Use following codes to answer Q1-Q5.

(1) Statement-1 is true, statement -2 is true ; statement -2 is a correct explanation for statement-1
(2) Statement-1 is true, statement -2 is true ; statement -2 is a Not correct explanation for statement-1
(3) Statement-1 is true, statement -2 is false.
(4) Statement-1 is false, statement -2 is true.

Q1. Statement -1 : 3,6 and 12 are in GP , then 9 ,12 and 18 are in HP .

Statement -2 : if middle term is added in three consecutive terms of a GP , resultant will be in HP.

Q2. Statement-1 : From a group of 8 men and 4 women a team of 5 members ,including at least one woman can be formed in 736 ways.

Statement-2 : number of ways of selecting at least one woman from m men and n women is ${}^{m+n}C_n - {}^{m}C_n$

Q3. Statement -1 : the points on the curve $y^2 = x + \sin x$ at which the tangent is parallel to x-axis lie on a straight line .

Statement -2 : tangent is parallel to x-axis, then $\frac{dy}{dx} = 0 \; or \; \frac{dy}{dx} = \infty$

Q4. Statement-1 : length of the latusrectum of parabola $(6x + 8y + 7)^2 = 4(8x + 6y + 3) \; is \; 4$.

Statement -2 : length of latusrectum of the parabola $y^2 = 4ax$ is 4a .

Q5. Statement-1: the Points A,B and C are collinear, then area of triangle ABC = 0 .

Statement-2: $AB + BC = AC$

Q6. If a triangle ABC , C = 60 , then the value of $\frac{1}{a+c} + \frac{1}{b+c} \; is \; equal \; to$

(1) $\frac{1}{a+b+c}$
(2) $\frac{2}{a+b+c}$
(3) $\frac{3}{a+b+c}$
(4) None of these

Q7. If $\tan^{-1}\frac{x-1}{x+2} - \tan^{-1}\frac{x+1}{x+2} = \frac{\pi}{4}$, then the value of x is :

(1) $\frac{1}{\sqrt{2}}$
(2) $-\frac{1}{\sqrt{2}}$
(3) $\pm\sqrt{\frac{5}{2}}$
(4) $\pm\frac{1}{2}$

Q8. If $A(-a, 0) \; and \; B(a, 0)$ are two fixed points, then the locus of the point at which AB subtends a right angle is :

(1) $x^2 + y^2 = 2a^2$
(2) $x^2 - y^2 = a^2$
(3) $x^2 + y^2 + a^2 = 0$
(4) $x^2 + y^2 = a^2$

Q9. The equation represents a pair of straight lines. The distance between them is :

$$8x^2 + 8xy + 2y^2 + 26x + 13y + 15 = 0$$

(1) $\frac{7}{\sqrt{5}}$
(2) $\frac{7}{2\sqrt{5}}$
(3) $\frac{\sqrt{7}}{5}$
(4) None of these

Q10. The equation of the tangent to the circle $x^2 + y^2 + 4x - 4y + 4 = 0$ which makes equal intercepts on the positive co-ordinate axes is :

(1) $x + y = 2$
(2) $x + y = 2\sqrt{2}$
(3) $x + y = 4$
(4) $x + y = 8$

Q11. The parabola $y^2 = 8x \; and \; the \; circle \; x^2 + y^2 = 2$:

(1) Have only two common tangents which are mutually perpendicular.
(2) Have only two common tangents which are parallel to each other.
(3) Have infinitely many common tangents
(4) Does not have any common tangent

Q12. Tangent at a point of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is drawn cuts the co-ordinate axes at A and B . The minimum areas of the triangle OAB (O being the origin) :

(1) $ab \; sq \; units$
(2) $\frac{a^3+ab+b^3}{3} \; sq \; units$
(3) $(a^2 + b^2) sq \; units$
(4) $\frac{a^2+b^2}{4} \; sq \; units$

Q13. If $f(x + 2) + f(x) = f(x + 1)$, then :

(1) $f(x + 1) = f(x)$
(2) $f(x + 1) = 2f(x)$
(3) $f(x + 2) = 2f(x)$
(4) $f(x)$ is a periodic function

Q14. Let function $f: R \to R$ be defined by $f(x) = 2x + \sin x$ for $x \in R$, $then \; f \; is$:

(1) One –one and onto
(2) One-one but not onto
(3) Onto but not one-one
(4) Neither one –one nor onto

Q15. Which of the following statements is true ?

(1) Periodic functions are invertible functions
(2) Periodic functions may not be invertible functions
(3) Periodic functions attain local maximum or local minimum
(4) A continuous periodic function is bounded

Q16. . Which of the following is not true ?

(1) A polynomial function is always continuous.
(2) A continuous function is always differentiable
(3) A differentiable function is always continuous.
(4) $e^x \; is \; continuous \; for \; all \; x$

Q17. The value of the indefinite integral is

$$\int \frac{dx}{x(x^7 + 1)}$$

(1) $\text{Ln}\left(\frac{x^7}{x^7+1}\right) + c$
(2) $\frac{1}{7}\text{Ln}\left(\frac{x^7}{x^7+1}\right) + c$
(3) $\ln\left(\frac{x^7+1}{x^7}\right) + c$
(4) $\frac{1}{7}\ln\left(\frac{x^7+1}{x^7}\right) + c$

Q18. Let function $f: R \to R$ be defined by $f(x) = \tan x \; - x$, then $f(x)$ is

(1) Increases
(2) Decreases
(3) Remains constant
(4) Becomes zero

Q19. The marks of some students were listed out of 75. The standard deviation of marks was found to be 9. Subsequently the marks were raised to a maximum of 100 and variance of new marks was calculated. The new variance is :

(1) 144
(2) 122
(3) 81
(4) None of these

Q20. The area bounded by the curve $y = f(x), x - axis \ and \ ordinates \ x = 1 \ and \ x = \ b \ is \ (b - 1)\sin(3b + 4)$, $then \ f(x) is$:

(1) $3(x - 1)\cos(3x + 4) + \sin(3x + 4)$
(2) $(b - 1)\sin(3x + 4) + 3\cos(3x + 4)$
(3) $(b - 1)\cos(3x + 4) + 3\sin(3x + 4)$
(4) None of the above

Q21. A ball of mass 3 kg moving with velocity of 3 m/s collides with another ball of mass 1 kg moving with velocity u in the opposite direction . if the first ball comes to rest after the impact and e = 2/ 7 . then u is in m/s is :

(1) 13/3
(2) 17/3
(3) 19/3
(4) 23/3

Q22. $\lim_{x\to 0} \frac{(4^x - 9^x)}{x(4^x + 9^x)}$

(1) $\ln\left(\frac{2}{3}\right)$
(2) $\frac{1}{2}\ln\left(\frac{3}{2}\right)$
(3) $2\ln\left(\frac{3}{2}\right)$
(4) $\ln\left(\frac{3}{2}\right)$

Q23.
$if \ 2^x + 2^y = 2^{x+y}$, $then \ the \ value \ of \ \frac{dy}{dx} \ at \ x = y = 1 \ is$:

(1) 0
(2) -1
(3) 1
(4) 2

Q24 . the minimum value of $x^2 + \frac{1}{x^2+1}$ is at :

(1) X =0
(2) X = 1
(3) X = 4
(4) X = 3

Q25. The value of the integral $\int_0^{\pi} \frac{x dx}{1+\sin x}$

(1) $-\pi$
(2) $\frac{\pi}{2}$
(3) π
(4) None of these

Q26. If
$\vec{a} \ and \ \vec{b} \ are \ two \ non - collinear \ vectors \ and$

$x\vec{a} + y\vec{b} = 0$

(1) X =0 but y is not necessarily zero
(2) Y= 0 but x is not necessarily zero
(3) X = 0 , y =0
(4) None of the above

Q27. 20 persons are invited for a party. In how many different ways can they and the host be seated at circular table, if the two particular persons are to be seated on either side of the host?

(1) 20!
(2) 2. 18!
(3) 18!
(4) None of these

Q28. The solution of $\frac{dy}{dx} = \ 2^{y-x}$ is :

(1) $2^x + 2^y = c$
(2) $2^x - 2^y = c$
(3) $\frac{1}{2^x} - \frac{1}{2^y} = c$
(4) $\frac{1}{2^x} + \frac{1}{2^y} = c$

Q29. The statement p v ~p is

(1) Tautology
(2) Contradiction
(3) Neither a tautology nor a contradiction
(4) None of the above

Q30. The minimum value of $P = bcx + cay + cay + abz$, $where\ xyz = abc\ os$:

(1) 3abc
(2) 6abc
(3) Abc
(4) 4abc