OJEE 2017 Question Paper

Odisha Joint Entrance Examination

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OJEE 2017 (MCA)

Q.no	QUESTION
1	$\sim(p \vee q) \vee (\sim p \wedge q)$ is logically equivalent to (A)$\sim p$ (B)p C)q D)$\sim q$
2	The contrapositive of the statement "if x is lucky then x is wealthy" is A) if x is wealthy then x is lucky B) if x is not lucky then x is not wealthy C) if x is not wealthy then x is not lucky D) if x is not lucky then x is wealthy
3	If $p \rightarrow (q \vee r)$ is false ,then the truth values of p,q,r are respectively A)T,T,T B)T,F,F C)F,F,F D)F,T,T
4	In a class of 100 students the following is the qualifying result of the examinations in three subjects Economics (E), Commerce (C) and Statistics(S). 10 students qualified in all the three subjects.20 qualified in E & C;30 qualified in C & S;25 in E& S.12 only in E;5 only in C ;8 only in S. The number of students not qualified in all the three subjects is A)20 B)3 C)36 D)42
5	On set of real numbers R, for $x, y \in R$ define a relation T by x T y if and only if $x - y + \sqrt{2}$ is an irrational number,then T is A)Equivalence B)Symmetric C)Transitive D)reflexive
6	If $A = \{8^n - 7n - 1 / n \in N\}, B = \{49(n-1) / n \in N\}$ then A) $A \subset B$ B) $B \subset A$ C) $A = B$ D) information not sufficient

7	If $f:[-3,2] \to \left[0, \sqrt[3]{n}\right]$ is onto defined by $f(x) = \begin{cases} 2+\sqrt[3]{x}, & -3 \le x \le -1 \\ x^{2/3}, & -1 \le x \le 2 \end{cases}$, then n= A)1 B)2 C)4 D)6
8	If two functions f and g are defined on sets such that fog exist. The necessary condition that fog is on to is A) f is on to B) g is on to C) both f and g are on to D) none of f and g is onto
9	The domain of $f(x)= \sqrt{\log_{10}[(5x-x^2)/4]}$ is A) [0, 1] B) [1, 4] C) [-1, 2] D)set of all real numbers
10	The sum of two numbers is 25 and the geometric mean is 52% lower than twice their average. Find the numbers (A)17, 8 (B)10, 15 (C) 16, 9 (D) 12, 13
11	A batsman scores 120 runs in the 25th inning and thus increases his average by 4.What is his average after the 25th inning? (A)24 (B)16 (C) 20 (D) 12
12	z is a complex number. The locus of the point z satisfying the equation $|z-z_1|+|z-z_2| = \lambda$ where $\lambda > |z_1-z_2|$ is A) ellipse B) circle C) Hyperbola D) straight line
13	If $1,\omega,\omega^2$ are the cube roots of unity , then the roots of $(x-1)^3 +8=0$ A) $1,1+2\omega,1+2\omega^2$ B) $-1,1-2\omega,1-2\omega^2$ C) $-2,2-\omega,2-\omega^2$ D) $2,2\omega,2\omega^2$
14	The value of $\sqrt{15+8i} + \sqrt{15-8i}$ is equal to A)15 B) 8 C) 23 D) 7

15	If there are 2 kinds of balls red and black and at least 4 of each kind, the number of ways a ball can be put in each of 4 different boxes is A) 1 B)8 C)6 D)16
16	In an examination, a candidate has to pass in each of the 6 subjects, the number of ways that he can fail is A) 21 B)81 C)63 D)16
17	If the ratio of the 7th term from the beginning to the 7th term from the end in the expansion of $\left(\sqrt[3]{2} + \dfrac{1}{\sqrt[3]{3}} \right)^{x}$ is $\dfrac{1}{6}$, then x is A)9 B)6 C)12 D) 11
18	If $c_0, c_1, c_2, c_3, c_4 \ldots \ldots c_n$ are the binomial coefficients then $5c_1 + 8c_2 + 11c_3 \ldots \ldots + (3n+2)c_n =$ A) $(3n+7)2^{n-1}$ B) $(3n+4)2^{n-1} - 2$ C) $\dfrac{(3n+2)}{2} 2^n - 2$ D) $3n.2^n$
19	The number of irrational terms in the expansion of $\left(\sqrt[3]{4} + \sqrt{5} \right)^{21}$ is A) 15 B) 22 (C) 18 D) 4
20	The inverse of $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix} =$ A) $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$ C) $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ D) $\begin{bmatrix} 1 & 0 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$
21	If $A = \left(a_{ij} \right)_{3 \times 3}$ such that $a_{ij} = (i+j)^2$, then cofactor of the element $a_{23} =$ A)1100 (B) 44 (C) 25 (D)33

22	If $\begin{bmatrix} x^2+2x+1 & x-7 & 2x^2 \\ x+6 & x^2+7x & 4 \\ 2+x & x & 8x-3 \end{bmatrix} = Ax^2+Bx+C$, then determinant of A+C=
	A) 192 B)0 (C) -192 D) 218

23	$\cos 225^{0} + \sin 165^{0}$ =
	A) 2 B) 0 C) 1 D) $\sqrt{\dfrac{3}{2}}$

24	In a triangle ABC, 3cosA+2=0, then the quadratic equation whose roots are sinA and tanA is
	A) $6x^2 - \sqrt{5}x - 5 = 0$ B) $6x^2 + \sqrt{5}x + 5 = 0$ C) $6x^2 - \sqrt{5}x + 5 = 0$ D) $6x^2 + \sqrt{5}x - 5 = 0$

25	In a triangle ABC, the lengths of the sides BC, CA and AB are respectively p, q and r. If(p+q+r)(q+r-p)=k p r, then k belongs to
	A) $(-\infty,0)$ B) $(0,4)$ C) $(4,\infty)$ D) $(-\infty,\infty)$

26	A straight line L with negative slope passes through the point $(4,9)$ and cuts the positive coordinate axes at the points A and B .As the line varies the minimum value of OA+OB is (O is origin)
	A)10 (B) 13 C)36 D) 25

27	If one of the lines of $my^2 + (1-m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines xy=o, then m is
	A)-1/2 B)-2 C)1 D)2

28	Two circles touch each other externally with radii 4 and 9 respectively .The area of the quadrilateral formed by the centres and the points of contact of a direct common tangent is
	A)124 B)78 C)30 D)136

29	Tangents are drawn to the circle C: $x^2 + y^2 = 1$ from any arbitrary point P on the circle $C_1 : x^2 + y^2 - 4 = 0$ .These tangents meet the circle C_1 again at A and B. Tangents are drawn to the circle C_1 at these points A and B. The locus of point of intersection of these tangents is
	A) $x^2 + y^2 = 10$ B) $x^2 + y^2 = 16$ C) $x^2 + y^2 = 25$ D) $x^2 + y^2 = 9$

30	The normal at the point $(bt_1^2, 2bt_1)$ on a parabola meets the parabola again in the point $(bt_2^2, 2bt_2)$, then A) $t_2 = -t_1 + \dfrac{2}{t_1}$ B) $t_2 = t_1 - \dfrac{2}{t_1}$ C) $t_2 = t_1 + \dfrac{2}{t_1}$ D) $t_2 = -t_1 - \dfrac{2}{t_1}$
31	The value of k if (1,2) and (k,-1) are conjugate points with respect to the ellipse $2x^2 + 3y^2 = 6$ is A)2 B)4 C)6 D)8
32	The combined equation of the asymptotes of the Hyperbola $xy + x + y + 5 = 0$ is A) xy=0 B)(x-1)(y-1)=0 C) (x-1)(y+1)=0 D) (x+1)(y+1)=0
33	If (K,1,5);(1,0,3);(7,-2,L) are collinear then (K,L)= A)(-2,-1) B)(2,1) C)(-2,1) D)(2,-1)
34	The plane 2x+2y-z=k touches the sphere $x^2 + y^2 + z^2 - 4x + 2y - 6z + 5 = 0$ and makes a positive intercept on the z-axis then k= A) -10 B)-8 C) 8 D)10
35	The plane 2x-2y-3z-14=0 and the line joining the points (1,2,4), (3,3,0) intersect at A)(5,2,0) B)(-3,-1,-6) C)(5,4,-4) D)(10,-15,12)
36	ABC is a triangle and AD, BE, CF are its medians then $\vec{AD} + \vec{BE} + \vec{CF} =$ A) $4\,\vec{AB}$ B) $3\,\vec{BC}$ C) $4\ \ \vec{CA}$ D) $\vec{O}$
37	If $\bar{a}, \bar{b}\ \&\ \bar{c}$ are non coplanar unit vectors such that $\bar{a} \times (\bar{b} \times \bar{c}) = \dfrac{\bar{b} + \bar{c}}{\sqrt{2}}$, then the angle between $\bar{a}\ \&\ \bar{b}$ is A) $\dfrac{3\pi}{4}$ B) $\dfrac{\pi}{4}$ C) $\dfrac{\pi}{2}$ D) π

38	A particle acted on by a constant forces $4\overline{i}+\overline{j}-3\overline{k}$ and $3\overline{i}+\overline{j}-\overline{k}$ is displaced from the point $\overline{i}+2\overline{j}+3\overline{k}$ to the point $5\overline{i}+4\overline{j}+\overline{k}$ .The total work done by the forces is A)20 units B)40 units C)30units D)50 units
39	If α is a repeated root of $ax^2+bx+c=0$ then $\lim\limits_{x\to\alpha}\dfrac{Sin(ax^2+bx+c)}{(x-\alpha)^2}$ A)0 B)a C)b D)c
40	If $x=f(t)$ and y=g(t) then $\dfrac{d^2y}{dx^2}=$ A)$\dfrac{g''(t)}{f''(t)}$ B)$\dfrac{f''(t)}{g''(t)}$ C)$\dfrac{f'(t)g''(t)-f''(t)g'(t)}{\left(f'(t)\right)^3}$ D)$\dfrac{g'(t)f''(t)-g''(t)f'(t)}{\left(g'(t)\right)^3}$ $(\ )'$ &$(\ )''$ represent first & second derivatives
41	If $y=x^n\ Log_e x$,then $x\ y_{n+1}=$ A)n B) $\log_e x^n$ C) $n!$ D)0
42	If $u=Tan^{-1}\left(\dfrac{x+y}{\sqrt{x}+\sqrt{y}}\right)$,then $x\dfrac{\partial u}{\partial x}+y\dfrac{\partial u}{\partial x}=$ A) $\dfrac{1}{2}Sec^2 u$ B)$\dfrac{1}{2}\dfrac{\sec u}{1+Tan^2 u}$ C)$\dfrac{1}{2}\dfrac{Tan u}{1-Tan^2 u}$ D) $\dfrac{1}{2}\dfrac{Tan u}{1+Tan^2 u}$
43	If $a^2x^4+b^2y^4=c^6$, the the maximum value of xy is A) $\dfrac{c^3}{2ab}$ B)$\dfrac{c^3}{\sqrt{2ab}}$ C)$\dfrac{c^3}{ab}$ D)$\dfrac{c^3}{\sqrt{ab}}$
44	The sum of the ordinates of the points on the curve $6y=4x^3+3x^2$ at which the tangents make equal angles with the Coordinate axes is A)3/8 B)0 C)1/24 D)13
45	A lamp of negligible height is placed at a distance of x meters from a wall. A man of height y meters is walking towards the wall at a speed of (x/10) meters per second. The rate of change of the shadow of the man on the wall when man is midway between wall and the lamp is (in meters per second) A)$\dfrac{-2y}{5}$ B)$-\dfrac{y}{5}$ C)$\dfrac{4y}{5}$ D) $-\dfrac{y}{10}$

46	A curve represented $x = t^5 - 5t^3 - 20t + 7, y = 4t^3 - 3t^2 - 18t + 3$ is increasing in an interval of finite length is A)(-2,2) B)(-1,3/2) C)(3/2,2) D)(-1,2)
47	$\int \cos(\ln x)dx =$ A) $\dfrac{x}{2}[\cos \ln x + \sin \ln x] + c$ B) $\dfrac{x}{2}[\cos \ln x - \sin \ln x] + c$ C) $x[\cos \ln x + \sin \ln x] + c$ D) $x^2[\cos \ln x + \sin \ln x] + c$
48	A function $y = f(x)$ has a second order derivative $f''(x) = 6(x-1)$. If its graph passes through the point (2,1) and at that point the tangent to the graph is $y = 3x - 5$, then the function is A) $(x-1)^2$ B) $(x+1)^2 + 2$ C) $(x-1)^3 + 3$ D) $(x-1)^3$
49	In the binomial expansion $\left(x^2 + \dfrac{1}{x}\right)^6$, m th term contains x^3 and n th term contains x^{-3}. The value of the integral $\int\limits_0^{2\pi} \mathrm{Sin}^m \theta \, \mathrm{Cos}^n \theta \, d\theta$ = A) $\dfrac{\pi}{32}$ B) $\dfrac{3\pi}{32}$ C) $\dfrac{3\pi}{132}$ D)0
50	In [a, b] a function f(x) <0, then the area bounded by the curve, x-axis, the lines x=a and x=b is A) $\int\limits_a^b f(x)dx$ B) $\int\limits_b^a f(x)dx$ C) $\int\limits_a^b f(-x)dx$ D) $-\int\limits_b^a f(x)dx$
51	The order and degree of the differential equation $5^{3Log_5 \frac{dy}{dx}} = 5 + 3^{5Log_3 \frac{d^2y}{dx^2}}$ are A)Order is 2& degree can not be determined B)Order is 2 & degree is 2 C)Order is 2, degree is 5 D) Order is 1 degree is 3
52	$y = ax + b$ is A) General solution for $\dfrac{d^3y}{dx^3} = 0$ & particular solution for $\dfrac{d^2y}{dx^2} = 0$

B) particular solution for $\dfrac{d^3y}{dx^3}=0$ & for $\dfrac{d^2y}{dx^2}=0$

C) General solution for $\dfrac{d^2y}{dx^2}=0$ & for $\dfrac{d^3y}{dx^3}=0$

D) General solution for $\dfrac{d^2y}{dx^2}=0$ & particular solution for $\dfrac{d^3y}{dx^3}=0$

53	The differential equations $\dfrac{dy}{dx}=\dfrac{xLogx}{y^3e^{y^2-5}}$ and $\dfrac{dy}{dx}+\dfrac{y^3e^{y^2-5}}{xLogx}=0$ represent two families of curves which A)Touch each other B) intersects at an angle of 45^0 C) do not meet each other D) are orthogonal.
54	The solution of $\dfrac{d^2y}{dx^2}=12x^2+\log x+2$,such that y(1)=0,and $y'(1)=0$ is y= A) $x^4+\dfrac{1}{2}x^2Log_ex+\dfrac{x^2}{4}-5x+\dfrac{15}{4}$ B) $x^4+\dfrac{1}{2}x^2Log_ex+\dfrac{x^2}{4}-\dfrac{5}{4}$ A) $x^4+\dfrac{1}{2}x^2Log_ex+\dfrac{x^2}{4}-\dfrac{5}{4}$ D) $x^4+Log_ex+\dfrac{x^2}{4}-\dfrac{5}{4}$
55	If $\sum\limits_{i=1}^{18}(x_i-8)=9$ and $\sum\limits_{i=1}^{18}(x_i-8)^2=45$,then the standard deviation of the observations $x_i(i=1,2,3....18)$ is A) 4/9 B)9/4 C)3/2 D)2/3

56	Consider the data 1,2,m,7,15,10,8,35,76,9,27 and the below statements.
	  1) m is median , when m is any value in between 9 and 10
	  2) 9 is median, when m is any value less than 9
	  3) 10 is median , when m is any value more than 10
	The true statements from the above are
	  A) Only (1) & (2) B) only (2) &(3) C) only (3) and (1) D) all (1) ,(2) &(3)

57	Probability that the selection is to consist of either all males or all females from the selections of 10 clerks from 22 males and 17 female applicants is A) $\dfrac{^{22}C_{10}}{^{39}C_{10}}$ B) $\dfrac{^{22}C_{10}\times{}^{17}C_{10}}{^{39}C_{10}}$ C) $\dfrac{^{22}C_{10}+{}^{17}C_{10}}{^{39}C_{10}}$ D) $\dfrac{^{17}C_{3}}{^{39}C_{10}}$
58	The probability that the year 2100 having 53 Sundays is A)1 B) 1/7 C) 2/7 D) 6/7

59	The hexadecimal number(2AF3)is equal to the to decimal number A) 10095 B)19995 C) 10005 D)10995
60	The equivalent octal number for the hexadecimal number 25B is A)1113 (B) 1333 (C)1133 D) 1033

61. What is the value of the C expression "4&8|12"?
    (A) 12   (B) 124   (C) 24   (D) 16

62. What is the value of the C expression "~4&~8|~12" assuming 8-bit number representation?
    (A) 255   (B) 243   (C) 244   (D) 242

63. For the following code fragment, find the number of times the statement at label L1 will get executed.

```
        for ( i = 0; i < 100; i++)
        {     i++;
              L1: ...
        }
```
    (A) 100   (B) 99   (C) 50   (D) 49

64. The canonical sum-of-product expression corresponding to the Boolean function f(A,B) = 1 is
    (A) AB + A'B + AB' + A'B'   (B) 1   (C) 0   (D) A + A' + B + B'

65. The difference between the number of 1's and number of 0's in the K-Map for the function f(a, b, c) = a + b'c is
    (A) 0   (B) 1   (C) 2   (D) 3

66. An SR-latch is created using only two NAND gates with S and R inputs feeding one NAND gate each. If both S and R inputs are set to zero, the outputs will be
    (A) Q and Q' both 1
    (B) Indeterminate
    (C) Both at 0
    (D) Q and Q' complementary to each other

67. An instruction performing an arithmetic operation will be fastest if the operands are available in
    (A) Cache   (B) CPU register
    (C) ALU   (D) Main memory

68. The signal lines between CPU and memory can be classified as
    (A) Address, Data   (B) Address, Read, Write
    (C) Address, Data, Control   (D) Address, Data, Read

69. MAC address is associated with which layer in OSI model?
    (A) Physical   (B) Datalink   (C) Network (D) Transport

70. In OSI model IP protocol runs at which layer?
    (A) Physical   (B) Datalink   (C) Network (D) Transport

71. FTP stands for
    (A) File Transfer Protocol   (B) Format Transfer Protocol
    (C) Fast Transfer Protocol   (D) Finite Transfer Protocol

72. IN TCP/IP, IP stands for
    (A) Inject Protocol   (B) Interleaved Protocol
    (C) Insensitive Protocol   (D) Internet Protocol

73. Which of the following requires a battery backup?
    (A) SRAM   (B) DRAM   (C) DDR RAM (D) All of them

74. Which of the following is a valid base 6 number?
    (A) 2047   (B) 565   (C) Both A and B (D) None of A or B

75. Value of the expression $(25)_{12}$ + $(46)_7$ in base 6 number system is
    (A) 143   (B) 341   (C) 124   (D) 421

76. Assuming that '/'is a left associate integer division operator and '\'
a right associative integer division operation, evaluate the expression
"2/3/4 + 4\3\2".
    (A) 0   (B) 4   (C) 3   (D) 1

77. What will be the output of the following code fragment
        int a = 3, b = 2;
        if (a / b > a % b)
            printf("Yes"); else printf("No");
    (A) Yes   (B)No   (C) Syntax error (D) None of these

78. If p is an integer pointer, 2*p will have a value
    (A) Twice the current value of p
    (B) Indeterminate
    (C) Syntax error
    (D) None of these

79. In a 'switch' statement
    (A) 'default' is optional
    (B) 'default' is mandatory

(C) 'default' is always executed

(D) 'default' is executed only when it is the last case option

80. In a C program, any for-loop can be converted into an equivalent

(A) while loop   (B) do-while loop

(C) Both A and B   (D) None of these

81. The #define directive is a

(A) Macro   (B) Constant   (C) Procedure   (D) None of these

82. Time complexity to sort an array of 100 numbers using Quicksort is

(A) O(100)   (B) O(10)   (C) O(log 100)   (D) O(1)

83. Data structure used to evaluate a postfix expression is a

(A) Queue   (B) Stack   (C) Tree   (D) Heap

84. In an array with n elements, the complexity to delete ith element

(A) O(1)   (B) O(n)   (C) O(log n)   (D) O(n^2)

85. Number of pointers needed in a stack and a queue are

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

86. In a binary tree each node can have

(A) exactly two children

(B) at most two children

(C) more than two children

(D) None of these

87. The minimum possible number of levels in an n-element binary tree can be

(A) n (B) 1   (C) 2n (D) log n

88. The best case complexity of Bubblesort is

(A) O(n)   (B) O($n$log$n$)   (C) O(n^2)   (d) O($n^2 log n$)

89. In a sequential search algorithm, in terms of O-notation, best case occurs when the element is

(A) the first one in the array

(B) the last one in the array

(C) within first 10 elements in the array

(D) both A and C

90. For the following code fragment, the time complexity is given by,

```
For(i = 0, j=0; i < n && j < n; i = 2*i, j++)
```

   (A) O(n)   (B) O(log n)   (C) O(n log n)   (D) O(1)

91. In C++ polymorphism means
   (A) function called depends upon the object invoking it
   (B) all the functions with same name getting invoked
   (C) both A and B
   (D) none of these

92. In case of public inheritance, which of the following members of parent class do get inherited
   (A) Public, Protected   (B) Private, Protected
   (C) Public, Private   (D) Public, Private, Protected

93. What is the output of the following code fragment?

```
int a = 067;
printf("%d", a+1);
```

   (A) 68   (B) 66   (C) 55   (D) 56

94. How many times is the loop-body executed in the following code fragment?

```
int x = 5, y = 10;
do {
      x+= 10;
} while (x < y);
```

   (A) 5   (B) 6   (C) 7   (D) 4

95. Final value of 's' in the following code fragment is

```
int s = 0;
for ( i = 0; i < 5; i++) s = s << 1 + i;
```

   (A) 10   (B) 20   (C) 26   (D) 28

96. What will be the output of the following code fragment?

```
if (5 < 2)
      cout << "I like";
else if ((6 >= 3) || (4 <= 8))
            cout << "computer";
      else cout << "fruits";
```

(A)computer   (B)fruits   (C)I like computer   (D)I like fruits

97. Boolean expression (x < y || x > y) is equivalent to
    (A)y >= x (B)x != y   (C)x >= y   (D)None of these

98. Resolution of a computer screen corresponds to
    (A) Total number of pixels
    (B) Number of pixel per unit length
    (C) Number of pixels per unit area
    (D) None of these

99. Full form of DDR
    (A) Double Data Rate
    (B) Dual Data Rate
    (C) Double Disk Rate
    (D) Dual Disk Rate

100. SATA stands for
    (A) Serial Advanced Technology Attachment
    (B) Special Asynchronous Technology Addition
    (C) Serial Asynchronous Terminal Adapter
    (D) Special Advanced Terminal Adapter

101. CDMA stands for
    (A) Carrier Detect Multiplexed Access
    (B) Code Division Multiple Access
    (C) Carrier Division Multiple Access
    (D) Carrier Division Multiplexed Access

102. Which of the following is not an input device?
    (A) Scanner   (B) Printer   (C) Disk   (D) Pen drive

103. Command "cp –i" in Unix makes cp command to
    (A) prompt the name of the file overwritten
    (B) prompt the name of the file if not existing
    (C) always prompt the name of the file
    (D) None of these

104. Command to delete all files in a directory and subdirectories within it in UNIX is
    (A) rm –i (B) rm –chk   (C) rm –d (D) rm –r

105. Unix command to get status of all processes in the system is
    (A) ps -a (B) ps -x (C) ps -l (D) None of these

106. The command "command1 | command2" in Unix
    (A) redirects output of command1 to input of command2
    (B) makes input common for command1 and command2
    (C) executes both the commands in parallel
    (D) None of these

107. In Unix, if the file permission for a user is "001" then the user can
    (A) read and write onto the file but cannot execute
    (B) not read write onto the file but can execute
    (C) not read write or execute the file
    (D) None of the above

108. The unix command to reduce priority of a process is
    (A) red   (B) lower   (C) upper   (D) nice

109. The memory management system of an operating system manages
    (A) Main memory (B) Disk   (C) Tape   (D) All of these

110. Kernel of an operating system contains
    (A) shared data structures   (B) shared routines
    (C) None of A or B   (D) Both A and B

111. If X is larger than Y and X is larger than Z then which of the
following statement(s) is/are true?
    (A) X is larger than both Y and Z
    (B) X is the larger than Y but Y is smaller than Z
    (C) Y is smaller than Z
    (D) None of A, B, C

112. If X is larger than Y and Y is larger than Z then which of the
following statement(s) is/are true?
    (A) Z is larger than X
    (B) Z is smaller than X
    (C) Z is smaller than Y
    (D) Both B and C

113. If X is larger than Y and Y is smaller than Z then which of the
following statement(s) is/are definitely true?
    (A) X is smaller than Z
    (B) X is larger than Z
    (C) Both A and B
    (D) None of these

114. If X is larger than the minimum of Y and Z then which of the
following is definitely true about X?

(A) X is larger than both
(B) X is smaller than both
(C) X is between Y and Z
(D) None of A,B,C

115. If X is larger than the maximum of Y and Z then which of the following is definitely true about X?
    (A) X is larger than both
    (B) X is smaller than both
    (C) X is between Y and Z
    (D) None of A,B,C

116. If X is smaller than the maximum of Y and Z then which of the following is definitely true about X?
    (A) X is larger than both
    (B) X is smaller than both
    (C) X is between Y and Z
    (D) None of A,B,C

117. If X is smaller than the minimum of Y and Z then which of the following is definitely true about X?
    (A) X is larger than both
    (B) X is smaller than both
    (C) X is between Y and Z
    (D) None of A,B,C

118. In a Boolean formula, A + B = B + C. Then which of the following statement(s) is/are definitely true?
    (A) A = C
    (B) B = 1
    (C) A = C'
    (D) None of these

119. In a Boolean formula, A + B' = A. Which of the following is/are definitely true?
    (A) B = 0
    (B) A = 1
    (C) A = 0
    (D) None of these

120. In a Boolean formula A + A' = 1. Which of the following is/are definitely true?
    (A) A = 1
    (B) A = 0
    (C) A can assume any value
    (D) None of these

1. Which of the following words correctly defines the phrase, "to displace, replace or substitute"?
   A. Supine
   B. Surcharge
   C. Supersede
   D. Subterfuge

2. The given sentence has been divided into 4 parts out of which a part may contain grammatical error. Select the part having grammatical error as answer else mark option 'e' i.e. (No correction required)' as the answer.
   I found that dress (1) / more better than (2) / any other dress (3) / in the case (4).
   A. 1
   B. 2
   C. 3
   D. No correction required.

3. Fill in the blanks with appropriate preposition:
   He comes _____ a family which has a passion _____ playing cricket.
   A. from, in
   B. off, for
   C. of, in
   D. of, for

4. Choose the correct alternative which can be substituted for the given word in the bracket to make the sentence meaningful.
   The seniors _____ (apology) for their rude behavior with juniors.
   A. apologetic
   B. apologizing
   C. apologized
   D. were apologetic

5. Rearrange the following parts (1, 2, 3 and 4) in proper sequence to obtain a correct sentence.
   1. pending because it wasn't
   2. Too many cases still lie
   3. is the convict
   4. confirmed that the accused really

   A. 2, 1, 4, 3.
   B. 2, 4, 1, 3.
   C. 1, 4, 2, 3.
   D. 1, 3, 2, 4.

6. Select the most effective word from the options given below to fill in the blank and complete the sentence meaningfully.
   A _____ of advisers.
   A. Army
   B. Board
   C. Crowd
   D. Council

7. Pick out the word closest in opposite meaning to the given word: Admonish.
   A. Permit
   B. Advise
   C. Praise
   D. Compliment

8. Choose the correct alternative which can be substituted for the below given word/ sentence.
   Cultivation, management, and study of individual trees is called as _____ .
   A. Arboriculture
   B. Horticulture
   C. Sericulture
   D. Viticulture

9. Choose the pair of words which have a similar relationship to that between the given pair of words - MERGE : DISCONNECT.
   A. Gratify : Delight
   B. Worship : Devotion
   C. Robust : Incapable
   D. Intense : Acute

10. Choose the correct alternative which can be substituted for the below given phrase.
    To hold one's tongue.
    A. To support someone
    B. To interfere in someone's work
    C. To insult someone
    D. To keep/make someone keep quiet

11. In the sentence given below a part is underlined and for that part options are given. Choose the most suitable option that can replace the underlined part.
    A sharp fall in prices of jute <u>have led the poor jute farmers</u> to the brink of starvation.
    A. has led the poor jute farmers
    B. have led the poor jute farmers
    C. had led the pure jute farmers
    D. have led the poor farmers of jute

12. The given sentence has been divided into parts out of which a part may contain grammatical error. Choose the part which has grammatical error. or else choose 'No error' as your answer.
    Unlawful universities for professional courses (1)/ are today a boom industry (2)/ fueled by the ambition of parents (3)/ who wish to see their children become a doctor or an engineer at any cost (4).
    A. 1
    B. 2
    C. 3
    D. 4

13. Choose the correct alternative which can be substituted for the below given phrase.
    A person who talks in sleep is called as:
    A. Philatelist
    B. Somnambulist
    C. Somniloquist
    D. Oneirocritic

14. Complete the following sentences with the most appropriate words/phrases with reference to grammar, idioms, proverbs and syntax.
    Do not expect me to ……… you ……. this horrendous crime.
    A. abet, by
    B. abet, with
    C. abet, in
    D. abet, to

15. In the question below, there is a sentence with jumbled up parts. Rearrange these parts, which are labelled A, B, C and D to produce the correct sentence. Choose the proper sequence:
    It is possible that he thinks his …..
    m) job is to be a clerk
    n) and to read the results out loud as he stands at the cash register
    o) to keep people from stealing things
    p) to type letters into a computer

    A. mnop
    B. pomn
    C. nomp
    D. mopn

16. The given sentence is in active/ passive voice. Change the voice of the sentence. Select the correct option from the sentence below.
    She has preserved all the old letters of her dead lover.
    A. All the old letters of her dead lover have been preserved by her.

B. All the old letters of her dead lover has been preserved by her.

C. All the old letters have been preserved.

D. The letters of her old lover have been preserved.

17. In the following question, four pairs of words follow the first pair. Select the pair whose relation most closely matches the first pair.

Serpentine: River.

A. Problematic: Solution

B. Circuitous: Track

C. Rib-tickling: Wit

D. Exhaustive: List

18. Four alternatives are given for the idioms/ phrases underlined in the sentence. Choose the one that best expresses the meaning of the idiom

The demolition of the Babri Masjid had been a political hot potato for years.

A. a hotly debated delicate issue

B. a helping agent

C. forbidden issue

D. something that has been for long in the newspapers

19. The Question below consist of four sentences marked A, B, C and D. Arrange the sentences in a proper sequence to form a coherent paragraph.

a. My grandmother, like everybody's grandmother, was an old woman.

b. People said that she had once been young and pretty and even had a husband.

c. She had been old and wrinkled for twenty years that I had known her.

d. But that was hard to believe.

A. dcab

B. acbd

C. abcd

D. dcba

Directions for Questions 20 through to 23. Some parts of the sentences in the passages below are left blank. Fill them with the best alternative.

We ….. reached the top of the pass. It was lined by a large ……. of rocks …… with white silk scarves and ragged prayer flags. We all took a turn round the rocks in the clockwise direction, as was the …… and Tsetan checked the tyres on his vehicle.

20. The first blank should have:
    A. immediately
    B. hesitantly
    C. finally
    D. currently

21. The second blank should have:
    A. cairn
    B. monument
    C. assembly
    D. shaft

22. The third blank should have:
    A. garnished
    B. festered
    C. festooned
    D. enriched

23. The fourth blank should have:
    A. habit
    B. fashion
    C. etiquette
    D. tradition

24. Read each sentence to find out whether there is any grammatical error in it. The error, if any will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'.

A. We discussed about the problem so thoroughly
B. on the eve of the examination
C. that I found it very easy to work it out.
D. No error.

25. Pick the word/phrase which is most nearly opposite in meaning: ASPIRATION.
    A. dislike
    B. eagerness
    C. passion
    D. objective

26. The given sentence has been divided into parts out of which a part may contain grammatical error.
    Either the manager(a)/ or his subordinates (b)/ had failed in his (c)/ duties, because the project fell apart (d).

    A. a
    B. b
    C. c
    D. d

27. There are two sentences. Each sentence has a blank in it. Five options are given below the sentence pair. Choose the option that fits both the blanks.
    1. Anisha decided to resign after she was passed ____ for promotion again.
    2. I will go __ to the shop if you will come with me.

    A. Under
    B. In
    C. Over
    D. About

28. Complete the following sentences with the most appropriate words/phrases with reference to grammar, idioms, proverbs and syntax.

She wanted him to _____ the lines but he lacked sufficient understanding of the situation.

A. Read up all
B. Read between
C. Read for
D. None of the above

29. STUTTER : SPEECH :: ? : ?
   A. blare : hearing
   B. aroma: smell
   C. astigmatism : sight
   D. Novocain : touch

30. If the county continues to collect residential trash at current levels, landfills will soon be overflowing and parkland will need to be used in order to create more space. Charging each household, a fee for each pound of trash it puts out for collection will induce residents to reduce the amount of trash they create; this charge will therefore protect the remaining county parkland.

   Which of the following is an assumption made in drawing the conclusion above?
   A. The collection fee will not significantly affect the purchasing power of most residents, even if their households do not reduce the amount of trash t
   B. The collection fee will not induce residents to dump their trash in the parklands illegally.
   C. The beauty of county parkland is an important issue for most of the county's residents.
   D. Landfills outside the county's borders could be used as dumping sites for the county's trash.

31. Last year the rate of inflation was 1.2 percent, but for the current year it has been 4 percent. We can conclude that inflation is on an upward trend and the rate will be still higher next year.

   Which of the following, if true, most seriously weakens the conclusion above?

A. The inflation figures were computed on the basis of a representative sample of economic data rather than all of the available data.
B. Last year a dip in oil prices brought inflation temporarily below its recent stable annual level of 4 percent.
C. Increases in the pay of some workers are tied to the level of inflation, and at an inflation rate of 4 percent or above, these pay raises constitute a
D. Government intervention cannot affect the rate of inflation to any significant degree.

32. In an attempt to abate the destructive decline in Micro Chip's revenue brought about by shrinking demand that is accompanying an economic recession, Micro Chip is offering customers a 50% discount for the next three months on all purchases fully paid for within 15 days.

Which of the following assumptions most underlies the chip maker's offer of a discount?
A. Micro Chip expects this discount to help the company retain existing customers and gain new ones, enabling the firm to survive in the long-term.
B. The government will provide massive technology tax credits to businesses, spurring them to purchase chips and other related products.
C. The government will not pursue Micro Chip if in fact its behavior in offering a deep discount amounts to a violation of predatory pricing laws.
D. The decrease in revenue brought about by the reduction in price will be smaller than the anticipated increase in revenue brought about by the increase.

33. There is a certain relation between two given words on one side of : : and one word is given on another side of : : while another word is to be found from the given alternatives, having the same relation with this word as the given pair has.
Select the best alternative. Seismography: Earthquake : : Taseometer : ?
A. Landslides
B. Strains
C. Resistances
D. Volcanoes

34. Pick the word/phrase closest in meaning to the given word: Rubicund.

A. Hated
B. Colourless
C. Open
D. None of the above.

35. Rye sown in the fall and plowed into the soil in early spring leaves a residue that is highly effective at controlling broad-leaved weeds, but unfortunately for only about forty-five days. No major agricultural crop matures from seed in as little as forty-five days. Synthetic herbicides, on the other hand, although not any longer-lasting, can be reapplied as the crop grows. Clearly, therefore, for major agricultural crops, plowing rye into the soil can play no part in effective weed control.

The argument is most vulnerable to the objection that it fails to
A. consider that there might be minor, quick-growing crops that do mature in forty-five days or less
B. identify any alternative method of weed control that could be used instead of the method it rejects
C. distinguish among the various kinds of synthetic herbicides
D. allow for the possibility of combining the two weed-control methods it mentions

36. Pick the word/phrase most nearly opposite in meaning to the given word: Mercurial.
A. Stable
B. Chemical
C. Emotional
D. Psychological

37. The given sentence has been divided into 4 parts out of which a part may contain grammatical error.
The Bill was (1) / pushed through Lok Sabha (2) / in spite of opposition (3) / but for little modification. (4).

A. 1
B. 2
C. 3
D. 4

38. Fill in the blank space with an appropriate choice from the options given thereafter.
Far from being mere replicas of seventeenth-century African culture, Maroon societies have continually developed as their members have_____the artistic heritage bequeathed by their ancestors, adapting it creatively to their changing lives.

   A. confused
   B. repressed
   C. denied
   D. modified

39. A drug that is highly effective in treating many types of infection can, at present be obtained only from the bark of the ibora, a tree that is quite rare in the wild. It takes the bark of 5,000 trees to make one kilogram of the drug. It follows, therefore, that continued production of the drug must inevitably lead to the ibora's extinction. Which of the following, if true, most seriously weakens the argument above?

   A. The drug made from ibora bark is dispensed to doctors from a central authority.
   B. The leaves of the ibora are used in a number of medical products.
   C. The ibora can he propagated from cuttings and grown under cultivation.
   D. The ibora generally grows in largely inaccessible places.

40. Fill in the blank space: Although the substance is normally quite_____, scientists found that when tempered with other elements it could be stored safely in metal containers.
   A. voluminous
   B. caustic
   C. insoluble
   D. vapid

Section B: Analytical Reasoning.

41. What will be the number of zeroes at the end of the product of 1, 3, 5, 7, ..., 99?
    A. 10
    B. 2
    C. 5
    D. 0

42. The ratio of milk and water in 55 liters of mixture is 7: 4. How much water must be added to make the mixture's ratio 7: 6 (in liters)?
    A. 5
    B. 10
    C. 15
    D. 25

43. A mixture of glycerin and water contains 35% glycerin by weight. 25 grams of water is added to such 100 grams of mixture. What % of glycerin by weight is there in the new mixture?
    A. 25
    B. 23
    C. 29
    D. 28

44. A businessman sells a lot of shirts at a profit of 12.5% and then invests the proceeds in purchasing a lot of trousers, which he sells at a profit of 20%. If he makes a net profit of Rs. 700, the cost of the shirts was?
    A. 2400
    B. 2000
    C. 2500
    D. 1600

45. A can do a piece of work in 40 days. He worked at it for 5 days then B finished it in 21 days. In how many days can A and B together finish the work?
    A. 12 days
    B. 15 days
    C. 18 days
    D. 24 days

46. When 8% of a number is added to the number itself the result is 810. What is the number?
    A. 700
    B. 750
    C. 722
    D. 745.2

47. Ravi got 35% hike in his salary and 20% incentive on sales. If he sold goods worth Rs. 850 last year and the salary was Rs 70, then how much more does he earn this year with sales of Rs.900?
    A. 304
    B. 204
    C. 104
    D. 404

48. Two cyclists make the same journey by travelling at 9 km/hr and 10 km/hr respectively. Find the distance traveled by them when one takes 32 minutes longer than the other.
   A. 42
    B. 46
    C. 48
    D. 52

49. A sum of Rs. 3200 invested at 10% per annum compounded quarterly amounts to Rs. 3362. Then the time period is:
    A. 6 months
    B. 7 months
    C. 8 months
    D. 9 months

50. The population of a city increases by 10% annually. If it is 31200 now, then its approximate population two years ago was?
    A. 25785
    B. 28500
    C. 25781
    D. 25680

51. If the price of wheat rises by 9%, by what percent should Ramesh reduce the consumption so as not to exceed the budget on Wheat?
    A. 1%
    B. 8.25%
    C. 10%
    D. 10.5%

52. The number of students in 3 classes is in the ratio 2:3:4. If 12 students are increased in each class this ratio changes to 8:11:14. The total number of students in the three classes in the beginning was:
    A. 162
    B. 175
    C. 180
    D. 212

Directions for Questions 13 to 16: Study the chart and answer the questions: The pie chart given here represents the domestic expenditure of a family in percent. Study the chart and answer the following questions if the total monthly income of the family is Rs. 33,650.

Expenditure of Family
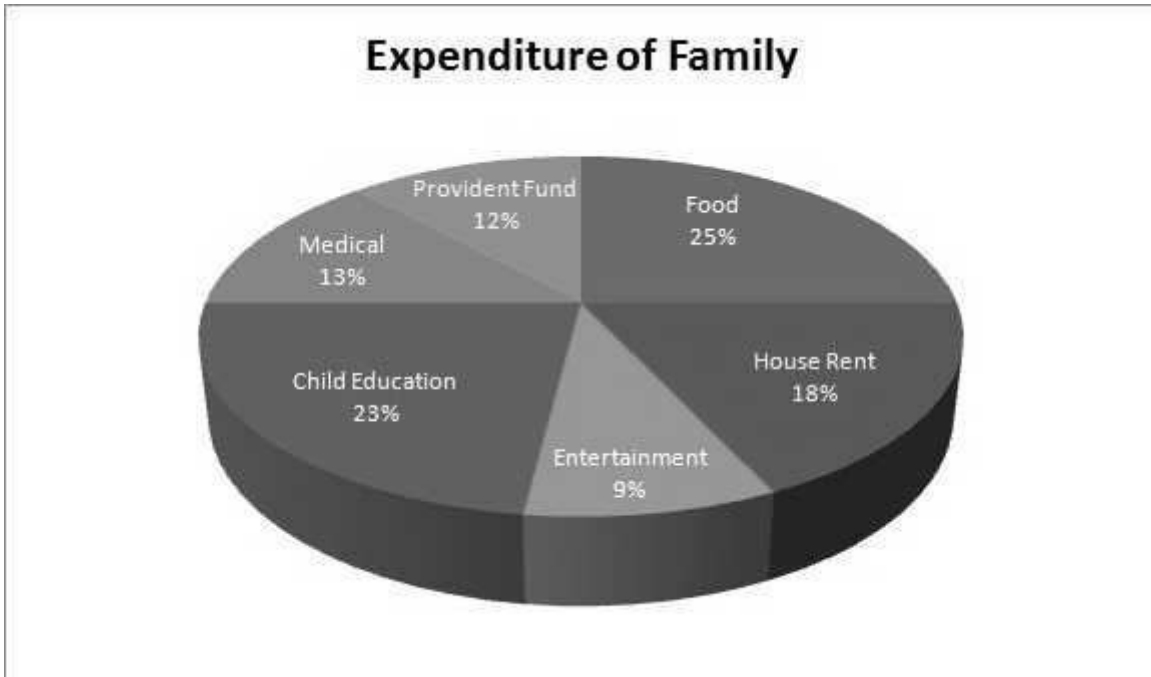
53. The house rent per month is:
   A. Rs.6000
   B. Rs.6152
   C. Rs.6057
   D. Rs.6048

54. The annual savings in the form of provident fund would be:
   A. Rs.48456
   B. Rs.49612
   C. Rs.50122
   D. Rs.52316

55. After providential fund deductions and payment of house rent, the total monthly income of the family remains:
   A. Rs.23545
   B. Rs.22345
   C. Rs.23555
   D. Rs.24555

56. The total amount per month, the family spends on food and entertainment combined together, is:
    A. Rs.11432
    B. Rs.11441
    C. Rs.12441
    D. Rs.11241

57. How many terms are there in 20, 25, 30......... 140?
    A. 22
    B. 25
    C. 27
    D. 32

58. In a triangle, ABC, the internal bisector of the angle A meets BC at D. If AB = 4, AC = 3 and ∠ A = 60°, then length of AD is:
    A. 2 √3
    B. (12√3) / 7
    C. (15√3) / 8
    D. (6√3) / 7

59. The average temperature for Wednesday, Thursday and Friday was 40°C. The average for Thursday, Friday and Saturday was 41°C. If temperature on Saturday was 42°C, what was the temperature on Wednesday?
    A. 39°C
    B. 44°C
    C. 38°C
    D. 41°C

60. The speed of the train going from Nagpur to Allahabad is 100 km/hr while when coming back from Allahabad to Nagpur, its speed is 150 km/hr. find the average speed during whole journey.
    A. 125 km/hr
    B. 75 km/hr
    C. 135 km/hr
    D. 120 km/hr

61. Find the average of first 97 natural numbers.
    A. 47
    B. 37
    C. 48
    D. 49

62. In an examination 80% candidates passed in English and 85% candidates passed in Mathematics. If 73% candidates passed in both these subjects, then what per cent of candidates failed in both the subjects?
    A. 8
    B. 15
    C. 27
    D. 35

63. If the price of the commodity is increased by 50% by what fraction must its consumption be reduced so as to keep the same expenditure on its consumption?
    A. 1/4
    B. 1/3
    C. 1/2
    D. 2/3

64. In how many ways can 8 Indians and, 4 American and 4 Englishmen can be seated in a row so that all person of the same nationality sit together?
    A. 3! 4! 8! 4!
    B. 4! 3!
    C. 2! 8! 4!

D. 3! 4!

65. A heap of pebbles when made up into group of 32, 40, 72, leaves the remainder 10, 18 and 50 respectively. Find least number of pebbles in the heaps.
    A. 1440
    B. 1442
    C. 1418
    D. 1244

66. Subhash can copy 50 pages in 10 hours; Subhash and Prakash together can copy 300 pages in 40 hours. In how much time can Prakash copy 30 pages?
    A. 13 hours
    B. 12 hours
    C. 10 hours
    D. 15 hours

67. In a business, A and C invested amounts in the ratio 2 : 1 , whereas the ratio between amounts invested by A and B was 3 : 2 . If Rs 157300 was their profit, how much amount did B receive?
    A. Rs. 48,000
    B. Rs. 42,000
    C. Rs. 48,400
    D. Rs. 49,000

68. Consider the following statements:

    I. Every equilateral triangle is necessarily an isosceles triangle.

    II. Every right-angled triangle is necessarily an isosceles triangle.

    III. A triangle in which one of the median is perpendicular to the side it meets, is necessarily an isosceles triangle.

    The correct statements are:

A. I and II

B. II and III

C. I and III

D. I, II and III

69. The selling price of an article after giving two successive discounts of 10% and 5% on the marked price is Rs. 171. What is the marked price?

A. Rs.200

B. Rs.300

C. Rs.400

D. Rs.250

70. A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:

A. Rs.702

B. Rs.700

C. Rs.698

D. Rs.690

71. In one hour, a boat goes 14 km/hr along the stream and 8 km/hr against the stream. The speed of the boat in still water (in km/hr) is:

A. 10 km/hr

B. 11 km/hr

C. 12 km/hr

D. 14 km/hr

72. A rectangular plot measuring 90 metres by 50 metres needs to be enclosed by wire fencing such that poles of the fence will be kept 55 metres apart. How many poles will be needed?

A. 30

B. 40

C. 56

D. 60

73. The distance between two cities A and B is 330 km. A train starts from A at 8 a.m. and travels towards B at 60 km/hr. Another train starts from B at 9 a.m. and travels towards A at 75 km/hr. At what time, will they meet?
   A. 11 am
   B. 12 pm
   C. 11:30 am
   D. 12:30 pm

74. The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 12.4 metres away from the wall. The length of the ladder is:
   A. 14.8 metres
   B. 6.2 metres
   C. 12.4 metres
   D. 24.8 metres

75. P is able to do a piece of work in 15 days and Q can do the same work in 20 days. If they can work together for 4 days, what is the fraction of work left?
   A. 8/15
   B. 7/15
   C. 11/15
   D. 2/11

76. The average weight of three boys A, B and C is 163/3 kg, while the average weight of three boys B, D and E is 53 kg. What is the average weight of A, B, C, D and E?
   A. 52.4 kg
   B. 53.2 kg
   C. 55.6 kg
   D. Data Inadequate

77. If the fifth term of a Geometric Progression is 81 and first term is 16, what will be the 4th term of the GP?
    A. 36
    B. 18
    C. 54
    D. 24

78. An accurate clock shows 8 o'clock in the morning. Through how may degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?
    A. 150°
    B. 180°
    C. 160°
    D. 120°

79. The ratio of speeds of A:B is 1:4. If B covers a distance in 20 min, A will cover it in:
    A. 40 minutes
    B. 5 minutes
    C. 10 minutes
    D. 80 minutes

80. How many times will a wheel of diameter 98 cm rotate in covering a distance of 308 metres?
    A. 100
    B. 120
    C. 130
    D. 140

Section C: General Knowledge

81. Who is the new Chief of the Army Staff (COAS) of the Indian Army?
    A. Vikram Singh Rathore
    B. Bipin Rawat
    C. Velu Nair
    D. Birender Singh

82. "BHIM" mobile app has been launched by Union Government to make digital payments easier. What does "BHIM" stands for?
    A. Build Interface for Money
    B. Built-up Interface for Money
    C. Bi-aural Interface for Money
    D. Bharat Interface for Money

83. "Swachh Swasth Sarvatra" initiative has been launched by the Union Health Ministry in collaboration with which union ministry?
    A. Ministry of Drinking Water and Sanitation
    B. Ministry of Finance
    C. Ministry of Housing and Urban Poverty Alleviation
    D. Ministry of AYUSH

84. Who has been appointed as the new deputy governor of Reserve Bank of India (RBI)?
    A. Abhay Kumar
    B. Viral Acharya
    C. Suresh Jaiswal
    D. Anirudh Jain

85. Which Bollywood personality has been conferred honorary doctorate by the Maulana Azad National Urdu University?

A. Aamir Khan

B. Nawazuddin Siddiqui

C. Shahrukh Khan

D. Salman Khan

86. Which of the following is an OPEC country?

A. Russia

B. Kazakhstan

C. Brazil

D. Nigeria

87. The world's largest single rooftop solar power plant has been opened in which state of India?

A. Punjab

B. Rajasthan

C. Gujarat

D. Odisha

88. Kempegowda International Airport is located in which city of India?

A. Bangalore

B. Kochi

C. Chennai

D. Hyderabad

89. The Valmiki National Park is located in which state of India?

A. Rajasthan

B. Madhya Pradesh

C. Bihar

D. Gujarat

90. The 2016 Indian Premier League (IPL) has been won by which of the following cricket teams?
    A. Rising Pune Supergiants
    B. Sunrisers Hyderabad
    C. Royal Challengers Bangalore
    D. Mumbai Indians

Section D: Reading Comprehension

Read the passages carefully and answer the questions that follow.

Passage I:

My next pet was a pigeon, the most revolting bird to look at, with his feathers pushing through the wrinkled scarlet skin, mixed with the horrible yellow down that covers baby pigeons and makes them look as though they have been peroxiding their hair. Because of his repulsive and obese appearance, we called him Quasimodo.

Since he had an unorthodox upbringing, without parents to teach him, Quasimodo became convinced that he was not a bird at all, and refused to fly. He walked everywhere. He was always eager to join us in anything we did. He would even try to come for walks with us. So, you had to either carry him on your shoulder, which was risking an accident to your clothes, or else you let him walk behind. If you let him walk, then you had to slow down your own pace to suit his, for should you get too far ahead you would hear the most frantic and imploring coos and turn around to find Quasimodo running desperately after you.

91. The narrator describes the pigeon as a 'revolting bird' because
   A. he could not fly
   B. he had to be carried everywhere
   C. he had wrinkled skin covered with yellow feathers
   D. he was fat

92. Quasimodo got his name because
   A. he was a fat and ugly
   B. he was attractive
   C. he could not fly
   D. he loved behaving like human beings

93. We know that Quasimodo was always eager to go on walks because
    A. he walked everywhere
    B. he did not know how to fly
    C. he complained loudly if he was not taken along
    D. he always copied whatever humans did

94. Quasimodo protested when he was
    A. left at home
    B. lifted on human shoulders
    C. taken for a walk
    D. left behind during walks

95. The phrase 'risking an accident to your clothes' means
    A. the bird pecked at their clothes
    B. there was a chance of the bird soiling their clothes
    C. the bird risked a fall
    D. the bird did not like their clothes

Passage II

With the Land Acquisition Bill in the limelight, nobody is talking about the real reforms that farmers need. The unseasonal rains over the last few years have resulted in enormous loss of crop output across many States of North India. This has shifted attention from the issue of land acquisition to other important problems faced by farmers in India. While it is important to debate the various clauses of the Land Acquisition Bill — what might benefit the farmers and what goes against their interests — it is also important for the government to pay attention to the bigger problems that Indian farmers face. The findings from a survey conducted by the Centre for the Study of Developing Societies in late 2013 among 5,480 farmers across 18 States in the country present a rather dismal picture of agriculture today. Most conversations with farmers reveal how income returns are very low, irrigation facilities are inadequate and supporting infrastructure is largely absent or are of poor

quality. Besides, crops also get destroyed either by drought or by floods. It is no wonder that the survey indicates that more than one-fifth (22 per cent) of the farmers have begun to dislike farming. The scarcity of financial resources for farming is another major issue. Unsurprisingly, the study indicated that one-third of the farmers had taken a loan in the last five years for meeting personal or farming needs. For non-farming purposes, most of them had to depend on either friends or moneylenders.

96. Which of the following statements is best supported by the passage?
    A. Income returns are adequate in farming business.
    B. Government is providing enough irrigation facilities to the farmers.
    C. Land Acquisition bill is not the only reason of concern for farmers.
    D. Loans are making the farmers financially independent

97. Which of the following statements can be inferred from the passage?
    A. Farmers are only concerned about the Land Acquisition Bill.
    B. Farming has become a very less lucrative work for farmers.
    C. Land Acquisition Bill will make the farmers financially strong.
    D. Most of the farmers are in favor of the Land Acquisition Bill.

98. Which one of the following weakens the conclusion drawn in the above passage?
    A. Both financial and infrastructural factors affect the business of farming.
    B. For arranging financial resources, both for farming and personal purpose, farmers have to depend upon outsider's money.
    C. Farmers are able to earn sufficient income from farming to meet their basic requirements.
    D. Irrigation facilities along with other infrastructural facilities are inadequately provided to the farmers.

99. What does the term 'dismal picture of agriculture' means in the passage?
    A. Agriculture sector is prospering day by day.
    B. Favorable factors are helping agriculture sector to grow.
    C. There is a sudden boom in the agriculture sector.
    D. Agriculture sector is going through a very bad phase these days.

100. According to the passage, which of the following resource is scarce in farming sector?
   A. Natural Resource
   B. Financial Resource
   C. Technological Resource
   D. Human Resource

Passage III

With the passage of a tough new law to deal with black money kept abroad—the Black Money (Undisclosed Foreign Income and Assets) and Imposition of Tax Bill, 2015—and introduction of the Benami Transaction (Prohibition) Bill in the Lok Sabha on the last day of the budget session, the government has demonstrated that it has the political will to address the menace of black money. The Black Money Bill, which seeks to unearth unaccounted funds and assets stashed by Indians abroad and provides for 120 per cent tax and penalty in addition to a 10-year jail term, will become law after getting assent of the president, having already been passed by both Houses of Parliament. The government has also armed itself to attach domestic property of equivalent value of such offenders. Crucially, the Lok Sabha Speaker had notified the Undisclosed Foreign Income and Assets (Imposition of Tax) Bill as a Money Bill. This meant that after the Lok Sabha had approved the bill, the Rajya Sabha where the government is in a minority had to act on it within 14 days of receiving it, or it would have been deemed to have been passed by that House. If the Rajya Sabha makes changes or rejects a Money Bill, the Lok Sabha has the power to accept or not accept the recommendations and it will be considered passed. It is now for the government to ensure that the new laws are implemented transparently and not applied selectively through misuse of the implementation machinery. For the first time in decades, the assault on black money is well on course. This apparent stranglehold on the black money menace must not be allowed to be sabotaged. Indeed, after this assault on black money held abroad begins to bear fruit, due attention needs to be given to tax evasion within the country which is an equally big menace.

101.   According to the passage, the Black Money Bill has been passed to:
   A. Distribute the Black money amongst the citizens of the country.
   B. Use the black money for the development of the country.
   C. Dig the unaccounted funds and assets stored by Indians abroad.
   D. Bring equality of income all over India.

102.   With reference to the passage, consider the following statements:
   I. After a Bill gets approved in Lok Sabha, it is deemed to have been passed by Rajya Sabha.
   II. If Rajya Sabha makes any changes in the bill previously passed by the Lok Sabha; then the Lok Sabha has the power to accept or not accept the recommendations and it will be considered passed.

   Which of the statements given above is/are correct?

   A. Only (I)
   B. Both (I) and (II)
   C. Only (II)
   D. Neither (I) Nor (II)

103.   What does the term 'Assault on Black Money' means in the passage?
   A. Utilising the black money for economic growth.
   B. Keeping an eye on the black money stored by the Indians abroad.
   C. A raid on the black money stored by the Indians abroad.
   D. Transferring the black money from to India abroad.

104.   What punishment will be given to the people caught with black money stored abroad?
   A. 120% tax & penalty
   B. 10-year jail term
   C. 120% tax & penalty or 10-year jail term

D. 120% tax & penalty and 10-year jail term

105.   According to the passage, other than penalty and jail term, what can be further demanded from the people who will get caught with black money stored abroad?
A. Attach domestic property of equivalent value to the black money stored.
B. Detach domestic property of equivalent value to the black money stored.
C. Attach domestic income of equivalent value to the black money stored.
D. Attach domestic liability of equivalent value to the black money stored.

Passage IV

Rising inflation, coupled with a new packaging legislation, will make price hikes of packaged foods inevitable, says the Divisional Chief Executive of ITC's foods division. On one hand the costs of inputs such as raw material, furnace oil and packaging material and even logistics have gone up, while on the other, the new packaging law that bans producers from reducing the quantity inside the packet, will leave them with no choice but to raise prices. This new Legal Metrology Act is likely to come into force shortly. At present, FMCG companies rely on reduced quantity to tackle rising inflationary pressure on input costs rather than changing the price points owing mainly to coinage issues. The new Act will make the price-point concept impossible, he said. On the demand-supply side, he said the company had to make a lot of efforts to meet the spurt in demand for its cream biscuits. Giving an example, he said the company's premium range offerings such as Dark Fantasy and Dream Cream Bourbon have witnessed a growth of 118% in the second quarter over the first. Even other Sunfeast premium creams have shown a growth of 72 percent in Q2 over Ql. Responding to a question on competition from global brands such as Oreo (from Kraft Foods), McVitie's from (United Biscuits), and domestic brands such as Parle and Britannia, he said international competition is a reality. It is good, as it aids 'premiumisation' of the category. He said this has actually enriched Sunfeast's portfolio last year. On the domestic front, given the emerging trends in consumption patterns, the biscuit market offers enormous opportunities, scope for improvement both in terms of new products and segments and also in terms of operational excellence. 'The field of play is large and we are encouraged and really excited about the years ahead,' he said. At present ITC's Sunfeast is the third largest national player after Parle and Britannia. The brand has 10% cent share of the ` 15000 crore biscuit

market. And, within this, in the creams segment (which accounts for over ` 3500 crore) Sunfeast commands 15% share.

106. The new Legal Metrology Act is in respect of:
    A. the legalities involved in weather forecasting
    B. anything that has to be marketed in Metro cities
    C. packaging of biscuits only
    D. packaged foods in general

107. How has competition from foreign brands affected the Indian biscuit market?
    I. Only the three largest manufacturers survived; while the smaller ones withered away.
    II. The range of categories available to the Indian consumers has expanded.

    III. The foreign brands got restricted to premium categories only; leaving the field open to domestic brands in non-premium categories.

    A. I and II

    B. II and III

    C. Only II

    D. I, II and III

108. The price-point concept discussed in the passage is referring to
    A. fixing prices of packaged foods in round figures for ease of payment at the point of purchase
    B. prices to be fixed by the government
    C. variations of prices from point-to-point in any city
    D. None of the above

109. What are the two factors that make price hikes inevitable according to the passage?
    A. Rising inflation with new packaging legislation
    B. Rising deflation with new packaging legislation
    C. Legal issues and market imperfections
    D. Pricing policies undertaken by market forces with unchanged packaging legislation

110. It can be accurately inferred from the passage that
    A. Parle is the largest selling brand of biscuits in India
    B. Sunfeast is the third largest selling brand of cream biscuits in the country
    C. competition from foreign brands has adversely affected the sales of Sun feast
    D. All of the above

Section E: Computer and Business Fundamentals

111.   A light sensitive device that converts drawing, printed text or other images into digital form is
   A. Keyboard
   B. Plotter
   C. Scanner
   D. OMR

112. In order to tell Excel that we are entering a formula in cell, we must begin with an operator such as
   A. $
   B. @
   C. +
   D. =

113. Which of the following memory is non-volatile?
   A. SRAM
   B. DRAM
   C. ROM
   D. All of the above

114. The file extension of MS-Word document in Office 2010 is _____.
   A. *.doc
   B. *.docx
   C. *.pdf
   D. *.txt

115. One MB is equal to?
   A. 1024 Bytes
   B. 1024 KB

C. 1000 KB

D. 1024 GB

116. Which of the following does not fall within the jurisdiction of MRTP commission?

A. Prevention of Monopolistic Trade practices

B. Prevention of Restrictive trade practices

C. Prohibition of Unfair Trade Practices

D. Regulation of Combinations

117. A situation in which the number of competing firms is relatively small is known as

A. Monopoly

B. Perfect competition

C. Monopsony

D. Oligopoly

118. _____ is an economic system based on the principal of free enterprise.

A. Capitalism

B. Socialism

C. Mixed Economy

D. Marxism

119. In the recent ordinance of SEBI Law the president of India has empowered the SEBI chairman to order searches and seizures on which subject?

A. Inside Trading

B. Foreign Direct Investments

C. Illegal Trade

D. Ponzi Schemes

120. The QIP in an economy stands for?

A. Quarterly Investment Programme

B. Qualified Investment Project

C. Quality Improvement Programme

D. Qualified Institutional Placement

OJEE 2017 (Lateral Entry B.Sc)

1. The time dependence of a physical quantity P is given by $P = P_0 e^{-\alpha t^2}$, where α is a constant and t is time. Then constant α is

(a) dimensionless   (b) dimension of t^{-2} (c) dimension of P (d) dimension of t^2

2. Two cars A and B are travelling in the same direction with velocities v_A and v_B $(v_A > v_B)$. When the car A is at a distance s behind car B, the driver of the car A applies the brakes producing a uniform retardation a, there will be no collision when

(a) $s < \dfrac{(v_A - v_B)^2}{2a}$ (b) $s = \dfrac{(v_A - v_B)^2}{2a}$ (c) $s \geq \dfrac{(v_A - v_B)^2}{2a}$ (d) $s \leq \dfrac{(v_A - v_B)^2}{2a}$

3. A solid sphere of mass M and radius R has a spherical cavity of radius $R/2$ such that the centre of cavity is at a distance $R/2$ from the centre of the sphere. A point mass m is placed inside the cavity at a distance $R/4$ from the centre of the sphere. The gravitational pull between the sphere and point mass m is

(a) $\dfrac{11GMm}{R^2}$ (b) $\dfrac{14GMm}{R^2}$ (c) $\dfrac{GMm}{2R^2}$ (d) $\dfrac{GMm}{R^2}$

4. The kinetic energy K of a particle moving along a circle of radius R depends on the distance covered s as $K = as^2$, where a is a constant. The force acting on the particle is

(a) $2a\dfrac{s^2}{R}$ (b) $2as\left(1 + \dfrac{s^2}{R^2}\right)^{1/2}$ (c) $2as$ (d) $2a\dfrac{R^2}{s}$

5. Steam is passed into 22 g of water at 20^0C. The mass of water that will be present when the water acquires a temperature of 90^0C (latent heat of steam is 540 cal/g) is

(a) 24.8 g (b) 24 g (c) 36.6 g (d) 30 g

6. Hot food cools from 94^0C to 86^0C in 2 min when the room temperature is 20^0C. How long would the food take to cool from 71^0C to 69^0C?

(a) 12 s   (b) 25 s   (c) 16 s   (d) 42s

7. A wire of length L and radius r fixed at one end and a force F applied to the other end produces an extension l. The extension produced in another wire of the same material of length $2L$ and radius $2r$ by a force $2F$, is

(a) l (b) $2l$ (c) $4l$ (d) $\frac{l}{2}$

8. The length of a sonometer wire AB is 110 cm. Where should the two bridges be placed from A to divide the wire in three segments whose fundamental frequencies are in the ratios of $1 : 2 : 3$.

(a) 30 cm, 90 cm (b) 60 cm, 90 cm (c) 40 cm, 70 cm (d) None of these

9. Four charges equal to $-Q$ are placed at the four corners of a square and a charge q is at its centre. If the system is in equilibrium, the value of q is

(a) $-\frac{Q}{4}\left(1 + 2\sqrt{2}\right)$ (b) $\frac{Q}{2}\left(1 + 2\sqrt{2}\right)$ (c) $-\frac{Q}{2}\left(1 + 2\sqrt{2}\right)$ (d) $\frac{Q}{4}\left(1 + 2\sqrt{2}\right)$

10. Two long and parallel straight wires A and B carrying currents of 8.0 A and 5.0 A in the same direction are separated by a distance of 4.0 cm. Estimate the force on a 10 cm section of wire A? (Assume that $\mu_o = 4\pi \times 10^{-7}$ H)

(a) 1.5×10^{-5} N   (b) 2×10^{-5} N   (c) 4×10^{-5} N   (d) 3.2×10^{-5} N

11. The armature of a DC motor has resistance of 20 Ω. It draws a current of 1.5 A when run by 220 V of DC. The value of peak *emf* induced in it will be

(a) 150 V   (b) 170 V   (c) 190 V   (d) 180 V

12. A parallel plate capacitor is charged and then disconnected from the charging battery. If the plates are now moved farther apart by pulling at them by means of insulating handles, then

(a) the energy stored in the capacitor decreases

(b) the capacitance of the capacitor increases

(c) the charge on the capacitor decreases

(d) the voltage across the capacitor increases

13. For maintaining sustained chain reaction, which of the following is required

(a) Protons   (b) Electrons   (c) Neutrons   (d) Positrons

14. A **Si** and a **Ge** diode has identical physical dimensions. The band gap of **Si** is larger than that of **Ge**. An identical reverse bias is applied across the diodes.

(a) The reverse current in **Ge** is larger than that in **Si.**

(b) The reverse current in **Si** is larger than that in **Ge.**

(c) The reverse current is identical in the two diodes

(d) The relative magnitude of the reverse current cannot be determined from the given data only

15. In Young's double slit experiment, the two slits act as coherent sources of equal amplitude A and wavelength λ. In another experiment with the same set up, the two slits are sources of equal amplitude A and wavelength λ but are incoherent. The ratio of the intensity of light at the mid-point of the screen in the first case to that of second case is

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

16.   Eka silico and Eka-aluminium are known as:

     a) gallium and germenium   b) germanium and gallium

     c) indium and silicon   d) zinc and arsenic

17.   Which of the following order is wrong with respect to the properties mentioned?

     a) $Al^{3+} < Li^+ < Mg^{2+} < Na^+$ (ionic radius)

     b) $I < Br < F < Cl$ (electron affinity)

     c) $Al_2O_3 < MgO < Na_2O < K_2O$ (basic nature)

     d) $Li < Na < K < Rb < Cs$ (increasing order of density)

18.   In which of the following the central atom has least number of lone pair of electron(s)?

     a) XeF_4 b) ClO_3^-

     c) IO_2^- d) I_3^-

19.　　　　The ion which is not tetrahedral in shape is:

a) NH_4^+

b) ClO_4^-

c) $NiCl_4^{2-}$

d) $PtCl_4^{2-}$

20.　Which compound has maximum O—N—O bond angle?

a) NO_2

b) NO_2^+

c) NO_3^-

d) NO_2^-

21.　Ka_1, Ka_2 and Ka_3 are the respective ionization constant for the following reactions

$$H_2S \rightleftharpoons HS^- + H^+$$

$$HS^- \rightleftharpoons S^{2-} + H^+$$

$$H_2S \rightleftharpoons S^{2-} + 2H^+$$

The correct relationship between Ka_1, Ka_2 and Ka_3 is

a)　$Ka_1 \times Ka_2 = Ka_3$

b)　$Ka_1 + Ka_2 = Ka_3$

c)　$Ka_1 / Ka_2 = Ka_3$

d)　$Ka_2 / Ka_1 = Ka_3$

22.　Which of the following alcohol will react fastest with conc. HCl ?

a) $CH_2=CH-CH_2OH$

b) $(CH_3)_3C-OH$

c) —CH(OH)CH$_3$

d) —CH$_2$CH$_2$CH

23.　The enantiomer of the following molecule (P) on reaction with NaOAc followed by hydrolysis with NaOH gives the compound

(P)

a)

b)

c)

d)

24. The conversion of acetophenone to acetanilide is best accomplished by using which reaction as one of the key step.

    a) Hofmann rearrangement   b) Curtius rearrangement

    c) Beckman rearrangement   d) Lossen rearrangement

25. Green chemistry means such reactions which

    a) are related to depletion of ozone layer

    b) study the reaction in green plants

    c) produces colour during reaction

    d) reduce the use and production of hazardous chemicals

26. An unknown organic compound (X) $C_8H_{10}O_3$ on acetylation with CH_3COCl/Py forms acetyl derivative of X whose M.W. is 280. X on treatment with CH_2N_2 gives a compound Y having M. W. 182. The number of phenolic hydroxyls and alcoholic hydroxyls in the compound X will respectively be:

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

27. Acetaldehyde can directly be converted into ethyl acetate by which one of the following reactions

    a) Cannizzaro reaction   b) Tischenko reaction

    c) Baeyer Villiger oxidation reaction   d) Claisen ester condensaation reaction

28. The number of radial nodes in 3s and 2p orbital respectively are

    a) 2 and 0   b) 1 and 2   c) 0 and 2   d) 2 and 1

29. 0.004 M solution of Na_2SO_4 is isotonic with 0.01 M solution of glucose at same temperature. Degree of dissociation of Na_2SO_4 is

    a) 85%   b) 25%   c) 50%   d) 75%

30. A 50 mL solution of pH = 1 is mixed with equal volume of solution of pH = 2. The pH of the resultant solution will be nearly

    a) 0.76   b) 2.26   c) 1.26   d) 1.76

31. If α , β are roots of the equation $x^2 + x + 1 = 0$ then the equation whose roots are α^{100} , β^{100} will be
   a) $x^2 + x + 1 = 0$
   b) $x^2 - x + 1 = 0$
   c) $x^2 + x - 1 = 0$
   d) $x^2 - x - 1 = 0$

32. If $\lfloor x \rfloor$ represents the greatest integer less than or equal to x, then the function $f(x) = \lfloor x + 1 \rfloor - \lfloor x - 1 \rfloor$ is
   a) not continuous in the interval (-1,1).
   b) continuous but not differentiable in the interval (-1,1).
   c) differentiable in the interval (-1,1).
   d) strictly increasing in the interval (-1,1).

33. If the pair of equation $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ have a common root then
   a) $a^2 = b^2$
   b) $(a - b)(a + b + 1) = 0$
   c) $(a - b)(a + b - 1) = 0$
   d) $(a + b)(a + b + 1) = 0$

34. If $\cos 8x \cos 4x \cos 2x \cos x = -\dfrac{1}{16}$, then the value of x will be
   a) $\dfrac{\pi}{16}$
   b) $-\dfrac{\pi}{15}$
   c) $-\dfrac{\pi}{16}$
   d) $\dfrac{\pi}{15}$

35. In the sitting arrangement for ten girls and ten boys around a round table with twenty identical chairs, the number of arrangements that no two girls will sit together is
   a) $3 \times (10)!$
   b) $2 \times (10)!$
   c) $(10)!$
   c) $5 \times (10)!$

36. If a, b, c are three real numbers satisfying the pair of conditions $a + b + c = 0$ and $(a - b)^2 + (b - c)^2 + (c - a)^2 > 0$ then the system of equations $\begin{aligned} ax + by + cz &= 0 \\ bx + cy + az &= 0 \\ cx + by + az &= 0 \end{aligned}$ will represent
   a) the straight line $x = y = z$.
   b) the straight line $x + 1 = y - 1 = z$.
   c) the straight line $x = -y = z$.
   d) the straight line $x - 1 = y = z + 1$.

37. The value of $\lim_{a \to 0}(1 + 2a)^{1/2a}$ will be

a) $-e$

b) $1/e$

c) e

d) 1

38. The value of the integral $\int_0^{\pi/4} \log|\tan 2x|\, dx$ will be

a) 0

b) 1

c) $-\frac{\pi}{2}\log 2$

d) $\pi \log 2$

39. If angle between the unit vectors $\vec{a}$, $\vec{b}$ is $\pi/4$ then the value of $\begin{vmatrix} \vec{a}.\vec{a} & \vec{a}.\vec{b} \\ \vec{a}.\vec{b} & \vec{b}.\vec{b} \end{vmatrix}$ is

a) 0

b) 1

c) $1/2$

d) $1/\sqrt{2}$

40. If $\vec{a}$, $\vec{b}$, $\vec{c}$ are position vectors of the points A, B, C and O is the origin, then the vector $\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}$ is

a) a vector parallel to the plane of the triangle ABC

b) a vector perpendicular to the plane of the triangle ABC

c) a vector perpendicular to the plane of the triangle OBC

d) a vector perpendicular to the plane of the triangle OAB

41. The line $\vec{r} = (\hat{i} + \hat{j} + \hat{k}) + \lambda(\hat{i} - \hat{j} + \hat{k})$ lies in the plane

a) $\vec{r} \cdot (\hat{i} + 2\hat{j} + \hat{k}) = 4$.

b) $\vec{r} \cdot (\hat{i} - 2\hat{j} + \hat{k}) = 4$

c) $\vec{r} \cdot (\hat{i} + 2\hat{j} - \hat{k}) = 4$

d) $\vec{r} \cdot (\hat{i} + 2\hat{j} + \hat{k}) = -4$

42. Let S_n be the sum of first n terms of the A.P. having first term a and common difference d. Then S_n be the nth term of

a) an A.P. with first term a and common difference d.

b) an A.P. with first term a be and common difference $a + d$.

c) an G.P. with first term a and common ratio d.

d) none of the above.

43. The line of interaction of the pair of planes, $\vec{r} \cdot (\hat{i} + 2\hat{j} + 3\hat{k}) = 0$ and $\vec{r} \cdot (3\hat{i} + 2\hat{j} + \hat{k}) = 0$ is equally inclined to the axes
    a) $\hat{i}, \hat{j}$
    b) $\hat{j}, \hat{k}$
    c) $\hat{i}, \hat{k}$
    d) $\hat{i}, \hat{j}, \hat{k}$

44. The equation of a sphere that have points $\vec{g}, \hat{u}$ as the extreme points of one diameter is
    a) $\left(\vec{r} - \blacksquare\right) \cdot \left(\vec{r} - \frac{\hat{u}}{2}\right) = 0$
    b) $(\vec{r} - \varrho) \cdot (\vec{r} - \vec{h}) = 0$
    c) $(\vec{r} - 3\vec{g}) \cdot (\vec{r} - 3\hat{u}) = 0$
    d) $(\vec{r} - 2\vec{g}) \cdot (\vec{r} - 2\hat{u}) = 0$

45. If $y = \frac{1}{1+\sin x}$ and $z = \frac{x}{(\sec x + \tan x)}$ then the value of x at which $\frac{dz}{dy} = 0$
    a) $-\frac{\pi}{4}$
    b) $\frac{\pi}{6}$
    c) $-\frac{\pi}{2}$
    d) $\frac{\pi}{3}$

46. *Which of the following statement is not true in general?*
    a) *(A∨B) ∨~A is a tautology, for any B.*
    b) *A implies B if and only if B implies A.*
    c) *A is a tautology if and only if ~A is a contradiction.*
    d) *(A∨B)∧~A is not a contradiction, for any B always.*

47. *All points (x,y) satisfying the differential equation* $\frac{d^2y}{dx^2} = 0$ *belong to*
    a) *The perimeter of a closed curve centered at origin.*
    b) *The area bounded by a circle centered at origin.*
    c) *Any one of the infinite number of straight line in XY plane.*
    d) *The area bounded by a circle not centered at origin.*

48. *The differential equation formed by the primitive* $lx + my = n$ *is*
    a) $\frac{dy}{dx} = -l/m$
    b) $\frac{d^2y}{dx^2} = k/n,$ *where k is any constant*
    c) $\frac{dy}{dx} = -m/n$
    d) $\frac{d^2y}{dx^2} = 0$

49. *The differential equation* $3\frac{d^2y}{dx^2} + 5x(\frac{dy}{dx})^4 + 4y = 5x\text{-}4$ *has degree and order*
    a) *1,2.*

b) *1,3.*

c) *2,2.*

d) *3,2.*

50. *Conditional probability P(A|B) is undefined only when*

a) *A is a certain event*

b) *P(B)=0*

c) *P(A)=0*

d) *B is a certain event.*

51. *The binary representation of the decimal number 39 is*

a) *101111*

b) *100111*

c) *101011*

d) *111011*

52. *The plane containing the origin and passing through the line of intersection of the planes* $2x + 2y - 4z = 2$ *and* $3x + 9y - 3z = 12$ *is*

a) *3x+y=7z*

b) *x+3y=4z*

c) *2x+3y=5z*

d) *3x+2y+7z=0*

53. *The general solution of the differential equation* $y = 5xp + 3e^p$, *where* $p = \frac{dy}{dx}$ *is*

a) $y = 5x + 3e^c$

b) $y = 5c + 3e^c$

c) $y = 5xc + 3xe^c$

d) $y = 5xc + 3e^c$

where c is a constant.

54. The parabolas $y = 2(x + 1)^2$ and $y = -2(x - 1)^2$ has

a) x axis as one common tangent.

b) Two common tangents $y = 0$ and $x + y = 0$

c) Two common tangents $3x = 0$ and $2y = 3x$

d) No common tangent

55. *The equation* $5x^2 - 5y^2 + 3x + 3y = 4$ *represents*

a) *A parabola*

b) *A pair of straight lines*

c) *A hyperbola*

d) *An ellipse*

56. *Mean and Standard deviation of a sample of 15 positive numbers are 15 and 3 respectively. The sum of squares of the numbers is*
   a) *(225+10)6*
   b) *(225+11)9*
   c) *(225+9)15*
   d) *(225+9)11*

57. *The value of the integral $\int_{-3}^{-3} 3x\,dx$ is*
   a) *3*
   b) *-3*
   c) *1*
   d) *0*

58. State which of the following is not true:
   a) *Addition of two real numbers is always commutative.*
   b) *Multiplication of two integers is commutative.*
   c) *Perpendicularity in the set of straight lines is not an equivalence relation.*
   d) *Parallelism in the set of straight lines is not an equivalence relation.*

59. The sphere $5x^2 + 5y^2 + 5z^2 + 10x + 10y - 10z = 40$ *has center*
   a) $(1,1,1)$
   b) $(-1,-1,1)$
   c) $(1,1,-1)$
   d) $(1,-1,1)$

60. For a natural number $n(> 2)$, the number $n(n+1)(n-1)$ is not always divisible by
   a) *6*
   b) 2
   c) 7
   d) 3

OJEE 2017 (M. TECH)

(1) Concept of city of tomorrow was given by:
  a. Ebenezer Howard
  b. K. A. Doxiadis
  c. Le Corbosier
  d. Frank LloydWright.

(2) Physical planning of an urban environment means:
  a. Men's interrelationship and behavior
  b Built environment
  c   Natural environment
  b. Ideological environment

(3) largest city in India is:
  a. Chennai
  b. Delhi
  c. Mumbai
  d. Kolkata

(4) Covered area means:
  a. The Ground area covered immediately above the plinth level by chajjas and   canopies.
  b. The Ground area covered immediately above the plinth level covered by the building including drainage culvert.
  c. The Ground area covered immediately above the plinth level covered by the building
  d. None of the above.

(5) Sustainable development:
  a. Meets the needs of the present generations, without compromising the ability of future generations to meet their own needs.
  b. Meets the needs of the future generations.
  c. Meets the needs of manufacturing development without compromising eco-system.
  d. Meets the needs of future city development goals.

(6) Neighborhood concept was introduced by:
  a. Robert Adam
  b. James Wyatt
  c. Alvar Aalto
  d. Clarence Perry

(7) Village Housing Scheme was introduced for the first time in India in the year:
   a. 1940
   b. 1950
   c. 1957
   d. 1960

(8) The botanical name of Neem tree is:
   a. Araucaria columnaris
   b. Azadirachta indica
   c. Autocarpus hetrophyllus
   d. Antirrhinum majus

(9) Landscaping:
   a. Does not take care of weather Including flora and fauna.
   b. Refers to building activity only excluding natural elements such as landforms.
   c. Does not deals with art and craft of growing plants.
   d. Refers to any activity that modifies the visible features of an area of land.

(10) CAD was first invented in the year:
   a. 1940
   b. 1947
   c. 1952
   d. 1961

(11) The objective of the Green Building is:
   a. Related to social interaction in building design.
   b. To reduce the overall impact of the built environment on human health and the natural environment
   c. To increase the overall impact of the built environment on human health and the natural environment.
   b. To increase the overall impact of the built environment on human total planning.

(12) Advantage of Passive Building System:
   a. One time cost.
   b. Increases first cost.
   c. Recurring cost
   d. Cannot be easily Upgraded

(13) Relative Humidity (RH) is::
   a.   (Actual Vapor Density + Saturation Vapor Density) X 100%
   b. (Actual Vapor Density / Saturation Vapor Density) X 100%
   c. (Saturation Vapor Density / Actual Vapor Density) X 100%
   d. (Saturation Vapor Density X Actual Vapor Density) X 100%

(14) Sound:
   a. Wave with frequencies above 20 kHz and below 40 kHz is suitable for human ear.
   b. Is produced by vibration of materials that travel through air. water or solid matter.
   c.   Wave can travel through vacuum.
   d. Frequency from aircraft should be below 30 Hz.

(15) Barrier-free Design is helpful:
   a. For eco-system.
   b. For short height persons.
   c. For landscaping.
   d. For those with mobility problem

(16) The cave architecture in India is believed to have begun in:
   a.   In the first century BC.
   b. In the third century BC.
   c. In the seventh century BC.
   d. In the ninth century BC.

(17) In orissan temple Pista is:
   a. The base of temple.
   b. Where main deity is kept.
   c. A pyramidal-shaped roof.
   d. For bathing/washing purpose.

(18)   Excavation done for Indus Valley Civilization in:
   a. India
   b. Bangladesh
   c. Nepal
   d. Pakistan

(19) Fatepur Sikri was founded in the year:
   a. 1480
   b. 1501
   c. 1569
   d. 1601

(20) The material used in ancient Egyptian house was:
   a. Palm leave
   b. Mud brick
   c. Bamboo
   d. Timber

(21) Vernacular architecture is also called:
   a. Boroque architecture
   b. Traditional architecture
   c. Cuboid architecturte
   d. Floral architecture

(22) Industrial revolution took place in:
   a. End of 16th century
   b. 1st half of 17th century.
   c. 2nd half of 17th century.
   d. 18th to 19th century.

(23) Art Nouveau is what style?
   a. Utilitarian
   b. Plain
   c. Ornamental
   d. Functional

(24) Deconstructivism is a movement of postmodern architecture which appeared in:
   a. 1800
   b. 1880
   c. 1980
   d. 2001

(25) The famous building **Casa Mila was** designed by architect:

a. Antoni Gaudi
b. Alvar Aalto
c. Edwin Lutyens
d. Richard Neutra

(26) State the water requirements for Hostels per head per day in liters:
a. 45
b. 70
c. 135
d. 250

(27) Anti-siphonage pipe is a pipe which is installed in the house drain:
a. To preserve the water seal of trap.
b. To break the water seal of trap.
c. To damage the water seal of trap.
d. None of the above.

(28) Desirable limit of Arsenic in drinking water as per Bureau of Indian standard is:
a. 0.01 mg/l
b. 0.05 mg/l
c. 0.10 mg/l
d. 0.25 mg/l

(29) For a population over 10,00,000 in Indian towns per capita demand of water is approximately:
a. 110 liters/day/capita
b. 150 liters/day/capita
c. 190 liters/day/capita
d. 250 liters/day/capita

(30) A service connection is primarily a connection:
a. From the consumer pipe to service pipe.
b. From consumer pipe to the main.
c. From the distribution system to consumer.
d. From the distribution system to the main.

(31) In water carriage system in sanitation:

a. The system is very cheap in initial cost.
b. Storm water is carried usually through surface drain.
c. It causes nuisance of smell.
d. This system is very hygienic.

(32) Intercepting trap is generally provided:
a. Before yard gully.
b. At the junction of house drain and public sewer.
c. At the junction of gully trap and public sewer.
d. At the junction of underground storage tank and water main.

(33) Bar charts were introduced by:
a. Truman H. Aldrich
b. Braden Allenby
c. Sir Ove Arup
d. Henry Gantt

(34) Specification:
a. Is not a part of tender document.
b. Contains brief description of all workmanship and materials.
c. Is a part of tender document.
d. None of the above

(35) To avoid possibility of lumping under pressure, the height of cement stack shall not be more than:
a. 5 bags
b. 7 bags
b. 10 bags
c. 15 bags

(36) Maximum distance of carriage by manual labor route:
a. Shall be up to 10 meters.
b. Shall be up to 20 meters.
c. Shall be up to 50 meters.
d. Shall be up to 80 meters.

(37) Cement bags should be stacked:

a. Directly on the floor.
b. Directly on the floor with water proofing during monsoon.
c. At least 150 mm-200 mm above the floor.
d. Directly on the floor with shade above.

(38) Coarse aggregates are particles:
a. Less than 1.75 mm
b. Less than 2.05 mm
c. Greater than 3.00 mm and less than 4.75 mm
d. Greater than 4.75mm

(39) The quality of first class brick should:
a. Be reddish-yellow in color.
b. Absorb water more than one-sixth of their weight, when immersed in water for one hour.
c. Do not absorb water more than one-sixth of their weight, when immersed in water for one hour.
d. Do not absorb water more than one-fourth of their weight, when immersed in water for one hour.

(40) Scaffolding or the temporary structures are needed for constructing a building, when the height of wall, column or other structure exceeds about:
a. 0.5 m
b. 1.5 m
c. 0.8 m
d. 3.0 m

(41) The gap between the two walls in cavity wall should be:
a. Between 2.5 mm to 5.0 mm.
b. Between 5.0 mm to 10.0 mm
c. Not less than 12.5 mm and not more than 25.0 mm.
d. Not less than 50.0 mm and not more than 75.0 mm.

(42) In an arch Skew back is:

a. The inner curve surface of an arch.
b. The inclined or splayed surface on abutment to receive the arch.
c. The wedge-shaped unit of masonry, forming an arch.
d. The wedge-shaped unit fixed at the crown of an arch.

(43) Hip roof is formed by:
   a. Four sloping surface.
   b. Three sloping surface.
   c. Two sloping surface.
   d. One sloping surface.

(44) Shoring is required:
   a. To strengthen the existing foundation.
   b. When a wall develops cracks and needs repair.
   c. To deepen the existing foundation.
   d. To construct a building in the existing building.

(45) Defect caused due to the formation of bubbles under the film of paint is called:
   a. Blistering
   b. Fading
   c. Flashing
   d. Sponification

(46) Acceptable noise level range in dB(A) of restaurants is:
   a. 20-30
   b. 30-35
   c. 40-45
   d. 50-55

(47) Average TL (Transmission loss) in dB for half brick wall with plaster on both side of approx. weight 268-270 kg/m-square is:
   a. 53

b. 50

c. 45

d. 36

(48) Opening for ventilation should be:
   a. 5% to 10 % of floor area.
   b. 20% to 30 % of floor area.
   c. 4% to 8% of floor area.
   d. 35% to 40 % of floor area.

(49) Minimum rate of fresh air in hospital's operation theatre is:
   a. 10 air changes per hour.
   b. 2 air changes per hour.
   c. 5 air changes per hour.
   d. 25 air changes per hour.

(50) External staircase, used as fire escape shall have maximum inclination of:
   a. 60º
   b. 50º
   c. 45º
   d. 10º

(51) What is the minimum aggregate covered area of departmental store or shops, where the automatic sprinklers system should be installed?
   a. 300 m²
   b. 400 m²
   c. 500 m²
   d. 700 m²

Choose one correct answer from a, b, c and d

(52) What is the unit of measurement in expansion joints in concrete?
   a. Running meter
   b. Cubic meter

c. Square meter

d. Kg

(53) Free holder of property:

    a. Requires to pay periodic payment for property.

    b. Absolute owner of the property.

    c. Occupational right for specific duration.

    d. Neither he can sell the property nor sub-let the same.

(54) The innermost central portion or core of the tree is called:

    a. Heart wood

    b. Cambium layer

    c. Sap wood

    d. Pith

(55) For red color glass we use coloring pigment as:

    a. Ferrosoferric oxide , Chromium sesquioxide

    b. Manganese dioxide

    c. Caprous oxide, Metallic gold

    d. Tin oxide, Calcium phosphorite

(56) What process should you go for, to make the steel soft?

    a. Tempering

    b. Normalizing

    c. Nitriding

    d. Annealing

Choose one correct answer from a, b, c and d

(57) The Wills Tower also referred as Sears Tower, one of the tallest building in the world is located in:

    a. Chicago

b. Paris

c. Berlin

d. Scotland

(58) The second five year plan of India stressed on:

    a. Primary sector

    b. Green revolution

    c. Employment

    d. Public sector

(59) The hall of nations at Pragati Maidan Exhibition Centre in Delhi was designed by:

    a. Raj Rewal

    b. B. V. Doshi

    c. Laurie Baker

    d. Louis Khan

(60) The Heliotrope in Freiburg is an environmentally friendly house is a good example of solar house and first building in the world to capture more energy designed by:

    a. Cristopher Alexander

    b. Peter Behrens

    c. Alvar Aalto

    d. Rolf Disch

OJEE 2017 (Lateral Entry to B Tech)

Engineering Mathematics

Q.no	Question
1	If a is a complex number and b is a real number then the equation $\bar{a}z + a\bar{z} + b = 0$ represents a A) Straight line B) Parabola C) Circle D) Hyperbola
2	If $1, \omega, \omega^2$ are the cube roots of unity, then $\Delta = \begin{vmatrix} 1 & \omega^n & \omega^{2n} \\ \omega^n & \omega^{2n} & 1 \\ \omega^{2n} & 1 & \omega^n \end{vmatrix} =$ A)1 B) ω C) ω^2 D) 0
3	The product of the 4 values of $\left(\dfrac{1}{2} + i \dfrac{\sqrt{3}}{2} \right)^{3/4}$ is 1) -1 B) 1 C) i D) -i
4	The locus of z satisfying the inequality $\log_{1/3}\left|z+1\right| > \log_{1/3}\left|z-1\right|$ is A) Re (z)>0 B)Re (z) <0 C)Im (z)>0 D)Im (z) <0
5	The number of ways of arranging 3 copies each of 4 different books in a shelf is A) $\dfrac{12!}{(4!)^4}$ B) $\dfrac{12!}{(4!)^3}$ C) $\dfrac{12!}{(3!)^3}$ D) $\dfrac{12!}{(3!)^4}$

6	15 students are to be distributed to write their examination in a room which can accommodate 5 and the rest are accommodated in another room . The number of ways that the students are distributed is A) 3000 B)3003 C)3006 D)3009
7	The coefficient of x^4 in the expansion $(1+2x+3x^2+4x^3+....)^{\frac{1}{2}}$ is A)0 B)1 C)-1 D)2
8	$$c_0c_1 + c_1c_2 + c_2c_3 + ... + c_{n-1}c_n =$$ A) $\dfrac{(2n)!}{(n-1)!(n+1)!}$ B) $\dfrac{(2n)!}{(n-3)!(n+1)!}$ C) $\dfrac{(2n)!}{(n-2)!(n+2)!}$ D) $\dfrac{(2n)!}{(n-1)!(n+2)!}$
9	If A is an invertible matrix of order n, then the determinant of Adj (A) is equal to A) $\left|A\right|^n$ B) $\left|A\right|^{n+1}$ C) $\left|A\right|^{n-1}$ D) $\left|A\right|^{n+2}$
10	$$\begin{vmatrix} y+z & x & x \\ y & z+x & y \\ z & z & x+y \end{vmatrix} =$$ A) xyz B)2xyz C)3xyz D)4xyz

11	The equation along with the equations 12x-3y+7z=16 and 2x+3y+4z=9 form a system of equations having unique solution is 1) 14x+11z=1 (B) 21y+17z = 2 C) x +y +z=2 D) 34x-33y-4
12	$Sinx + 2Sin2x = 3 + Sin3x, 0 \le x \le 2\pi$ has (A) 2 solutions in I quadrant B) One solution in II quadrant (C) No solution in any quadrant D) one solution in each quadrant
13	$Sin^{-1}\left(\dfrac{24}{25}\right) + Tan^{-1}\left(\dfrac{5}{12}\right) =$ A) $Tan^{-1}\left(\dfrac{27}{11}\right)$ B) $Tan^{-1}\left(\dfrac{16}{63}\right)$ C) $Sin^{-1}\left(\dfrac{16}{65}\right)$ D) $Cos^{-1}\left(-\dfrac{36}{325}\right)$
14	Minimum value of $Sin^2\theta + Co\sec^2\theta$ is A)2 B)1 C)1/2 D)4
15	If A and B are acute angles, sinA= $\dfrac{1}{5\sqrt{2}}$ and TanB=1/3, then A+2B= A) $\dfrac{\pi}{2}$ B) $\dfrac{\pi}{3}$ C) $\dfrac{\pi}{4}$ D) $\dfrac{\pi}{6}$
16	Two vertices of a an equilateral triangle are ay (1,0) , (-1,0) and the third vertex is above x-axis. The equation of the Circumcircle is A) $3x^2 + 3y^2 - 2\sqrt{3}y = 3$ B) $x^2 + y^2 - 2y = 1$ C) $2x^2 + 2y - 3\sqrt{2}x = 2$ D) $x^2 + y^2 - 2x = 1$

17	The equation of the line which is concurrent with the lines $4x+3y-7=0$, $8x+5y-1=0$ and having slope -1.5 is A) $3x+2y-63=0$ B) $2x-3y-2=0$ C) $8x-5y-12=0$ D) $3x+2y-2=0$
18	The area (in square units) of the Quadrilateral formed by the points (1,2),(2,-3), (-2,4)and (0,5) is A)13.5 B)15.2 C)18 D)20
19	The points A, B, C, D with position vectors 7**i**-4**j**+7**k**, **i**-6**j**+10**k**, -**i**-3**j**+4**k**, 5**i**-**j**+**k** respectively, forms a A)Square B) Rhombus C)Parallelogram but not a rhombus D) Rectangle
20	The length of orthogonal projection of a vector **i**-2**j**+**k** on vector 4**i**-4**j**+7**k** is A) 19/6 B) 19/8 C) 19(4**i**-4**j**+7**k**)/9 D) 19/9
21	$A(\bar{a}), B(\bar{b}), C(\bar{c})$ are position vectors of the vertices of a triangle ABC. The length of the perpendicular drawn from C to AB is A) $\dfrac{\left[\bar{a}\times\bar{b}+\bar{b}\times\bar{c}+\bar{c}\times\bar{a}\right]}{\left|\bar{a}-\bar{b}\right|}$ B) $\dfrac{\left[\bar{a}\times\bar{b}+\bar{b}\times\bar{c}+\bar{c}\times\bar{a}\right]}{\left|\bar{b}-\bar{c}\right|}$ C) $\dfrac{\left[\bar{a}\times\bar{b}+\bar{b}\times\bar{c}+\bar{c}\times\bar{a}\right]}{\left|\bar{a}-\bar{c}\right|}$ D) $\left[\bar{a}\times\bar{b}+\bar{b}\times\bar{c}+\bar{c}\times\bar{a}\right]$
22	If $y=Cos^{-1}\left[\dfrac{1-(\log x)^2}{1+(\log x)^2}\right]$,then $f'(e)$ A) Does not exist B)is equal 2/e C)is equal to 1/e D)is equal to 1

23	If $y = Log\left(x + \sqrt{x^2 + 1}\right)$ then $y_2(1) =$ A)0 B)1 C)$\dfrac{-1}{2\sqrt{2}}$ D)$-2\sqrt{2}$
24	Let $f(x) = \begin{cases} |x|\cos\dfrac{1}{x} + 15x^2, & x \neq 0 \\ k, & x = 0 \end{cases}$. If f(x) is continuous at x=o ,then k= A)15 B)-15 C)0 D)6
25	At x=a ,if a function f(x) has a maximum value M($\neq 0$)then $\dfrac{-1}{M}$ is A) Maximum for $\dfrac{-1}{f(x)}$ B) Minimum for $\dfrac{-1}{f(x)}$ C) Maximum for $f(1/x)$ C) Minimum for $f(-1/x)$
26	If $u = y^x + x^y$,then at $x = e \, \& \, y = e$ $\dfrac{\partial u}{\partial x} + \dfrac{\partial u}{\partial y} =$ 1) e B)2e C)$4e^e$ D) 1
27	If $u = \sin^{-1}\left(\dfrac{x^3 + y^3}{x^5 + y^5}\right)$, then $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} =$ 1) -2 B) -2Tanu C)-2Sinu D)-2Cosu
28	The area bounded by the curves $y = |x| - 1$ and $y = -|x| + 1$ is A)1 B)2 C)$2\sqrt{2}$ D)4

29	$\int \dfrac{3\cos x - 2\sin x}{4\sin x + 5\cos x}dx =$ A) $\dfrac{22}{41}Log|4\sin x + 5\cos x| - \dfrac{7}{41}x + c$ B) $\dfrac{22}{41}Log|4\sin x + 5\cos x| + \dfrac{7}{41}x + c$ C) $\dfrac{22}{41}Log|3\cos x - 2\sin x| + \dfrac{7}{41}x + c$ D) $\dfrac{22}{41}Log|3\cos x - 2\sin x| - \dfrac{7}{41}x + c$
30	$\displaystyle\int_{2}^{3} \dfrac{\sqrt{x}}{\sqrt{x} + \sqrt{5-x}}dx =$ A) ½ B)3/2 C)5/2 D)0
31	The solution of $\dfrac{dy}{dx} = \dfrac{xy}{x^2 + y^2}$ is A) $x = ce^{2x^2/y^2}$ B) $y = ce^{x^2/2y^2}$ C) $x = ce^{x/2y^2}$ D) $y = ce^{x/2y}$
32	The general solution of an ordinary differential equation represents A) a family of curves B) a curve passing through (0,0) C) arbitrary constant D) particular solution
33	If the lines having Direction ratios(2,-m,3m) and (1+m,-2m,1) include an acute angle for 1) All values of m B)-2<m<-0.5 C)m<-2 and m>-0.5 D)m=2

34	$\bar{a} = 3\bar{i} + 3\bar{j} + 3\bar{k}$ and $\bar{R} = x\bar{i} + y\bar{j} + z\bar{k}$ .The equation of the sphere having (1,3,5) and (5,3,1) as ends of the diameter is 1) $\left\|\bar{R} - \bar{a}\right\| = 4$ (B)$\left\|\bar{R} - \bar{a}\right\| = 4\sqrt{2}$ C)$\left\|\bar{R} - \bar{a}\right\| = \sqrt{2}$ D)$\left\|\bar{R} - \bar{a}\right\| = 0$
35	If the three planes represented by $a_i x + b_i y + c_i z = d_i, i = 1,2,3$ form a prism , then the number of solutions of these system of equations is (A) Infinite B) only one C) more than one but finiteD) zero
36	If 5 arithmetic means(A.M's) are inserted in between two numbers a and b, then sum of the 5 A.M's is (A) $\frac{5}{2}(a+b)$ (B) $\frac{7}{2}(a+b)$ (C) $(a+b)$ (D)$\frac{5}{2}(a-b)$
37	The algebraic sum of the deviations of a data from it's mean is (1) 0 (B) mean (C) 1 (D) Mean deviation
38	The mean of the absolute deviations of the items of the data from Mean is A)Standard deviation (B) Median C) Mean deviation D) quartile deviation
39	The probability for an unsuccessful attempts that can be made by a thief to open a number lock having 3rings in which each rings contain 6 numbers is A) 17/18 B) 728/729 C) 95/96 D) 215/216
40	A die is rolled 3 times, The probability of getting a larger number than the number obtained in previous roll each time is A)15/216 B)5/54 C)13/216 D)1/18

Basic Electrical Engineering

41. Carbon, as a material, is used in making
    (A) pole-shoes in a DC machine to facilitate the flow of current from or to the magnetic poles
    (B) commutator segments in a DC machine to facilitate the flow of current from or to the rotating armature winding conductors
    (C) brushes in a DC machine to facilitate the flow of current from or to the rotating armature winding conductors
    (D) armature coils in a DC machine to facilitate the flow of current from or to the rotating armature winding conductors.

42. Mica, as a material, is used between
    (A) the commutator segments of a DC machine to provide insulation
    (B) the brush and the commutator segment of a DC machine to provide mechanical lubrication to reduce friction
    (C) two armature conductors to increase conductivity
    (D) field and armature to act as a medium for heat dissipation.

43. A magnetic flux of 0.05 Weber links a coil having 5000 number of turns. The flux changes its sign in a time interval of 0.1 second. The value of induced emf in the coil during this change in flux-linkage is
    (A) 5000 V
    (B) 2500 V
    (C) 4000 V
    (D) 1000 V.

44. Iron losses in a 3 kVA single phase two winding transformer can be determined in the laboratory by performing on it
    (A) the Open Circuit Test by applying rated voltage
    (B) the Short Circuit Test by applying rated voltage
    (C) the Open Circuit Test by applying reduced voltage
    (D) the Short Circuit Test by applying reduced voltage.

45. In a DC series generator, the field winding is made up of conductors of
    (A) thin cross section and large number
    (B) thin cross section and less number
    (C) thick cross section and large number
    (D) thick cross section and less number.

46. The compensating winding in a DC machine is housed
    (A) in slots of armature
    (B) in slots of pole faces
    (C) partly in slots of armature and partly in slots of pole faces
    (D) around the interpoles.

47. In a DC machine, operating in the saturated region of magnetic field, the nature of the effect of armature reaction flux on the main field flux is
   (A) magnetizing only
   (B) cross-magnetizing only
   (C) demagnetizing only
   (D) demagnetizing and cross-magnetizing only.

48. A single phase transformer is used in a circuit along with an ammeter of 5 A rating connected in secondary side. The ammeter in the secondary side reads 2 A while the actual line current in the primary side is 80 A. The ratio of current in the secondary side to the current in the primary side will be
   (A) 1:40
   (B) 1:16
   (C) 16:1
   (D) 40:1.

49. For P_2 being the total power input to the rotor of a three-phase induction motor and 's' being its slip, its total rotor copper loss will be
   (A) sP_2
   (B) $P_2 = (1-s)P_2$
   (C) $(s/(1-s))P_2$
   (D) $P_2 = (1-s)/P_2$.

50. A DC generator driven at 1000 RPM has an open circuit voltage of 240 V. If its speed is increased to 1250 RPM, the open circuit voltage will be
   (A) 200 V
   (B) 240 V
   (C) 260 V
   (D) 300 V.

51. The mmf set up by the interpole in a DC shunt machine is proportional to
   (A) armature current
   (B) load current
   (C) field current
   (D) sum of armature current and field current.

52. The cost of the systems of wiring is maximum in case of
   (A) Cleat wiring
   (B) Lead sheathed wiring
   (C) Conduit wiring
   (D) Wood Casing Capping wiring.

53. Which of the following DC generators will be in a position to set up induced emf even in the absence of residual flux?
   (A) Shunt generator

(B) Compound generator
(C) Series generator
(D) Separately excited generator.

54. The voltage regulation on full-load of an ideal DC generator is
    (A) negative
    (B) high positive
    (C) low positive
    (D) zero.

55. The load on a DC series generator is reduced to zero. Its terminal voltage will
    (A) decrease
    (B) increase
    (C) become close to zero
    (D) remain same.

56. An electric kettle draws 6 A current when connected across a single phase 220 V, 50 Hz AC supply. Assuming the electric kettle to be a purely resistive load, the real and reactive power consumed by it will be (A) 1320 W and 1320 VAR
    (B) 0 W and 1320 VAR
    (C) 1320 W and 0 VAR
    (D) 0 W and 0 VAR respectively.

57. If the mechanical load on the shaft of a DC shunt motor is increased, its speed will
    (A) reduce rapidly
    (B) remain constant
    (C) increase rapidly
    (D) reduce slightly.

58. The unit of measurement of Electrical Energy consumed in domestic loads is
    (A) Kilo-Watt-Hour (kWh)
    (B) Mega-Watt-Hour (MWh)
    (C) milli-Watt-Hour (mWh)
    (D) Watt-second (Ws).

59. The developed torque T_d versus the armature current I_a characteristics of a DC series motor is a
    (A) parabola throughout
    (B) parabola from no-load to certain load and straight line thereafter
    (C) straight line throughout
    (D) straight line from to certain load and parabola thereafter.

60. The DC motor suitable for traction applications is
    (A) shunt motor

(B) cumulative compound motor
(C) series motor
(D) differentially compound motor.

61. A 50-mH inductance carries current of 5 A which reverses in 25 milli-seconds and as a result, a voltage is induced in the inductance. The average value of this induced voltage in the inductor will be
 (A) 10 V
 (B) 20 V
 (C) 40 V
 (D) 30 V.

62. The purpose of providing a starter for a three-phase induction motor is to
 (A) reduce the speed
 (B) increase the speed
 (C) limit the starting current to safe value
 (D) reduce the flux.

63. Three resistances of 25 ohms, 10 ohms and 15 ohms are connected in series and the series combination is connected across a 250 Volt DC supply. The voltage across the 15 ohms resistor will be
 (A) 50 V
 (B) 90 V
 (C) 80 V
 (D) 75 V.

64. In house hold wiring system, a fuse wire is used to
 (A) boost the circuit current to higher value during the time of need
 (B) break the circuit when current flowing through it exceeds the limiting value
 (C) carry the normal working current safely without heating
 (D) carry the normal working current safely without heating and to break the circuit when current flowing through it exceeds the limiting value.

65. The purpose of adding little percent silicon to steel in the manufacturing of transformer core stampings is to reduce
 (A) secondary copper loss
 (B) primary copper loss
 (C) eddy current loss
 (D) hysteresis loss.

66. In the expression of waveforms $v_1 = V_m \cos(\omega t)$ and $v_2 = V_m \cos(\omega t + \pi/6)$,
 (A) v_1 leads v_2 by $\pi/6$ radians in phase
 (B) v_2 and v_1 are in phase
 (C) v_2 lags v_1 by $\pi/6$ radians in phase
 (D) v_2 leads v_1 by $\pi/6$ radians in phase.

67. The root-mean-square (rms) value of a cosine wave $y = 415 \cos(100\pi t)$ is

(A) 415
(B) 415/√3
(C) 415/2
(D) 415 /√2.

68. A resistance R of value 1 MΩ is connected in series with a capacitor C of value 5 μF. For this RC circuit, the time of 10 seconds will be equal to
    (A) one time constant
    (B) two time constants
    (C) three time constants
    (D) four time constants.

69. The purpose of using laminated core in a transformer is to reduce
    (A) primary copper loss
    (B) hysteresis loss
    (C) eddy current loss
    (D) secondary copper loss.

70. The larger portion of loss incurred in a DC motor while drawing full-load current from the DC supply is
    (A) field copper loss
    (B) mechanical loss
    (C) iron loss
    (D) armature copper loss.

71. It is desired to measure the current flowing through a resistive load in a DC network. The measuring instrument required for this is
    (A) an ammeter to be connected in series with the load
       (B) a voltmeter to be connected in series with the load
    (C) an ammeter to be connected parallel to the load
    (D) a voltmeter to be connected parallel to the load.

72. A 440/220 V single phase two winding transformer has winding leakage reactances as 2.1 ohm and 0.5 ohm on respective sides. The total leakage reactance referred to high voltage side will be
    (A) 1.025 ohms
    (B) 3.1 ohms
    (C) 4.1 ohms
    (D) 8.6 ohms.

73. At a node in a DC network, out of five branch currents present, three branch currents leave the node and two branch currents enter it. If the two branch currents entering the node are 8 A and 12 A respectively and the currents in two of the three outgoing branches are 5 A and 7 A, then value of the other outgoing current from the node will be
    (A) 8A
    (B) 12 A

(C) 16 A
(D) 20 A.

74. Compared to the secondary of a loaded step-down transformer, the primary has
    (A) less voltage and larger current
    (B) larger voltage and larger current
    (C) larger voltage and less current
    (D) less voltage and less current.

75. An energy meter having a meter-constant of 1200 revolutions per kilo-watt-hour (kWh) is found to make 5 revolutions in 75 seconds. The load power is
    (A) 500 W
    (B) 100 W
    (C) 200 W
    (D) 1000 W.

76. The maximum permissible values of earth resistance in case of small substation, major power station and large power station are respectively
    (A) 2 ohms, 0.5 ohm and 1 ohm
    (B) 1 ohm, 0.5 ohm and 2 ohms
    C) 0.5 ohm, 1 ohm and 2 ohms
    (D) 2 ohms, 1 ohm and 0.5 ohm.

77. The AC generators used in thermal power plants are generally of
    (A) low speed type and horizontally mounted
    (B) very high speed type of the order of 3000 RPM and horizontally mounted
    (C) low speed type and vertically mounted
    (D) very high speed type of the order of 3000 RPM and vertically mounted.

78. The type of generating power plant generally chosen to meet the base load demand is
    (A) nuclear power plant
    (B) hydro-electric power plant
    (C) power plant using diesel generator sets
    (D) none of these.

79. Three electrical loads when connected individually, one at a time, across a single phase AC source, draw individual currents of 5(0.5+j0.866) A, 5(0.5-j0.866) A and 5A respectively. The resultant current, drawn from the same supply source when all these three loads are connected in parallel at a time, will be
    (A) 0 A
    (B) 5 A
    (C) 10 A
    (D) 15 A.

80. At 75% of full load, the copper loss occurring in a single phase two winding transformer is 900 watts. At 100% full load, the copper loss will be

(A) 900 watts
(B) 1600 watts
(C) 1200 watts
(D) 1125 watts.

Engineering Mechanics

81. A cylinder has a height, h and is standing perpendicular to the ground. The first half of the cylinder close to the ground has half the density of the upper half. The CG of the entire cylinder from ground would be at a height of :
    (a) 5h/12
    (b) 7h/12
    (c) 9h/2
    (d) 3h/12

82. A cylinder has a height, h and is standing perpendicular to the ground. If the first half of the cylinder has a density double that of the upper half then the CG from ground would have been at :
    (a) 5h/12
    (b) 7h/12
    (c) 9h/2
    (c) 3h/12

83. A solid hemisphere of radius 'a ' is lying on the ground with its flat face on the surface. The CG of the hemisphere from the ground would be at:
    (a) 5a/8
    (b) 3a/8
    (c) a/8
    (d) a/2

84. A uniform thickness hemispherical shell has a mass M and radius R. Its moment of inertia about the vertical axis passing through the center of the hemisphere would be :
    (a) $2/3MR^2$
    (b) $MR^2/2$
    (c) $MR^2/4$
    (d) $2MR^2/5$

85. A spring of spring constant 100N/m is attached with a mass of 25kg and is resting on a frictionless plane. The mass is given an initial displacement of 10cm from rest. What would be the maximum velocity of the mass?
    (a) .1m/s
    (b) .4 m/s
    (c) .2m/s
    (d) None of the above

86. A spring of spring constant 100N/m is attached with a mass of 25kg and is resting on a frictionless plane. The mass is given an initial displacement of 10cm from rest. What would be the maximum acceleration of the mass?
    (a) $.2 \ m/s^2$
    (b) $.4 \ m/s^2$
    (c) $.1 \ m/s^2$

(d) .8 m/s^2

87. A spring of spring constant 100N/m is attached with a mass of 25kg and is resting on a frictionless plane. The mass is given an initial displacement of 10cm from rest. The time period of oscillation of the mass would be
    (a) 2π s
    (b) 2 s
    (c) π s
    (d) 1 s

88. A solid cylinder of mass M is kept on a frictionless ramp of height H. It is suddenly allowed to move. The velocity of the cylinder when it reaches the bottom of the ramp would satisfy the relation:
    (a) $v^2 = gH$
    (b) $v^2 = 4gH$
    (c) $v^2 = gH/2$
    (d) $v^2 = 2gH$

89. A solid cylinder of mass M is kept on a rough ramp (having friction) of height H. It is suddenly allowed to move. The velocity of the cylinder when it reaches the bottom of the ramp would satisfy the relation :
    (a) $v^2 = 2gH$
    (b) $v^2 = 2gH/3$
    (c) $v^2 = 4gH/3$
    (d) $v^2 = gH$

90. A particle of mass M, is projected at an angle of 30^0 to the horizontal at a velocity of V m/s in air where there is no frictional loss present for the particle. The ratio of kinetic energy of the particle at the highest point of the path to that of the initial KE would be :
    (a) ½
    (b) ¼
    (c) ¾
    (d) 1

91. A particle is kept on an incline which is having friction and exactly a similar particle is kept on a similar incline having no friction. In which case the particle would reach the bottom of the incline faster?
    (a) Incline having friction
    (b) Incline with no friction
    (c) It would take same time irrespective of friction
    (d) It can not be solved

92. A small stone is thrown vertically upward at a velocity of 20m/s and while reaching the ground it was found to have a velocity of 16m/s. If the gravity is 10m/s^2 and the air resistance is can be assumed to be uniform then what was the maximum height attended by the stone.
    (a) 5.0 m
    (b) 3.6 m
    (c) 32.8 m
    (d) 16.4 m

93. A spring-mass system oscillates such that the mass moves on a rough surface having coefficient of friction μ. It is compressed by a distance a, from its normal length and, on being released, it moves to a distance b from its equilibrium position. The decrease in amplitude for one-half cycle (-a to b) is:

   (a) $\mu mg/K$

   (b) $2\mu mg/K$

   (c) $\mu g/K$

   (d) $\mu mg/2K$

94. Three rods of mass m and length l are joined together to form an equilateral triangle. What would be the moment of inertia of the system about an axis passing through its center of mass and perpendicular to the plane of the triangle?

   (a) $\frac{ml^2}{2}$

   (b) $\frac{ml^2}{6}$

   (c) $\frac{ml^2}{12}$

   (d) $\frac{ml^2}{2}$

95. What is the moment of inertia of a solid sphere of mass M and radius R about an axis XX as shown in the Figure?
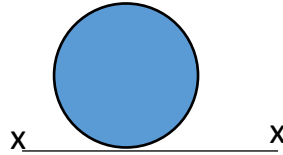
   (a) $\frac{2}{5}MR^2$

   (b) $\frac{9}{10}MR^2$

   (c) $\frac{7}{5}MR^2$

   (d) $\frac{8}{5}MR^2$

96. A uniform rod has mass m and length $2l$. Two particles of mass m each are placed at its two ends. What is the moment of inertia of the system about the center of mass of the system?

   (a) $\frac{25ml^2}{12}$

   (b) $\frac{4ml^2}{3}$

   (c) $\frac{5ml^2}{3}$

   (d) $\frac{7ml^2}{3}$

97. A uniform circular disk has a moment of inertia of $2\ kg.m^2$ about its central axis which is perpendicular to the plane of the disk. If a segment of 60^0 is cut out from the disk then the moment of the inertia of the remaining disk about the same old axis is:
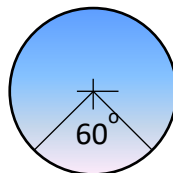
(a) $0.666\ kg\ m^2$
(b) $2.0\ kg\ m^2$
(c) $1.666 kg\ m^2$
(d) $0.5\ kg\ m^2$

98. Three co-planner forces F1, F2 and F3 are in equilibrium. If F1= 40N then how much is F2?
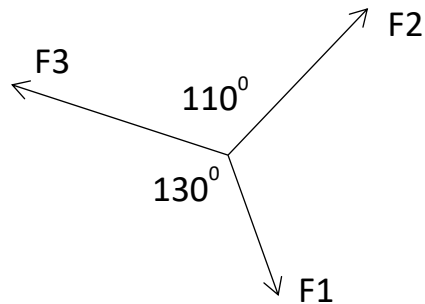
(a) 32.60 N
(b) 55.56 N
(c) 49.06 N
(d) -17.85 N

99. A particle of mass, 0.01kg started to move from rest to a velocity of 3i+4j m/s in a conservative force field. The work done on the particle is :
(a) 5 J
(b) 0.125 J
(c) 0.25 J
(d) Nothing can be told about it

100.   A mass of 1kg when attached to a spring and left slowly vertically, extends to a distance of 0.01m. If the same mass is released suddenly then the spring would be extended by:
(a) 0.01 m
(b) 0.015 m
(c) 0.02 m
(d) None of the above

101.   A particle executing SHM can be described by the equation $x = 12\sin(6t + 4)$. The time period of the particle can be: (Q 21 and 22 are linked)
(a) 12 s
(b) π/2 s
(c) π/3 s

(d) 4 s

102. A particle executing SHM can be described by the equation $x = 12 \sin(6t + 4)$. The maximum velocity of the particle is :
    (a) 48 units
    (b) 24 units
    (c) 6 units
    (d) 72 units

103. A spherical mass of 3kg travels on a smooth floor with a velocity of 4m/s and hits another mass of 2kg at rest. If the smaller mass travels at a speed of 2m/s after the collision the velocity of the larger mass would be: (assume rectilinear motion)
    (a) 2.666 m/s
    (b) 6 m/s
    (c) 3 m/s
    (d) 1 m/s

104. A ball is dropped vertically downward on to solid surface from a height of h. If the coefficient of restitution between the ball and the surface is e, then to what height the ball would rise after the first bounce?
    (a) h/e^2
    (b) he^2
    (c) he
    (d) h/e

105. A solid sphere rolls on a floor without slipping. The ratio of the translational to rotational kinetic energy is:
    (a) 2
    (b) ¼
    (c) 4
    (d) 5/2

106. A football (assume thin spherical shell) rolls on a floor without slipping. The ratio of the rotational to translational kinetic energy is:
    (a) 3/2
    (b) 3/4
    (c) 2/3
    (d) 4/3

107. The figure here shows three blocks connected by a rope system. It can be assumed that the ropes from 4kg to 2kg block have same tensions. The blocks are on a frictionless horizontal surface and pulled with a force of 36N. Then the tension T2 would be:
    (a) 0 N
    (b) 18 N
    (c) 36 N
    (d) 12 N
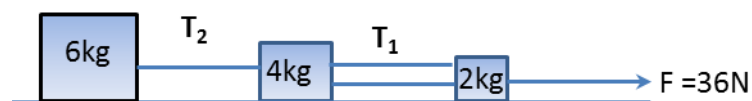
108.   The figure here shows three blocks connected by a rope system. It can be assumed that the ropes from 4kg to 2kg block have same tensions. The blocks are on a frictionless horizontal surface and pulled with a force of 36N. The tension T1 would be:

(a) 3 N

(b) 12 N

(c) 6 N

(d) 15 N

6kg T_2 4kg T_1 2kg   F =36N
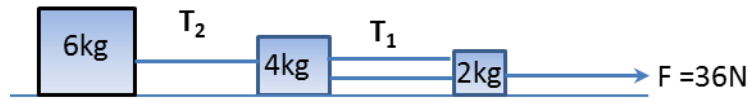
109.   The blocks shown in the figure are on a smooth floor. What is the contact force between the two blocks.

(a) 18 N

(b) 12 N

(c) 20 N

(d) 0 N

38N   5kg   3kg   6N

110.   A point mass of 4kg is placed on the x axis at 3m from the origin and another of 2kg is placed 3m away from the 4kg mass on the x-axis. The center of mass of the system lies on the x-axis at x =?

(a) 4.5 m

(b) 3 m

(c) 4 m

(d) 5m

111.   A mass of m1=3 kg with a velocity of 2m/s hits elastically another mass of m2=3 kg at rest. The velocity after the collision for mass m2 would be:

(a) 0 m/s

(b) 1 m/s

(c) 2 m/s

(d) Not possible to determine

112.   A mass of m1=1 kg with a velocity of 2m/s hits elastically another mass of m2=3 kg at rest. Find the velocity of m2 after the collision is:

(a) 0 m/s

(b) 1.5 m/s

(c) 1.333 m/s

(d) 1 m/s

113.   Two blocks are on a frictionless floor connected by a spring of spring constant k=100N/m. The blocks are applied with a force as shown in the figure. What would happen to the spring?
{Problem 33 and 34 are linked}

(a) The spring remains unchanged in length

(b) The spring gets compressed

(c) The spring gets stretched

(d) The spring gets compressed and then becomes stretched

40N   4kg   2kg   10N
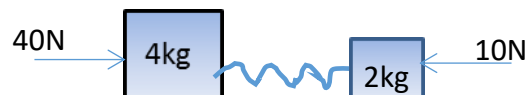
114.   In problem 33 if the spring length changes then that change is :

(a) 0 m

(b) 0.2 m compression

(c) 0.2 m stretching

(d) 0.2 m compression first and then 0.2 m stretching

115.   A bucket is having water in it which weighs 10 kg (weight of bucket is almost nothing). If the bucket is tied to a rope of length L and revolved around a vertical circle with the rope in one hand then what is the minimum rotational speed of the bucket so that the water does not come out of the bucket.

(a) $\sqrt{gL}$

(b) $2g/L$

(c) $\sqrt{g/L}$

(d) $\sqrt{2g/L}$

116.   A mass weighing 5 kg is hanging from a vertical spring balance which is fixed on to an elevator. The elevator suddenly accelerated upward at an acceleration of $3m/s^2$. In such a situation:

(a) The spring would be stretched more

(b) The spring would be compressed a bit

(c) The spring length would remain unchanged

(d) Nothing can be told about the spring

117.   On a horizontal spring balance a can is placed, which has water in it and the can is 75% filled. The weight reading shows to be 2kg on the display unit of the balance. A boy tried to put a stick in to the water without touching the can or the spring balance and the water from the can was also not spilling.

(a) The display would show now less reading

(b) The display would show more reading

(c) The reading would remain unchanged

(d) None of the above

118.   A mass is hung from a digital spring balance which shows the weight to be 2kg. The entire spring balance and the mass hanging from it is allowed to fall freely from a very tall building. The display would now show:

(a) More reading

(b) Less reading

(c) No change in reading

(d) Record the weight to be zero

119.   A force of 2i+3j N is working on a mass of 1kg and the mass got a displacement of 3i+4j m. The work done on the mass is:

(a) 18 J

(b) 14J

(c) 0 J

(d) 12 J

120.   A force of 2i+3j N is working on a mass of 1kg and the mass got a displacement of 3i+4j m. The velocity of the mass during the application of the force changed by an amount:

(a) 1 m/s

(b) 3m/s

(c) 4m/s

(d) 6 m/s

1. The use of which of the following drug is associated with the development of a systemic lupus erythematosus (SLE) like syndrome?
   (a) Probenecid   (b) Phenobarbital
   (c) Nitrofurantoin   (d) Hydralazine.

2. An inverse relationship exists between the concentration of calcium in the blood and the blood concentration of
   (a) Magnesium   (b) Thyroid hormone
   (c) Testosterone   (d) Phosphorus

3. A patient receiving isocarboxazid should be advised to
   (a) Avoid foods high in potassium   (b) Avoid foods high in tyramine
    (c) Avoid foods high in Sodium   (d) Avoid foods high in vitamin K

4. An antacid that is most likely to induce gastric hyper secretion is
   (a) Calcium carbonate   (b) Bismuth subgallate
   (c) Aluminium hydroxide   (d) Magnesium hydroxide.

5. A drug interaction is likely to occur when 6-mercaptopurine is used with
   (a) Aspirin   (b) Allopurinol
    (c) Streptokinase   (d) Pyridoxin

6. Which one of the following body areas usually has the lowest (most acidic) pH?
   (a) Blood   (b) Lachrymal fluid
   (c) Oral cavity   (d) Skin

7. A patient is using hydrochlorothiazide and guanethidine for the treatment of hypertension. This patient should not receive
   (a) Potassium supplementation   (b) Tricyclic antidepressants
   (c) Aluminium containing antacids   (d) Folic acid supplementation

8. Which of the following is true of active transport System?
   (a) They do not consume energy   (b) They never become saturated
   (c) They do not reach equilibrium (d) All of the above.

9. The diagnostic test that is most closely associated with organ 'Heart' is
   (a) Bilirubin   (b) Amylase
   (c) alkaline phosphatase   (d) Lactate dehydrogenase.

10. Thiazides may produce
    (a) Reduce glucose tolerance   (b) Hyperkalemia
    (c) Decrease blood levels of uric acid   (d) Hypernatremia

11. The most frequent dose limiting adverse effect associated with cancer chemotherapy is
    (a) alopecia   (b) mucositis
    (c) nausea and vomiting   (d) myelo-suppression

12. The drug of choice in the treatment of hyperkalemia induced arrhythmias is
    (a) Calcium gluconate   (b) Calcium carbonate
    (c) Sodium bicarbonate   (d) Digoxin

13. The inhibition of Pituitary thyrotropin secretion is controlled by which of the following?
    (a) Free thyroxine   (b) Thyroid-releasing hormone
    (c) Free thyroxine index   (d) Reverse tri-iodothyronine

14. Sodium bicarbonate is most likely associated with
    (a) May cause diarrhoea   (b) Can not be used by patient with heart failure
    (c) May cause dry mouth   (d) Can be alternated with an antacid mixture to control diarrhoea.

15. When administered at the same time, antacids can decrease the therapeutic efficacy of which of the following drugs?
    (a) Sucralfate   (b) Ranitidine
    (c) Cimetidine   (d) all of the above.

16. In Validity of a drug manufacturing license is upto
    (a) 31st April   (b) 30th June
    (c) 31st December   (d) 1st January

17. Central Drug Research Institute is situated at
    (a) Kasauli   (b) Calcutta
    (c) Lucknow   (d) Izatnagar.

18. Starches from various source may be characterized by
    (a) getatinisation temperature   (b) by carbohydrate content
    (c) by iodine colour test   (d) by NMR spectroscopy.

19. Lemon peel is rich in terpene
    (a) thymol   (b) eugenol
    (c) citral   (d) limonene.

20. Ideally, an antacid should raise the pH of the stomach contents to a value of
    approximately
    (a) 3.5   (b) 5.5
    (c) 6.5   (d) 7.5

21. Psoriasis is characterized by
    (a) Granulomatous lesions   (b) Nodules
    (c) Silvery grey scales   (d) Small red vesicles

22. A patient suffering from severe hypertensive crisis would most likely be
    treated initially with
    (a) guanethidine   (b) methyldopa
    (c) reserpine   (d) diazoxide.

23. Which of the following agent would be most dangerous to use in a patient
    already receiving high doses of gentamicin
    (a) ethacrynic acid   (b) tetracycline
    (c) propantheline bromide   (d) pentobarbital sodium.

24. The level of which of the following enzymes would be elevated in acute
    pancreatitis?
    (a) alkaline phosphatase   (b) acid phosphatase
    (c) lactic dehydrogenase   (d) amylase.

25. Which of the following is not a white blood cell?
    (a) basophil   (b) eosinophil
    (c) monocyte   (d) reticulocyte

26. A penicillin derivative that is most closely related to ampicillin but has much
    greater activity against 'Pseudomonas' is
    (a) methicillin   (b) ticarcillin
    (c) nafcillin   (d) dicloxacillin

27. Heroin is
    (a) 3, 6 di-acetyl morphine   (b) brown sugar
    (c) addictive   (d) All of the above

28. A glycoside present in Nux-vomica seed is
    (a) loganin   (b) strychnine
    (c) brucine   (d) vomicine.

29. Myxedema is what kind of state
    (a) Hypothyroid   (b) Hypoparathyroid
    (c) Hyperthyroid   (d) Hyperparathyroid

30. A micro organism that is particularly dangerous to eye is
    (a) Aspergillus niger   (b) Bacillus subtilis
    (c) E. coli   (d) Pseudomonas aeruginosa

31. A Physician has decided upon a course of tetracycline therapy for a patient
    with renal impairment. Which of the following drug is least likely to
    accumulate in the patient's blood?
    (a) demeclocycline   (b) doxycycline
    (c) minocycline   (d) oxytetracycline

32. The peak of the serum concentration vs time curve approximates the
    (a) Point in time when max pharmacological effect occurs.
    (b) Point in time when absorption and elimination of the drug have equalities.
    (c) Maximum concentration of free drug in the urine.
    (d) Time required for essentially the entire drug to be absorbed from the G.I.
        tract.

33. The time of the peak serum concentration gives some indication of the relative
    rate of
    (a) absorption   (b) distribution
    (c) metabolism   (d) elimination

34. Methyl salicylate is also known as
    (a) Camphorated oil   (b) peppermint oil
    (c) Salicylamide   (d) Oil of wintergreen

35. The concentration of ethyl alcohol in dilute alcohol is
    (a) 20%   (b) 50%
    (c) 70%   (d) 92%

36. To treat a mild case of scabies , _____ is used.
    (a) calamine   (b) coal tar
    (c) ichthamol   (d) sulphur.

37. Ibuprofen has a pka of 5.5. If the pH of a patient's urine is 7.5, what will be the ratio of dissociated to undissociated drug be?
    (a) 2:1   (b) 100:1
    (c) 20:1   (d) 1:2

38. Which of the following forms of radiation has the greatest penetration power
    (a) alpha-radiation   (b) beta-radiation
    (c) gamma-radiation   (d) X-rays

39. All the following viscosity builders have been used in opthalmic solution except
    (a) hydroxy propyl methyl cellulose   (b) polyvinyl alcohol
    (c) polyvinyl pyrolidone   (d) veegum.

40. All aqueous solution that freeze at -0.52^0C are isotonic with red blood cells. They are also iso-osmotic with each other. Which of the following apply?
    (a) both statements are true
    (b) both statements are false
    (c) the first statement is true but the second is false
    (d) the second statement is true but the first is false

41. An excellent choice of diluent for compressed vaginal tablet formulation would be
    (a) lactose   (b) starch
    (c) sucrose   (d) talc

42. A synonym of cold cream USP is
    (a) Galen's cerate   (b) petrolatum rose water ointment
    (c) rose water ointment (d) wool fat emulsion

43. The local anesthetic most commonly need in OTC burn remedies is
    (a) benzocaine   (b) butamben picrate
    (c) lidocaine   (d) phenol

44. Which of the following ingredients is available in OTC aerosol asthmatic products?
    (a) epinephrine   (b) ephedrine
    (c) metaproterinol   (d) all of the above.

45. Characteristic of inhalation aerosol dosage form include
    (a) avoid first pass metabolism
    (b) rapid onset of action
    (c) can administered large amounts of drug to intended site
    (d) both   a   and   b

46. The capping of a tablet may be result of any of the following except
    (a) excessive lubricant   (b) excessive pressure of compression
    (c) excessive fine powder   (d) insufficient binder

47. Which of the following is not used primarily as a diluent in tablet
    formulations?
    (a) magnesium stearate   (b) dicalcium phosphate
    (c) lactose   (d) mannitol

48. A vehicle for nasal medication should possess all of the following properties
    except
    (a) an acid pH   (b) isotonicity
    (c) high buffer capacity   (d) ability to resist growth of micro-organism

49. The most preferred digitalis cardiac glycoside due to its less cumulative effect
    (a) digitoxin   (b) gitoxin
    (c) digitonin   (d) digoxin

50. An example of nonionic surfactant
    (a) ammonium laurate   (b) cetylpyridinium chloride
    (c) dioctyl sodium sulfosuccinate   (d) sorbitan monopalmitate

51. All of the following statements concerning toxoids are true except
    (a) toxoids are detoxified toxins
    (b) toxoids are antigen
    (c) toxoids produce permanent immunity
    (d) toxoids produce artificial active immunity.

52. All of the following biologicals are used for active immunization except
    (a) bacterial vaccines   (b) bacterial antigens
    (c) human immune sera   (d) multiple antigen preparation

53. Methyl paraben is an ester of
    (a) benzoic acid   (b) propionic acid
    (c) para amino salicylic acid (d) dipropionic acid

54. Naturally occuring vitamin K_1 is also called
    (a) menadione   (b) phytonadione
    (c) tocopherol   (d) dihydro tachysterol

55. Even distribution of drug into the blood after an i.v. bolus injection can be
    expected within _____ minutes.
    (a) 1   (b) 10
    (c) 4   (d) 30

56. A suspension is not suitable for what type of injection?
    (a) intra-articular   (b) intra-dermal
    (c) intra-muscular   (d) intra-venous

57. Isotonicity is critical for which injection?
    (a) intra-articular   (b) intra-dermal
    (c) intra-muscular   (d) intra-venous

58. Which of the following neddles is suitable for the administration of insulin
    solution
    (a) 16G ⅝″   (b) 21G ½″
    (c) 21G ⅝″   (d) 25G ⅝″

59. The shrinkage that occurs when alcohol and purified water are mixed is
    primarily due to
    (a) attractive Vander waals forces   (b) covalent bonding
    (c) hydrogen bonding   (d) ionic bonding.

60. According to USP the instruction 'protect from light' in a monograph
    indicates storage in a
    (a) dark place   (b) coloured glass bottle
    (c) light resistant container (d) tight glass container.

OJEE 2017 (BIOLOGY)

1. The other name of transposon is
   a) Walking gene
   b) Running gene
   c) Hopping gene
   d) Jumping gene

2. "The Decent of Man" was authored by
   a) Lamarck
   b) Darwin
   c) J.C. Bose
   d) Odum

3. cDNA is
   a) coiled DNA
   b) complementary DNA
   c) cytoplasmic DNA
   d) circular DNA

4. Example of a plasmid is
   a) pBR 322
   b) *Eco* RI
   c) *Alu* I
   d) *Hind* II

5. The genetic material of HIV is
   a) Single stranded DNA
   b) Single stranded RNA
   c) Double stranded DNA
   d) None of these

6. *Rana tigrina* is an example of
   a) Fish
   b) Amphibia
   c) Reptilia
   d) Mammalia

7. Which of the following is not an extra embryonic membrane?
   a) Amnion
   b) Chorion
   c) Coelom
   d) Allantois

8. Fertilization of Sea Urchin is
   a) External
   b) Internal

c) Terrestrial

d) Aerial

9. Nervous system of mammals is derived from
   a) Ectoderm
   b) Mesoderm
   c) Endoderm
   d) Mesoglea
10. Budding is seen in
    a) Crab
    b) Oyster
    c) Starfish
    d) Hydra
11. GnRH is secreted from
    a) Testis
    b) Ovary
    c) Hypophysis
    d) Hypothalamus
12. Steps of embryogenesis are
    a) Blastula- morula- zygote- gastrula- embryo
    b) Zygote- morula- blastula- gastrula- embryo
    c) Zygote- gastrula- blastula- morula- embryo
    d) Blastula- morula- gastrula - zygote- embryo
13. Mutation is caused by
    a) Any chemical compound
    b) Any physical agent
    c) Mutagens
    d) None of the above
14. Number of allosome present in a sperm nucleus of human is
    a) 1
    b) 2
    c) 22
    d) 23
15. Acid rain is mainly caused by
    a) NO_2
    b) SO_2
    c) O_2
    d) NO_2 and SO_2
16. Adrenal gland is also called

a) Supra hepatic gland

b) Supra corotic gland

c) Supra renal gland

d) Supra stomach gland

17. Vasopressin is secreted from

a) Kidney

b) Anterior pituitary

c) Hypothalamic neuron

d) All of these

18. Number of thoracic ganglia of *Periplaneta americana* is

a) 2

b) 3

c) 4

d) None of these

19. The enzyme which is known as 'molecular glue' is-

a) Restriction endonuclease

b) DNA ligase

c) Exonuclease

d) Lipase

20. 'Sea Horse' is a

a) Mammal

b) Fish

c) Bird

d) Snake

21. Peacock is a

a) Running bird

b) Flying bird

c) Both a & b

d) None of the above

22. Peacock is a/an

a) Ammonotelic organism

b) Ureotelic organism

c) Uricotelic organism

d) Proteotelic organism

23. I am an invertebrate with closed blood vascular system. Who am I?

a) Ring worm

b) Earthworm

c) Tape worm

d) Round worm

24. Haemoglobin contains

a) Mercury

b) Zinc

c) Copper

d) Iron

25. Bronchus is found in

a) Heart

b) Limb

c) Lung

d) Bone

26. Example of local hormone is

a) Pepsin

b) Trypsin

c) Gastrin

d) Lipase

27. Elbow joint is an example of

a) Gliding joint

b) Hinge joint

c) Pivot joint

d) Ball and socket joint

28. Element(s) essential for muscle contraction is/are

a) Ca ion

b) Action potential

c) ATP

d) All of these

29. Which of the following animal is diploblastic?

a) Man

b) Snail

c) Amoeba

d) Jelly fish

30. Pseudocoelom is present in the following parasite

a) *Ascaris*

b) *Plasmodium*

c) *Taenia*

d) *Trypanosoma*

Q31. In five kingdom classification, the main basis of classification is:

(a) Structure of nucleus

(b) Structure of cell membrane

(c) Mode of nutrition

(d) Asexual reproduction

Q32. *Spirogyra* mats show an unusual phototactic movement towards:

(a) Blue light

(b) Yellow light

(c) Orange light

(d) Red light

Q33. Choose the correct pair

(a) *Cycas*- Simple leaf

(b) *Dryopteris*- pyrenoid

(c) *Saccharomyces*- pseudomycelium

(d) *Funaria*- gemma cup

Q34. A type of modified sub-aerial stem is:

(a) Thorn

(b) Runner

(c) Tuber

(d) Cladode

Q35. Name the type of aestivation when sepals or petals in a whorl just touch one another at the margin without overlapping:

(a)Twisted

(b) Imbricate

(c) Valvate

(d) Vexillary

Q36. A group of similar plants which breed freely among themselves constitute a:

(a) Species

(b) Genus

(c) Family

(d) Order

Q37. Monadelphous stamen is the unique character of:

(a) Fabaceae

(b) Brassicaceae

(c) Asteraceae

(d) Malvaceae

Q38. Which one among the following will settle down at last during centrifugation?

(a) Chloroplast

(b) Mitochondria

(c) Ribosomes

(d) Nuclei

Q39. Which of the following constitutes approximately 8%-15% of the cell wall in higher plants?

(a) Proteins

(b) Lipids

(c) Carbohydrates

(d) Flavonoids

Q40. Enzymes increase the rate of reaction by:

(a) Lowering the free energy of activation
(b) Increasing the free energy change of the reaction

(c) Changing the equilibrium constant of the reaction
(d) Change the direction of reactions

Q41. The non-histone proteins which hold the sister chromatid pairs of chromosomes during metaphase are:

(a) Cohesins
(b) Condensins

(c) Topoisomerases
(d) Nucleoplasmin

Q42. In n-hybrid cross the number of phenotypic and genotypic classes are:

(a) 1^n and 2^n respectively
(b) 2^n and 3^n respectively

(c) 3^n and 2^n respectively
(d) 2^n and 4^n respectively

Q43. *Pisum sativum* has 2n = 14 chromosomes, the number of linkage group in it will be:

(a) 7
(b) 14

(c) 21
(d) 28

Q44. In a nucleotide the base is linked to the:

(a) $1'$-position of a sugar
(b) b. $2'$-position of a sugar

(c) $3'$-position of a sugar
(d) $5'$-position of a sugar

Q45. In prokaryotes initiation of transcription requires:

(a) TATA box and core polymerase
(b) Sigma factor and RNA pol I

(c) Sigma factor and core polymerase
(d) Sigma factor and RNA pol I & II

Q46. Isobilateral leaves are usually:

(a) Astomatic
(b) Hypostomatic

(c) Epstomatic
(d) Amphistomatic

Q47. In dicot root cork cambium originates from:

(a)Pith
(b) Hypodermis

(c) Pericycle
(d) Endodermis

Q48. Which of the following statements is incorrect?

(a) Water is an essential component protoplasm
(b) Water is indispensable for growth of and development of plants

(c) Water does not provide medium for biochemical reactions in cells
(d) In water two hydrogen atoms are joined to oxygen atom by covalent bonds at an angle of 105°

Q49. Sugar moves in phloem elements as:

(a) Glucose   (b) Sucrose

(c) Cellulose   (d) Starch

Q50. An ion constituent of Oxygen Evolution Centre of Light reaction of photosynthesis is

(a) Mn^{2+} (b) Mg^{2+}

(c) Fe^{2+} (d) Cu^{2+}

Q51. For each glucose molecule that is broken down in glycolysis there is a net gain of:

(a) 1 ATP molecule   (b) 2 ATP molecules

(c) 3 ATP molecules   (d) 4 ATP molecules

Q52. During non-cyclic electron transport, photophospholyration occurs at:

(a) Two places   (b) Three places

(c) One place   (d) Four places

Q53. The number of ATP molecules required for fixation of a single N_2 molecule is:
(a) 1   (b) 4

(c) 8   (d) 16

Q54. Closure of stomata in plants is induced by:

(a) IAA   (b) ABA

(c) GA_3 (d) Ethylene

Q55. In vernalization, the cold stimulus is perceived by:

(a) Laternal meristem   (b) Apical meristem

(c) Intercalary meristem   (d) Cork cambium

Q56. The pioneer in xerarch succession is the:

(a) Mossess   (b) Crustose lichens

(c) Shurbs   (d) Trees

Q57. In which kind of ecological interaction does one organism benefit while the other is neither harmed nor helped?

(a) Parasitism   (b) Commensalism

(c) Symbiosis   (d) Mutualism

Q58. Reduction in number and degree of lignification of the tracheary elements is a common adaptive feature of:

(a) Xerophytes   (b) Hydrophytes

(c) Halophytes   (d) Heliophytes

Q59. Rice bran oil is extracted from:

    (a) Endosperm   (b) Embryo

    (c) Husk   (d) Coleoptile

Q60. In which of the following diseases insects act as vector during transmission?

    (a) Powdery mildew of peas   (b) Mosaic disease of papaya

    (c) Bacterial blight of rice   (d) Bacterial blight of potato