: b

Comprehension:
In each question below are given two statements followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts.
Read the conclusion and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

20. Statements:
No women teacher can play.
Some women teachers are athletes.

Conclusions:
I. Male athletes can play.
II. Some athletes can play.
(a) Neither I nor II follows
(b) Only conclusion II follows
(c) Either I or II follows
(d) Only conclusion I follows
Ans: a

21. Statements:
All mangoes are golden in colour.
No golden-coloured things are cheap.

Conclusions:
I. All mangoes are cheap.
II. Golden-coloured mangoes are not cheap.
(a) Only conclusion I follows
(b) Either I or II follows
(c) Only conclusion II follows
(d) Neither I nor II follows
Ans: c

22. Statements:
All young scientists are open-minded.
No open-minded men are superstitious.

Conclusions:
I. No scientist is superstitious.
II. No young people are superstitious.
(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Neither I nor II follows
(d) Either I or II follows
Ans: c

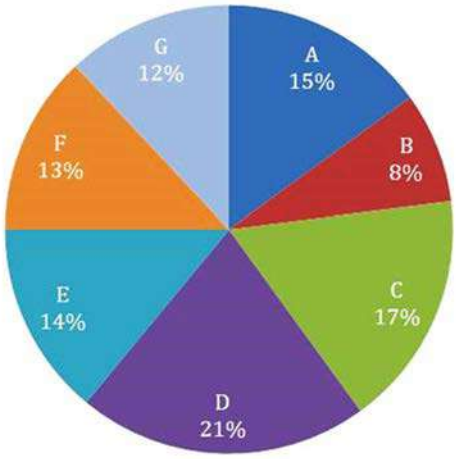
23. Six books are labelled A, B, C, D, E and F and are placed side by side. Books B, C, E and F have green covers while others have yellow covers. Books A, B and D are new while the rest are old volumes. Books A, B and C are law reports while the rest are medical extracts. Which two books are old medical extracts and have green covers?
(a) C and E (b) B and C
(c) E and F (d) C and F
Ans: c

24. Find out the wrong number in the FOLLOWING series.
2, 5, 10, 17, 26, 38, 50, 65
(a) 50 (b) 65
(c) 26 (d) 38
Ans: d

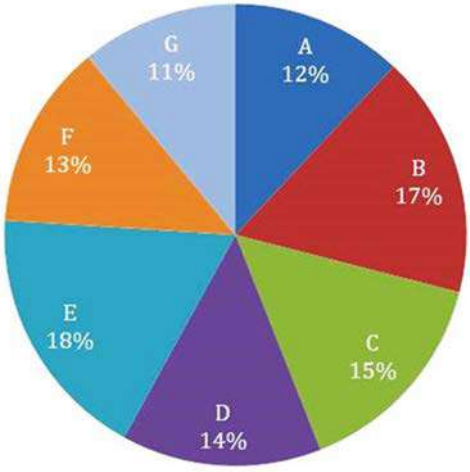
25. Find out the wrong number in the FOLLOWING series.
30, -5, -45, -90, -145, -195, -255
(a) -145 (b) -255
(c) -195 (d) -5
Ans: a

Comprehension:
The following questions are based on the pie-charts given below.
Percentage-wise distribution of students studying in Arts and Commerce in seven different institutions – A, B, C, D, E, F and G

Total number of students in Arts = 3800



Total number of students Commerce = 4200



26. What is the total number of students studying Arts in Institutes A and G together?
(a) 1226 (b) 1206
(c) 1126 (d) 1026
Ans: d

27. How many students from Institute B study Arts and Commerce?
(a) 1208 (b) 1108
(c) 1018 (d) 1180
Ans: c

28. The ratio of the number of students studying Arts to that studying commerce in Institute E is.
(a) 19 : 16 (b) 19 : 27
(c) 19 : 28 (d) 27 : 14
Ans: b

29. Statement:
Many shops in the local market have extended their shops and occupied most part of the footpath in front of their shops.

Course of Action
I. The civic authority should immediately activate a task force to clear all the footpaths encroached by the shop owners.
II. The civic authority should charge hefty penalty to the shop owners for occupying the footpath
III. The civic authority should setup a monitoring system so that encroachments do not recur in future.
(a) None follows
(b) I and II follows
(c) II and III follow
(d) All I, II and III follows
Ans: d

30. Statement:
There is a significant increase in the number of patients affected by some disease in a city

Course of action:
I. Municipal Corporation of the city should take immediate action.
II. This problem should be raised in the UNESCO.
III. Hospitals in the city should be equipped properly for the treatment of the patients
(a) All follow (b) I and II follow
(c) Only III follow (d) I and II follow
Ans: b

Direction: Read the following information carefully and answer the questions.
Five Dramas A, B, C, D and E have to be staged in 6 hour where 1 hour needs to be given per drama.
(1) A break of 1 hour has to be taken in third or four hour.
(2) Drama show cannot be started with A and cannot end in C.
(3) D has to follow B immediately with no break in between.
(4) A cannot be done immediately after D
(5) A has to precede E immediately with no break in between.

31. Which hour is a break hour?
(a) 5^{th} (b) 2^{nd}
(c) 4^{th} (d) 3^{rd}
Ans: d

32. Which is the drama to be staged first?
(a) None of these (b) B
(c) D (d) A
Ans: b

33. Which is the drama staged immediately after the break?
(a) D (b) None of these
(c) A (d) B
Ans: b

34. Which drama is staged immediately after D?
(a) E (b) C
(c) B (d) None of these
Ans: b

35. Which drama is staged immediately after E?
(a) C (b) A
(c) None of these (d) E
Ans: c

36. Running at the same constant rate, 6 identical machines can produce a total of 270 bottles per minute. At this rate, how many bottles could 10 such machines produce in 4 minutes?
(a) 10800 (b) 648
(c) 1800 (d) 2700
Ans: c

37. At what time, in minutes, between 3 o'clock and 4 o'clock, both the needles will coincide each other?
(a) $5\frac{1}{11}$ (b) $12\frac{4}{11}$
(c) $13\frac{4}{11}$ (d) $16\frac{4}{11}$
(a) C (b) b
(c) d (d) a
Ans: c

38. 1. A is the brother of B
2. C is the father of A
3. D is brother of E.
4. E is the daughter of B
Then, the uncle of D is?
(a) A (b) E
(c) B (d) C
Ans: a

39. A person's present age is two-fifth of the age of his mother. After 8 years, he will be onehalf of the age of his mother. What is the present age of the mother?
(a) 40 (b) 30
(c) 60 (d) 50
Ans: a

40. The greatest number which on dividing 1657 and 2037 leaves remainders 6 and 5 respectively is
(a) 127 (b) 235
(c) 123 (d) 305
Ans: a

COMPUTER AWARENESS

1. The maximum and minimum value represented in signed 16 bit 2's complement representations are
(a) -16384 and 16383
(b) 0 and 32767
(c) 0 and 65535
(d) -32768 and 32767
Ans: d

2. The minimum number of NAND gates required for implementing the Boolean expression, $AB + A\bar{B}C + A\bar{B}\bar{C}$ is:
(a) 1 (b) 0
(c) 2 (d) 3
Ans: b

3. Which of the following is equivalent to the Boolean expression:
$(X + Y).(X + \bar{Y}).(\bar{X} + Y)$
(a) XY (b) $X\bar{Y}$
(c) $\bar{X}Y$ (d) $\bar{X}\bar{Y}$
Ans: a

4. Suppose the largest n bit number requires 'd' digits in decimal representation. Which of the following relations between 'n' and 'd' is approximately correct
(a) $d = 2^n$ (b) $n = 2^d$
(c) $d < n \log_{10} 2$ (d) $d > n \log_{10} 2$
Ans: d

5. If a processor clock is rated as 2500 million cycles per second, then its clock period is:
(a) 2.50×10^{-10} sec (b) 4.00×10^{-10} sec
(c) 1.00×10^{-10} sec (d) None of the above
Ans: b

6. Write the simplified form of the Boolean expression $(A + C)(AD + AD') + AC + C$:
(a) $A + C'$ (b) $A' + C$
(c) $A + D$ (d) $A + C$
Ans: d

7. FFFF will be the last memory location in a memory of size
(a) 1k (b) 64k
(c) 32k (d) 16k
Ans: b

8. 'Floating point representation' is used to represent
(a) Integers (b) Whole Numbers
(c) Real Numbers (d) Boolean Values
Ans: c

9. The Boolean expression AB+ AB' + A'C + AC is unaffected by the value of the Boolean variable
(a) A (b) None of these
(c) C (d) B
Ans: d

10. If a signal passing through a gate is inhibited by sending a low into one of the inputs, and the output is HIGH, the gate is a(n):
(a) NOR (b) AND
(c) OR (d) NAND
Ans: d

GENERAL ENGLISH

1. What can you call a person who leads an unconventional style of living?
(a) Altruist (b) Agnostic
(c) Bohemian (d) Cynic
Ans: c

2. "Bite the bullet" means
(a) to stop a conflict
(b) to analyse your faults
(c) to become mad
(d) to accept something that is difficult or unpleasant
Ans: d

3. Fill in the banks with the correct option
Technical writing demands _____ use of language.
(a) Dramatic (b) Poetic
(c) Figurative (d) Factual
Ans: d

4. Select correct articles
He is….M.A. with PhD and teaches in …university.
(a) a, an (b) the, the
(c) a, the (d) an, the
Ans: d

5. Fill in the blank with the most appropriate option
Kedar_____ this project for a month and now he is about to join a new project.
(a) guiding (b) guides
(c) has been guiding (d) guided
Ans: c

6. Select the correct form of verb/ Subject verb agreement
The principal, along with his assistants, _____ the meeting.
(a) is attending (b) attending
(c) attend (d) are attending
Ans: a

Choose the correct alternative
The country cleared this **path and paved** it with packed gravel, so they would have a peaceful place to hike and bike.

7. Which of the following alternatives to the underlined portion would NOT be acceptable?
(a) path, paving
(b) path and then paved
(c) path before paving
(d) path paved
Ans: d

COMPREHENSION:

Read the following passage carefully and answer the questions:

You might think you've experienced VR, and you might have been pretty impressed.

Particularly if you're a gamer, there are some great experiences to be had out there (or rather, in there) today. But over the next few years, in VR, as in all fields of technology, we're going to see things that make what is cutting-edge today look like Space Invaders. And although the games will be amazing, the effects of this transformation will be far broader, touching on our work, education, and social lives.

Today's most popular VR applications involve taking total control of a user's senses (sight and hearing, particularly) to create a totally immersive experience that places the user in a fully virtual environment that feels pretty realistic. Climb up something high and look down, and you're likely to get a sense of vertigo. If you see an object moving quickly towards your head, you'll feel an urge to duck out of the way.

Very soon, VR creators will extend this sensory hijacking to our other faculties – for example, touch and smell – to deepen that sense of immersion. At the same time, the devices we use to visit these virtual worlds will become cheaper and lighter, removing the friction that can currently be a barrier.

I believe extended reality (XR) – a term that covers virtual reality (VR), augmented reality (AR), and mixed reality (MR) – will be one of the most transformative tech trends of the next five years. It will be enabled and augmented by other tech trends, including super-fast networking, that will let us experience VR as a cloud service just like we currently consume music and movies. And artificial intelligence (AI) will provide us with more personalized virtual worlds to explore, even giving

us realistic virtual characters to share our experiences with.

8. The passage states all the following about VR applications except
   (a) Vertigo is a major feature of all AI applications
   (b) VR applications creates a virtual environment that feels pretty realistic
   (c) Future AI will allow us to share our experiences with realistic virtual characters
   (d) VR applications takes control of the user's senses
   Ans: a

9. 'Duck out of something' means
   (a) To hit something hard
   (b) To avoid doing something
   (c) To fall down
   (d) To meet with an accident
   Ans: b

10. Select an antonym for the word 'augment' from the options given below:
   (a) Aggrandize (b) Reinforce
   (c) Curtail (d) Inflate
   Ans: c

11. Select the word which means the same as the following:
   To read something carefully
   (a) Presume (b) Peruse
   (c) Perverse (d) Persiflage
   Ans: b

12. Choose the correct alternative with the correct choice given below each statement:
   You are to conform _____ the rules of the institute.
   (a) with (b) to
   (c) of (d) on
   Ans: b

13. Choose the antonym:
   BOLD
   (a) Fearful (b) Coy
   (c) Timid (d) Nervous
   Ans: c

14. Select the one which best expresses the same sentence in indirect/direct speech:
   He said, "I am glad to be here this evening."
   (a) He said he was glad to be here this evening.
   (b) He says he was glad to be here this evening.
   (c) He asked he is glad to be here this evening
   (d) He said that he was glad to be there that evening
   Ans: d

15. Identify the word that is similar in meaning to the underlined word.
   Raghu made <u>adulatory</u> remarks about the waiter who served the food.
   (a) Complimentary (b) Ironic
   (c) Slanderous (d) Derogatory
   Ans: a

16. Which of the phrase given below should replace the phrase printed in bold to make the sentence grammatically correct.
   He is addicted to smoke.
   (a) used to smoke
   (b) addicted with smoking
   (c) addict of smoking
   (d) addicted to smoking
   Ans: d

17. Fill in the blanks with the correct preposition
   Jagdish is waiting for me____ the campus.
   (a) In (b) On
   (c) At (d) Out
   Ans: b

18. Read the following sentence to find if there is any error in any part:
   (A) If I were him/ (B) I would teach/ (C) him a lesson/ (D) No error
   (a) I would teach (b) If I were him
   (c) him a lesson (d) No error
   Ans: d

19. Choose the synonym.
   LIBERAL
   (a) Sober (b) Generous
   (c) Reactionary (d) Affectionate
   Ans: b

20. Fill in the blank
   Neither Peter nor I _____ responsible for this blunder
   (a) were (b) is
   (c) am (d) are
   Ans: c