QB365

12th Maths Model One Marks

12th Standard

Maths

Reg.No. :

Time : 03:20:00 Hrs

Total Marks : 180

Mutiple Choice Questions

First 3 Chapters

180 x 1 = 180

1) The rank of the matrix $\begin{pmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{pmatrix}$ is,

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

2) The rank of the diagonal matrix $\begin{pmatrix} -1 & 0 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -4 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$ is

(a) 0 (b) 2 (c) 3 (d) 5

3) If A = (2 0 1), then the rank of AA^T is ....

(a) 1 (b) 2 (c) 3 (d) 0

4) If A = $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$, then the rank of AA^T is,

(a) 3 (b) 0 (c) 1 (d) 2

5) If the rank of the matrix $\begin{pmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{pmatrix}$ is 2, then λ is,

(a) 1 (b) 2 (c) 3 (d) any real number

6) If A is a scalar matrix with scalar $k \neq 0$, of order 3, then A^{-1} is

(a) $\frac{1}{k^2}I$ (b) $\frac{1}{k^3}I$ (c) $\frac{1}{k}I$ (d) $K\,I$

7) If the matrix $\begin{pmatrix} -1 & 3 & 2 \\ 1 & k & -3 \\ 1 & 4 & 5 \end{pmatrix}$ has an inverse then the values of k

(a) k is any real number (b) k = -4 (c) $k \neq -4$ (d) $k \neq 4$

8) If A = $\begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$, then (adjA) A =

(a) $\begin{pmatrix} \frac{1}{5} & 0 \\ 0 & \frac{1}{5} \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 5 & 0 \\ 0 & -5 \end{pmatrix}$ (d) $\begin{pmatrix} 5 & 0 \\ 0 & 5 \end{pmatrix}$

9) If A is a square matrix of order n then $|adjA|$ is

(a) $|A|^2$ (b) $|A|^n$ (c) $|A|^{n-1}$ (d) $|A|$

10) The inverse of the matrix $\begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$ is

(a) $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$ (d) $\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

11) If A is a matrix of order 3, then $det(kA)$ is,

(a) $k^3 det(A)$ (b) $k^2 det(A)$ (c) $k\, det(A)$ (d) $det\,(A)$

12) If I is the unit matrix of order n, where $k \neq 0$ is a constant, then $adj(kI)$ is

(a) $k^n(adj\,I)$ (b) $k(adj\,I)$ (c) $k^2(adj(I))$ (d) $k^{n-1}(adj\,I)$

13) If A and B are any two matrices such that AB= 0 and A is non-singular, then

(a) B=0 (b) B is singular (c) B is non-singular (d) B =A

14) If A = $\begin{pmatrix} 0 & 0 \\ 0 & 5 \end{pmatrix}$, then A^{12} is,

(a) $\begin{pmatrix} 0 & 0 \\ 0 & 60 \end{pmatrix}$ (b) $\begin{pmatrix} 0 & 0 \\ 0 & 5^{12} \end{pmatrix}$ (c) $\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

15) Inverse of $\begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix}$ is,

(a) $\begin{pmatrix} 2 & -1 \\ -5 & 3 \end{pmatrix}$ (b) $\begin{pmatrix} -2 & 5 \\ 1 & -3 \end{pmatrix}$ (c) $\begin{pmatrix} 3 & -1 \\ -5 & -3 \end{pmatrix}$ (d) $\begin{pmatrix} -3 & 5 \\ 1 & -2 \end{pmatrix}$

16) In a system of 3 linear non-homogeneous equation with three unknowns, if $\Delta = 0$ and $\Delta_x = 0$, $\Delta_y = 0,\ \Delta_y \neq 0, \Delta_z = 0$ then the system has

(a) unique solution (b) two solutions (c) infinitely many solutions (d) no solutions

17) The system of equations $ax + y + z = 0$;$x + by + z = 0$;$x + y + cz = 0$ has a non – trivial solution then $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

(a) 1 (b) 2 (c) -1 (d) 0

18) If $ae^x + be^y = c$; $pe^x + qe^y = d$ and $\Delta_1 = \begin{vmatrix} a & b \\ p & q \end{vmatrix}$;$\Delta_2 = \begin{vmatrix} c & b \\ d & q \end{vmatrix}$; $\Delta_3 = \begin{vmatrix} a & c \\ p & d \end{vmatrix}$ then the value of (x, y) is

(a) $\left(\frac{\Delta_2}{\Delta_1} \frac{\Delta_3}{\Delta_1}\right)$ (b) $\left(log\frac{\Delta_2}{\Delta_1}, log\frac{\Delta_3}{\Delta_1}\right)$ (c) $\left(log\frac{\Delta_1}{\Delta_3}, log\frac{\Delta_1}{\Delta_2}\right)$ (d) $\left(log\frac{\Delta_1}{\Delta_2}, log\frac{\Delta_1}{\Delta_3}\right)$

19) If the equations $-2x+y+z=l\,; x-2y+z=m\,; x+y-2z=n$ such that $l+m+n=0$, then the system has ....

(a) non-zero unique solution (b) trivial solution (c) infinitely many solutions (d) no solution

20) The rank of the matrix $\begin{pmatrix} 2 & -4 \\ -1 & 2 \end{pmatrix}$ is

(a) 1 (b) 2 (c) 0 (d) 8

21) The rank of the matrix $\begin{pmatrix} 7 & -1 \\ 2 & 1 \end{pmatrix}$ is

(a) 9 (b) 2 (c) 1 (d) 5

22) If A and B are matrices conformable to multiplication then $(AB)^T$ is

(a) A^TB^T (b) B^TA^T (c) AB (d) BA

23) $(A^T)^{-1}$ is equal to

(a) A^{-1} (b) A^T (c) A (d) $(A^{-1})^T$

24) if $\rho(A) = r$ then which of the following is correct ?

(a) all the minors of order r which does not vanish (b) A has atleast one minor of order r which does not vanish and all higher order minor vanish

(c) A has atleast one $(r+1)$ order minor which vanishes (d) all $(r+1)$ and higher order minors should not vanish

25) Which of the following is not elementary transformation ?

(a) $R_i \longleftrightarrow R_j$ (b) $R_i \longrightarrow 2R_i + R_j$ (c) $C_i \longrightarrow C_j + C_i$ (d) $R_i \longrightarrow R_i + C_j$

26) Equivalent matrices are obtained by

(a) taking inverses (b) taking transposes (c) taking ad-joints (d) taking finite number of elementary transformations

27) In echelon form, which of the following is incorrect ?

(a) Every row of A which has all its entries 0 occurs below every row which has a non-zero entry (b) The first non-zero entry in each non-zero row is 1

(c) The number of zeroes before the first non-zero element in a row is less than the number of such zeroes in the next row

(d) Two rows can have same number of zeroes before the first non-zero entry

28) If $\triangle \neq 0$ then the system is

(a) Consistent and has unique solution (b) Consistent and infinitely many solutions (c) Inconsistent (d) Either consistent or inconsistent

29) In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and one of Δ_x,$\Delta_y$or$\Delta_z$is non-zero then the system is

(a) consistent (b) inconsistent (c) consistent and the system reduces to two equations (d) consistent and the system reduces to a single equation

30) In the system of 3 linear equations with three unknowns, if $\Delta = 0, \Delta_x = 0, \Delta_y = 0, \Delta_z = 0$ and atleast one 2 x 2 minor of $\Delta \neq 0$ then the system is

(a) consistent (b) inconsistent (c) consistent and the system reduces to two equations (d) consistent and the system reduces to a single equation

31) In the system of 3 linear equations with three unknowns, if $\Delta = 0$ and all 2 x 2 minors of $\Delta = 0$and atleast one 2 x 2 minor of $\Delta_x$or$\Delta_y$or$\Delta_z$is non-zero then the system is

(a) consistent (b) inconsistent (c) consistent and the system reduces to two equations (d) consistent and the system reduces to a single equation

32) In the system of 3 linear equations with three unknowns, if $\Delta = 0$and all 2 x 2 minors of $\Delta, \Delta_x, \Delta_y, \Delta_z$are zeroes and atleast one non-zero element is in Δthen the system is

(a) consistent (b) inconsistent (c) consistent and the system reduces to two equations (d) consistent and the system reduces to a single equation

33) Every homogeneous system (linear)

(a) is always consistent (b) has only trivial solution (c) has infinitely many solutions (d) need not be consistent

34) If $\rho(A) = \rho[A, B] =$ the number of unknowns then the system is

(a) consistent and has infinitely many solutions (b) consistent and has a unique solution (c) consistent (d) inconsistent

35) $\rho(A) \neq \rho[A, B]$ then the system is

(a) consistent and has infinitely many solutions (b) consistent and has a unique solution (c) consistent (d) inconsistent

36) In the system of 3 linear equations with three unknowns $\rho(A) = \rho(A, B) = 1$ then the system

(a) has unique solution (b) reduces to 2 equations and has infinitely many solution (c) reduces to a single equation and has infinitely many solution (d) is inconsistent

37) In the homogeneous system with three unknowns, $\rho(A) =$number of unknowns then the system has

(a) only trivial solution (b) reduces to 2 equations and has infinitely many solution (c) reduces to a single equation and has infinitely many solution (d) is inconsistent

38) The system of 3 linear equations with three unknowns, in the non-homogeneous system $\rho(A) = \rho(A, B) = 2$ then the system

(a) has unique solution (b) reduces to 2 equations and has infinitely many solution (c) reduces to a single equation and has infinitely many solution (d) is inconsistent

39) In the homogeneous system $\rho(A) <$ the number of unknowns then the system has

(a) only trivial solution (b) trivial solution and infinitely many non-trivial solutions (c) only non-trivial solutions (d) no solution

40) Cramer's rule is applicable only (with three unknowns) when

(a) $\triangle \neq 0$ (b) $\triangle = 0$ (c) $\triangle = 0, \triangle_x \neq 0$ (d) $\Delta_x = \Delta_y = \Delta_z = 0$

41) Which of the following statement is correct regarding homogeneous system

(a) always inconsistent (b) has only trivial solution (c) has only non-trivial solutions

(d) has only trivial solution only if rank of the coefficient matrix is equal to the number of unknowns

42) If $\vec{a}$is a non-zero vector and m is a non-zero scalar then $m\vec{a}$ is a unit vector if

(a) $m = \pm 1$ (b) $a = |m|$ (c) $a = \frac{1}{|m|}$ (d) $a = 1$

43) If $\vec{a}$ and $\vec{b}$ are unit vectors and θ is the angle between them, then $(\vec{a} + \vec{b})$ is a unit vector if

(a) $\theta = \frac{\pi}{3}$ (b) $\theta = \frac{\pi}{4}$ (c) $\theta = \frac{\pi}{2}$ (d) $\theta = \frac{2\pi}{3}$

44) If $\vec{a}$ and $\vec{b}$ include an angle 120° and their magnitude are2 and $\sqrt{3}$ then $\vec{a}.\,\vec{b}$ is equal to

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

45) If $\vec{u} = \vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c}(\vec{a} \times \vec{b})$, then

(a) $\vec{u}$ is a unit vector (b) $\vec{u} = \vec{a} + \vec{b} + \vec{c}$ (c) $\vec{u} = \vec{0}$ (d) $\vec{u} \neq \vec{0}$

46) If $\vec{a}+\vec{b}+\vec{c}=0, |\vec{a}|=3, |\vec{b}|=4, |\vec{c}|=5$ then the angle between $\vec{a}$ and $\vec{b}$ is ,

(a) $\theta=\frac{\pi}{6}$ (b) $\theta=\frac{2\pi}{3}$ (c) $\theta=\frac{5\pi}{3}$ (d) $\theta=\frac{\pi}{2}$

47) The vectors $2\vec{i}+3\vec{j}+4\vec{k}$ and $a\vec{i}+b\vec{j}+c\vec{k}$ are perpendicular when

(a) $a=2, b=3, c=-4$ (b) $a=4, b=4, c=5$ (c) $a=4, b=4, c=-5$ (d) $a=-2, b=3, c=4$

48) The area of the parallelogram having a diagonal $3\vec{i}+\vec{j}-\vec{k}$ and a side $\vec{i}-3\vec{j}+4\vec{k}$ is ,

(a) $10\sqrt{3}$ (b) $5\sqrt{30}$ (c) $\frac{3}{2}\sqrt{30}$ (d) $3\sqrt{30}$

49) If $|\vec{a}+\vec{b}|=|\vec{a}-\vec{b}|$ then

(a) $\vec{a}$ is parallel to $\vec{b}$ (b) $\vec{a}$ is perpendicular to $\vec{b}$ (c) $|\vec{a}|=|\vec{b}|$ (d) $\vec{a}$ and $\vec{b}$ are unit vectors

50) If $\vec{p}, \vec{q}$ and $\vec{p}+\vec{q}$ are vectors of magnitude λ then the magnitude of $|\vec{p}-\vec{q}|$ is

(a) 2λ (b) $\sqrt{3}\lambda$ (c) $\sqrt{2}\lambda$ (d) 1

51) If $\vec{a}\times(\vec{b}\times\vec{c})+\vec{b}\times(\vec{c}\times\vec{a})+\vec{c}(\vec{a}\times\vec{b})=\vec{x}\times\vec{y}$ then

(a) $\vec{x}=\vec{0}$ (b) $\vec{y}=\vec{0}$ (c) $\vec{x}$ and $\vec{y}$ are parallel (d) $\vec{x}=\vec{0}$ or $\vec{y}=\vec{0}$ or $\vec{x}$ and $\vec{y}$ are parallel

52) If $\overrightarrow{PR}=2\vec{i}+\vec{j}+\vec{k}, \overrightarrow{QS}=-\vec{i}+3\vec{j}+2\vec{k}$ then the area of the quadrilateral $PQRS$ is

(a) $5\sqrt{3}$ (b) $10\sqrt{3}$ (c) $\frac{5\sqrt{3}}{2}$ (d) $\frac{3}{2}$

53) The projection of $\overrightarrow{OP}$ on a unit vector $\overrightarrow{OQ}$ equals thrice the area of parallelogram $OPRQ$. Then $\angle POQ$ is,

(a) $tan^{-1}(\frac{1}{3})$ (b) $cos^{-1}(\frac{3}{10})$ (c) $sin^{-1}(\frac{3}{\sqrt{10}})$ (d) $sin^{-1}\frac{1}{3}$

54) If the projection of $\vec{a}$ on $\vec{b}$ and the projection of $\vec{b}$ on $\vec{a}$ are equal then the angle between $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ is,

(a) $\theta=\frac{\pi}{2}$ (b) $\theta=\frac{\pi}{3}$ (c) $\theta=\frac{\pi}{4}$ (d) $\theta=\frac{2\pi}{3}$

55) If $\vec{a}\times(\vec{b}\times\vec{c})=(\vec{a}\times\vec{b})\times\vec{c}$ for non coplanar vectors $\vec{a},\vec{b},\vec{c}$ then

(a) $\vec{a}$ is parallel to $\vec{b}$ (b) $\vec{b}$ is parallel to $\vec{c}$ (c) $\vec{c}$ is parallel to $\vec{a}$ (d) $\vec{a}+\vec{b}+\vec{c}=\vec{0}$

56) If a line makes $45^o, 60^o$ with positive direction of axes x and y then the angle it makes with the z axis is

(a) 30^o (b) 90^o (c) 45^o (d) 60^o

57) If $[\vec{a}\times\vec{b}, \vec{b}\times\vec{c}, \vec{c}\times\vec{a}]=64$ then $[\vec{a}, \vec{b}, \vec{c}]$ is

(a) 32 (b) 8 (c) 128 (d) 0

58) If $[\vec{a}+\vec{b}, \vec{b}+\vec{c}, \vec{c}+\vec{a}]=8$ then $[\vec{a}, \vec{b}, \vec{c}]$ is

(a) 4 (b) 16 (c) 32 (d) -4

59) The value of $[\vec{i}+\vec{j}, \vec{j}+\vec{k}, \vec{k}+\vec{i}]$ is equal to

(a) 0 (b) 1 (c) 2 (d) 4

60) The shortest distance of the point $(2, 10, 1)$ from the plane $\vec{r}\cdot(3\vec{i}-\vec{j}+4\vec{k})=2\sqrt{26}$ is

(a) $2\sqrt{26}$ (b) $\sqrt{26}$ (c) 2 (d) $\frac{1}{\sqrt{26}}$

61) The vector $(\vec{a}\times\vec{b})\times(\vec{c}\times\vec{d})$ is

(a) perpendicular to $\vec{a}, \vec{b}, \vec{c}$ and $\vec{d}$ (b) parallel to the vectors $(\vec{a}\times\vec{b})$ $and(\vec{c}\times\vec{d})$

(c) parallel to the line of intersection of the plane containing $\vec{a}$ and $\vec{b}$ and the plane containing $\vec{c}$ and $\vec{d}$

(d) perpendicular to the line of intersection of the plane containing $\vec{a}$ and $\vec{b}$ and the plane containing $\vec{c}$ and $\vec{d}$

62) If $\vec{a}, \vec{b}, \vec{c}$ are a right handed triad of mutually perpendicular vectors of magnitude a, b, c then the value of $[\vec{a}, \vec{b}, \vec{c}]$ is

(a) $a^2b^2c^2$ (b) 0 (c) $\frac{1}{2}abc$ (d) abc

63) If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar and $[\vec{a}\times\vec{b}, \vec{b}\times\vec{c}, \vec{c}\times\vec{a}]=[\vec{a}+\vec{b}, \vec{b}+\vec{c}, \vec{c}+\vec{a}]$ then the value of $[\vec{a}, \vec{b}, \vec{c}]$ is,

(a) 2 (b) 3 (c) 1 (d) 0

64) $\vec{r}=s\vec{i}+t\vec{j}$ is the equation of

(a) a straight line joining the points $\vec{i}$ and $\vec{j}$ (b) xoy $plane$ (c) yoz $plane$ (d) zox $plane$

65) If the magnitude of moment about the point $\vec{j}+\vec{k}$ of a force $\vec{i}+a\vec{j}-\vec{k}$ acting through the point $\vec{i}+\vec{j}$ is $\sqrt{8}$ then the value of a is

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

66) The equation of the line parallel to $\frac{x-3}{1}=\frac{y+3}{5}=\frac{2z-5}{3}$ and passing through the point $(1, 3, 5)$ in vector form is

(a) $\vec{r}=(\vec{i}+5\vec{j}+3\vec{k})+t(\vec{i}+3\vec{j}+5\vec{k})$ (b) $\vec{r}=(\vec{i}+3\vec{j}+5\vec{k})+t(\vec{i}+5\vec{j}+3\vec{k})$ (c) $\vec{r}=(\vec{i}+5\vec{j}+\frac{3}{2}\vec{k})+t(\vec{i}+3\vec{j}+5\vec{k})$

(d) $\vec{r}=(\vec{i}+3\vec{j}+5\vec{k})+t(\vec{i}+5\vec{j}+\frac{3}{2}\vec{k})$

67) The point of intersection of the line $\vec{r}=(\vec{i}-\vec{k})+t(3\vec{i}+2\vec{j}+7\vec{k})$ and the plane $\vec{r}\cdot(\vec{i}+\vec{j}-\vec{k})=8$ is

(a) (8, 6, 22) (b) (-8, - 6, -22) (c) (4, 3, 11) (d) (-4, -3, -11)

68) The equation of the plane passing through the point (2, 1, -1) and the line of intersection of the planes $\vec{r}\cdot(\vec{i}+3\vec{j}-\vec{k})=0$ and $\vec{r}\cdot(\vec{j}+2\vec{k})=0$ is,

(a) $x+4y-z=0$ (b) $x+9y+11z=0$ (c) $2x+y-z+5=0$ (d) $2x-y+z=0$

69) The work done by the force $\vec{F}=\vec{i}+\vec{j}+\vec{k}$ acting on a particle, if the particle is displaced from A $(3, 3, 3)$ to the point B $(4, 4, 4)$ is,

(a) 2 units (b) 3 units (c) 4 units (d) 7 units

70) If $\vec{a}=\vec{i}-2\vec{j}+3\vec{k}$ and $\vec{b}=3\vec{i}+\vec{j}+2\vec{k}$ then a unit vector perpendicular to $\vec{a}$ and $\vec{b}$ is,

(a) $\frac{\vec{i}+\vec{j}+\vec{k}}{\sqrt{3}}$ (b) $\frac{\vec{i}-\vec{j}+\vec{k}}{\sqrt{3}}$ (c) $\frac{-\vec{i}+\vec{j}+\overrightarrow{2k}}{\sqrt{3}}$ (d) $\frac{\vec{i}-\vec{j}-\vec{k}}{\sqrt{3}}$

71) The point of intersection of the lines $\frac{x-6}{-6}=\frac{y+4}{+4}=\frac{z-4}{-8}$ and $\frac{x+1}{2}=\frac{y+2}{4}=\frac{z+3}{-2}$ is

(a) (0, 0, -4) (b) (1, 0, 0) (c) (0, 2, 0) (d) (1, 2, 0)

72) The point of intersection of the lines $\vec{r} = (\overrightarrow{-i} + \overrightarrow{2j} + \overrightarrow{3k}) + t(\overrightarrow{-2i} + \vec{j} + \vec{k})$ and $\vec{r} = (\overrightarrow{2i} + \overrightarrow{3j} + \overrightarrow{5k}) + s(\vec{i} + \overrightarrow{2j} + \overrightarrow{3k})$ is,

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

73) The shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ is,

(a) $\frac{2}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{6}}$ (c) $\frac{2}{3}$ (d) $\frac{1}{2\sqrt{6}}$

74) The shortest distance between the parallel lines $\frac{x-3}{4} = \frac{y-1}{2} = \frac{z-5}{-3}$ and $\frac{x-1}{4} = \frac{y-2}{2} = \frac{z-3}{-3}$

(a) 3 (b) 2 (c) 1 (d) 0

75) The following two lines $\frac{x-1}{2} = \frac{y-1}{-1} = \frac{z}{1}$ and $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z-1}{2}$ are,

(a) parallel (b) intersecting (c) skew (d) perpendicular

76) The centre and radius of the sphere given by $x^2 + y^2 + z^2 - 6x + 8y - 10z + 1 = 0$

(a) (-3, 4, -5) , 49 (b) (-6, 8, -10) , 1 (c) (3, -4, 5) , 7 (d) (6, -8, 10) , 7

77) The value of $\vec{a}.\vec{b}$ when $\vec{a} = \vec{i} - 2\vec{j} + \vec{k}$ and $\vec{b} = 4\vec{i} - 4\vec{j} + 7\vec{k}$ is

(a) 19 (b) 3 (c) -19 (d) 14

78) The value of $\vec{a}.\vec{b}$ when $\vec{a} = \vec{j} + 2\vec{k}$ and $\vec{b} = 2\vec{i} + \vec{k}$ is

(a) 2 (b) -2 (c) 3 (d) 4

79) The value of $\vec{a}.\vec{b}$ when $\vec{a} = \vec{j} - 2\vec{k}$ and $\vec{b} = 2\vec{i} + 3\vec{j} - 2\vec{k}$ is

(a) 7 (b) -7 (c) 5 (d) 6

80) if $m\vec{i} + 2\vec{j} + \vec{k}$ and $4\vec{i} - 9\vec{j} + 2\vec{k}$ are perpendicular then m is

(a) -4 (b) 8 (c) 4 (d) 12

81) if $5\vec{i} - 9\vec{j} + 2\vec{k}$ and $m\vec{i} + 2\vec{j} + \vec{k}$ are perpendicular then m is

(a) $\frac{5}{16}$ (b) $\frac{-5}{16}$ (c) $\frac{16}{5}$ (d) $\frac{-16}{5}$

82) if $\vec{a}$ and $\vec{b}$ are two vectors such that $|\vec{a}| = 4, \left|\vec{b}\right| = 3$ and $\vec{a}.\vec{b} = 6$ then the angle between $\vec{a}$ and $\vec{b}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{-\pi}{6}$ (c) $\frac{-\pi}{3}$ (d) $\frac{\pi}{3}$

83) The angle between the vectors $3\vec{i} - 2\vec{j} - 6\vec{k}$ and $4\vec{i} - \vec{j} + 8\vec{k}$ is

(a) $\cos^{-1}\left(\frac{34}{63}\right)$ (b) $\sin^{-1}\left(\frac{-34}{63}\right)$ (c) $\sin^{-1}\left(\frac{34}{63}\right)$ (d) $\cos^{-1}\left(\frac{-34}{63}\right)$

84) The angle between the vectors $\vec{i} - \vec{j}$ and $\vec{j} - \vec{k}$ is

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

85) The projection of the vector $7\vec{i} + \vec{j} - 4\vec{k}$ on $2\vec{i} + 6\vec{j} + 3\vec{k}$ is

(a) $\frac{7}{8}$ (b) $\frac{8}{\sqrt{66}}$ (c) $\frac{8}{7}$ (d) $\frac{\sqrt{66}}{8}$

86) $\vec{a}.\vec{b}$, when $\vec{a} = 2\vec{i} + 2\vec{j} - \vec{k}$ and $\vec{b} = 6\vec{i} - 3\vec{j} + 2\vec{k}$ is

(a) 4 (b) -4 (c) 3 (d) 5

87) If the vectors $\vec{a} = 3\vec{i} + 2\vec{j} + 9\vec{k}$ and $\vec{b} = \vec{i} + m\vec{j} + 3\vec{k}$ are perpendicular then m is

(a) -15 (b) 15 (c) 30 (d) -30

88) If the vectors $\vec{a} = 3\vec{i} + 2\vec{j} + 9\vec{k}$ and $\vec{b} = \vec{i} + m\vec{j} + 3\vec{k}$ are parallel then m is

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

89) if $\vec{a}, \vec{b}, \vec{c}$ are three mutually perpendicular unit vectors, then $\left|\vec{a} + \vec{b} + \vec{c}\right| =$

(a) 3 (b) 9 (c) $3\sqrt{3}$ (d) $\sqrt{3}$

90) If $\left|\vec{a} + \vec{b}\right| = 60$ and $\left|\vec{a} - \vec{b}\right| = 40$ and $\left|\vec{b}\right| = 46$ then $|\vec{a}|$ is

(a) 22 (b) 21 (c) 18 (d) 11

91) Let $\vec{u}, \vec{v}$ and $\vec{w}$ be vector such that $\vec{u} + \vec{v} + \vec{w} = \vec{0}$,If $|\vec{u}| = 3, |\vec{v}| = 4$ and $|\vec{w}| = 5$ then $\vec{u}.\vec{v} + \vec{v}.\vec{w} + \vec{w}.\vec{u}$ is

(a) 25 (b) -25 (c) 5 (d) -5

92) The projection of $\vec{i} - \vec{j}$ on Z-axis is

(a) 0 (b) 1 (c) -1 (d) 2

93) The projection of $\vec{i} + 2\vec{j} - 2\vec{k}$ on $2\vec{i} - \vec{j} - 5\vec{k}$ is

(a) $\frac{-10}{\sqrt{30}}$ (b) $\frac{10}{\sqrt{30}}$ (c) $\frac{1}{3}$ (d) $\frac{\sqrt{10}}{30}$

94) The projection of $3\vec{i} + \vec{j} - \vec{k}$ on $4\vec{i} - \vec{j} + 2\vec{k}$ is

(a) $\frac{9}{\sqrt{21}}$ (b) $\frac{-9}{\sqrt{21}}$ (c) $\frac{81}{\sqrt{21}}$ (d) $\frac{-81}{\sqrt{21}}$

95) The work done in moving a particle from the point A, with position vector $2\vec{i} - 6\vec{j} + 7\vec{k}$ to the point B , with position vector $3\vec{i} - \vec{j} - 5\vec{k}$ by a force $\vec{F} = \vec{i} + 3\vec{j} - \vec{k}$ is

(a) 25 (b) 26 (c) 27 (d) 28

96) The work done by the force $\vec{F} = a\vec{i} + \vec{j} + \vec{k}$ in moving the point of application from $(1, 1, 1)$ to $(2, 2, 2)$ along a straightline is given to be 5 units. The value of a is

(a) -3 (b) 3 (c) 8 (d) -8

97) If $|\vec{a}| = 3, |\vec{v}| = 4$ and $\vec{a}.\vec{b} = 9$ then $\left|\vec{a} \times \vec{b}\right|$ is

(a) $3\sqrt{7}$ (b) 63 (c) 69 (d) $\sqrt{69}$

98) The angle between two vectors $\vec{a}$ and $\vec{b}$, if $\left|\vec{a} \times \vec{b}\right| = \vec{a}.\vec{b}$ is

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

99) If $|\vec{a}| = 2, \left|\vec{b}\right| = 7$ and $\vec{a}x\vec{b} = 3\vec{i} - 2\vec{j} + 6\vec{k}$ then the angle between $\vec{a}$ and $\vec{b}$ is

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

100) The unit normal vectors to the plane $2x-y+2z=5$ are

(a) $2\vec{i}-\vec{j}+2\vec{k}$ (b) $\frac{1}{3}(2\vec{i}-\vec{j}+2\vec{k})$ (c) $-\frac{1}{3}(2\vec{i}-\vec{j}+2\vec{k})$ (d) $\pm\frac{1}{3}(2\vec{i}-\vec{j}+2\vec{k})$

101) The length of the perpendicular from the origin to the plane $\vec{r}.(3\vec{i}+4\vec{j}+12\vec{k})=26$ is

(a) 26 (b) 26/169 (c) 2 (d) 1/2

102) The distance from the origin to the plane $\vec{r}.(2\vec{i}-\vec{j}+5\vec{k})=7$ is

(a) $\frac{7}{\sqrt{30}}$ (b) $\frac{\sqrt{30}}{7}$ (c) $\frac{30}{7}$ (d) $\frac{7}{30}$

103) The centre and radius of the sphere $\left|\vec{r}-(2\vec{i}-\vec{j}+4\vec{k})\right|=5$ are

(a) $(2,-1,4)$ and 5 (b) $(2,1,4) and\ 5$ (c) $(-2,1,4)$ and 6 (d) $(2,1,-4)$ and 5

104) The centre and radius of the sphere $\left|2\vec{r}+(3\vec{i}-\vec{j}+4\vec{k})\right|=4$ are

(a) $(\frac{-3}{2},\frac{1}{2},-2),4$ (b) $(\frac{-3}{2},\frac{1}{2},-2)$ and 2 (c) $(\frac{-3}{2},\frac{1}{2},-2),6$ (d) $(\frac{-3}{2},\frac{1}{2},-2)$ and 5

105) The vectors equation of a plane whose distance from the origin is p and perpendicular to a vector $\hat{n}$ is

(a) $\vec{r}.\vec{n}=p$ (b) $\vec{r}.\vec{n}=q$ (c) $\vec{r}x\vec{n}=p$ (d) $\vec{r}.\hat{n}=p$

106) The non-parametric vector equation of a plane passing through a point whose P. V is $\vec{a}$ and parallel to $\vec{u}$ and $\vec{v}$ is

(a) $[\vec{r}-\vec{a},\vec{u},\vec{v}]=0$ (b) $[\vec{r},\vec{u},\vec{v}]=0$ (c) $[\vec{r},\vec{a},\vec{u}\times\vec{v}]=0$ (d) $[\vec{a},\vec{u},\vec{v}]=0$

107) The non-parametric vector equation of a plane passing through three points whose P. Vs are $\vec{a},\vec{b},\vec{c}$ is

(a) $\left[\vec{r}-\vec{a}\quad \vec{b}-\vec{a}\quad \vec{c}-\vec{a}\right]=0$ (b) $\left[\vec{r}\quad \vec{a}\quad \vec{b}\right]=0$ (c) $\left[\vec{r}\quad \vec{b}\quad \vec{c}\right]=0$ (d) $\left[\vec{a}\quad \vec{b}\quad \vec{c}\right]=0$

108) The vector equation of a plane passing through the line of intersection the planes $\vec{r}.\overrightarrow{n_1}=q_1$ and $\vec{r}.\overrightarrow{n_2}=q_2$ is

(a) $(\vec{r}.\overrightarrow{n_1}-q_1)+\lambda(\vec{r}.\overrightarrow{n_2}-q_2)=0$ (b) $\vec{r}.\overrightarrow{n_1}+\vec{r}.\overrightarrow{n_2}=q_1+\lambda q_2$ (c) $\vec{r}\times\overrightarrow{n_1}+\vec{r}\times\overrightarrow{n_2}=q_1+q_2$ (d) $\vec{r}\times\overrightarrow{n_1}-\vec{r}\times\overrightarrow{n_2}=q_1+q_2$

109) The angle between the line $\vec{r}=\vec{a}+t\vec{b}$ and the plane $\vec{r}.\vec{n}=q$ is connected by the relation.

(a) $cos\theta=\frac{\vec{a}.\vec{n}}{q}$ (b) $cos\theta=\frac{\vec{b}.\vec{n}}{|\vec{b}||\vec{n}|}$ (c) $sin\theta=\frac{\vec{a}.\vec{b}}{|\vec{n}|}$ (d) $sin\theta=\frac{\vec{b}.\vec{n}}{|\vec{b}||\vec{n}|}$

110) The vector equation of a sphere whose centre is origin and radius 'a' is

(a) $r=\vec{a}$ (b) $\vec{r}-\vec{c}=\vec{a}$ (c) $|\vec{r}|=|\vec{a}|$ (d) $\vec{r}=a$

111) The value of $\left[\frac{-1+i\sqrt{3}}{2}\right]^{100}+\left[\frac{-1-i\sqrt{3}}{2}\right]^{100}$ is

(a) 2 (b) 0 (c) -1 (d) 1

112) The modules and amplitude of the complex number $\left[e^{3-i\frac{\pi}{4}}\right]^3$ are respctively

(a) $e^9,\frac{\pi}{2}$ (b) $e^9\frac{-\pi}{2}$ (c) $e^6\frac{-3\pi}{4}$ (d) $e^9\frac{-3\pi}{4}$

113) If $(m-5)+i(n+4)$ is the complex conjugate of $(2m+3)+i(3n-2)$ then (n,m) are

(a) $\left(\frac{-1}{2},-8\right)$ (b) $\left(\frac{-1}{2},8\right)$ (c) $\left(\frac{1}{2},-8\right)$ (d) $\left(\frac{1}{2},8\right)$

114) If x^2+y^2 = 1 then the value of $\frac{1+x+iy}{1+(x-iy)}$ is

(a) $x-iy$ (b) $2x$ (c) $-2iy$ (d) $x+iy$

115) The modulus of the complex number $2+i\sqrt{3}$ is

(a) $\sqrt{3}$ (b) $\sqrt{13}$ (c) $\sqrt{7}$ (d) 7

116) If $A+iB=(a_1+ib_1)(a_2+ib_2)(a_3+ib_3)$ then $A^2 + B^2$ is

(a) $a_1^2+b_1^2+a_2^2+b_2^2+a_3^2+b_3^2$ (b) $(a_1+a_2+a_3)^2+(b_1+b_2+b_3)^2$ (c) $(a_1^2+b_1^2)(a_2^2+b_2^2)(a_3^2+b_3^2)$ (d) $(a_1{}^2+a_2{}^2+a_3{}^2)(b_1^2+b_2^2+b_3^2)$

117) If $a=3+i$ and $z=2-3i$ then the points on the Argand diagram representing $az, 3az$ and $-az$ are

(a) vertices of a right angled triangle (b) vertices of an equilateral triangle (c) vertices of an isosceles triangle (d) collinear

118) The points z_1, z_2, z_3 in the complex plane are the vertices of a parallelogram taken in order if and only if

(a) $z_1+z_4=z_2+z_3$ (b) $z_1+z_3=z_2+z_4$ (c) $z_1+z_2=z_3+z_4$ (d) $z_1-z_2=z_3-z_4$

119) If z represents a complex number then $arg(z)+arg(\bar{z})$ is

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) 0 (d) $-\frac{\pi}{4}$

120) If the amplitude of a complex number is $\frac{\pi}{2}$ then the number is

(a) purely imaginary (b) purely real (c) 0 (d) neither real nor imaginary

121) If the point represented by the complex number iz is rotated about the origin through the angle $\frac{\pi}{2}$ in the counter clockwise direction then the complex number representing the new position is

(a) iz (b) $-iz$ (c) $-z$ (d) z

122) The polar form of the complex number $\left(i^{25}\right)^3$ is

(a) $cos\frac{\pi}{2}+isin\frac{\pi}{2}$ (b) $cos\pi+isin\pi$ (c) $cos\pi-isin\pi$ (d) $cos\frac{\pi}{2}-isin\frac{\pi}{2}$

123) If P represents the variable complex number Z and if $|2z-1|=2\ |z|$ then the locus of P is

(a) the straight line $x=\frac{1}{4}$ (b) the straight line $y=\frac{1}{4}$ (c) the straight line $z=\frac{1}{2}$ (d) the circle $x^2+\ y^2-4x-1=0$

124) The value of $\frac{1+e^{-i\theta}}{1+e^{i\theta}}$ is

(a) $cos\theta+isin\theta$ (b) $cos\theta-isin\theta$ (c) $sin\theta-icos\theta$ (d) $sin\theta+icos\theta$

125) If $z_n=cos\frac{n\pi}{3}+isin\frac{n\pi}{3}$ then $z_1z_2z_3......z_6$ is

(a) 1 (b) -1 (c) i (d) -i

126) If $-\bar{z}$ lies in the third quadrant then z lies in the

(a) first quadrant (b) second quadrant (c) third quadrant (d) fourth quadrant

127) If $x=cos\theta+isin\theta$ then the value of $x^n+\frac{1}{x^n}$ is

(a) $2cosn\theta$ (b) $2isinn\theta$ (c) $2sinn\theta$ (d) $2icosn\theta$

128) If $a = cos\alpha - i\sin\alpha, b = cos\beta - i\sin\beta$ and $c = cos\gamma - i\sin\gamma$ the $(a^2c^2 - b^2)/abc$ is

(a) $cos\ 2(\alpha-\beta+\gamma) + i\sin 2(\alpha-\beta+\gamma)$ (b) $-2cos(\alpha-\beta+\gamma)$ (c) $-2i\sin(\alpha-\beta+\gamma)$ (d) $2\cos(\alpha-\beta+\gamma)$

129) The value of $i + i^{22} + i^{23} + i^{24} + i^{25}$ is

(a) i (b) $-i$ (c) 1 (d) -1

130) The conjugate of $i^{13} + i^{14} + i^{15} + i^{16}$

(a) 1 (b) -1 (c) 0 (d) $-i$

131) If $-i + 2$ is one root equation $ax^2 - bx + c = 0$, then the other root is

(a) $-i-2$ (b) $i-2$ (c) $2+i$ (d) $2i+1$

132) The quadratic equation whose roots are $\pm i\sqrt{7}$ is

(a) $x^2+7=0$ (b) $x^2-7=0$ (c) $x^2+x+7=0$ (d) $x^2-x-7=0$

133) The equation having $4-3i\ and\ 4+3i$ and as roots is

(a) $x^2+8x+25=0$ (b) $x^2+8x-25=0$ (c) $x^2-8x+25=0$ (d) $x^2-8x-25=0$

134) If $\frac{1-i}{1+i}$ is a root of $ax^2+bx+1=0$, where a, b are real then (a,b) is

(a) (1,1) (b) (1,-1) (c) (0,1) (d) (1,0)

135) If ω is a cube root of unity then the value of $(1-\omega+\omega^2)^4 + (1+\omega-\omega^2)^4$ is

(a) 0 (b) 32 (c) -16 (d) -32

136) If ω is the nth root of unity then

(a) $1+\omega^2+\omega^4+\ldots\ldots = \omega+\omega^3+\omega^5+\ldots\ldots$ (b) $\omega^n = 0$ (c) $\omega^n = 1$ (d) $\omega = \omega^{n-1}$

137) If ω is a cube root of unity then the value of $(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8)$ is

(a) 9 (b) -9 (c) 16 (d) 32

138) The complex number form of $\sqrt{-35}$ is

(a) $i\sqrt{35}$ (b) $-i\sqrt{35}$ (c) $i\sqrt{-35}$ (d) $35i$

139) The complex number form of $3-\sqrt{-7}$ is

(a) $-3+i\sqrt{7}$ (b) $3-i\sqrt{7}$ (c) $3-i7$ (d) $3+i7$

140) Real and imaginary parts of $4-i\sqrt{3}$ are

(a) $4, \sqrt{3}$ (b) $4, -\sqrt{3}$ (c) $-\sqrt{3}, 4$ (d) $\sqrt{3}, 4$

141) Real and imaginary parts of $\frac{3}{2}i$ are

(a) $0, \frac{3}{2}$ (b) $\frac{3}{2}, 0$ (c) $2, 3$ (d) $3, 2$

142) The complex conjugate of $2+i\sqrt{7}$ is

(a) $-2+i\sqrt{7}$ (b) $-2-i\sqrt{7}$ (c) $2-i\sqrt{7}$ (d) $2+i\sqrt{7}$

143) The complex conjugate of $\sqrt{5}$ is

(a) $\sqrt{5}$ (b) $-\sqrt{5}$ (c) $i\sqrt{5}$ (d) $-i\sqrt{5}$

144) The standard form$(a+ib)$ of $3+2i+(-7-i)$ is

(a) $4-i$ (b) $-4+i$ (c) $4+i$ (d) $4+4i$

145) If $a+ib = (8-6i)-(2i-7)$ then the values of a and b are

(a) 8, -15 (b) 8, 15 (c) 15, 9 (d) 15, -8

146) If $p+iq = (2-3i)(4+2i)$ then q is

(a) 14 (b) -14 (c) -8 (d) 8

147) The conjugate of $(2+i)(3-2i)$ is

(a) $8-i$ (b) $-8-i$ (c) $-8+i$ (d) $8+i$

148) The real and imaginary parts of$(2+i)(3-2i)$ are

(a) -1, 8 (b) -8, 1 (c) 8, -1 (d) -8,-1

149) The modulus value of $-3-2i$ and $2-3i$

(a) 5,5 (b) $\sqrt{5}, 7$ (c) $\sqrt{6}, 1$ (d) $\sqrt{13}, 5$

150) The cube roots of unity are

(a) in G.P. with common ratio ω (b) in G.P. with common difference ω^2 (c) in A.P. with common difference ω (d) in A.P. with common difference ω^2

151) The arguments of nth roots of a complex number differ by

(a) $\frac{2\pi}{n}$ (b) $\frac{\pi}{n}$ (c) $\frac{3\pi}{n}$ (d) $\frac{4\pi}{n}$

152) Which of the following statements is correct?

(a) Negative complex numbers exist (b) Order relation does not exist in real numbers (c) Order relation exist in complex numbers

(d) $(1+i) > (3-2i)$ is meaningless

153) Which of the following are correct ? i) $Re(Z) \leq |Z|$ ii) $Im(Z) \geq |Z|$ iii) $|\bar{Z}| = |Z|$iv) $(\bar{Z^n}) = (\bar{Z})^n$

(a) $(i), (ii)$ (b) $(ii), (iii)$ (c) $(ii), (iii) and (iv)$ (d) $(i), (iii) and (iv)$

154) The values of $\bar{\bar{Z}} + \bar{Z}$

(a) $2Re(Z)$ (b) $Re(Z)$ (c) $Im(Z)$ (d) $2Im(Z)$

155) The value of $Z\bar{Z}$ is

(a) $|Z|$ (b) $|Z|^2$ (c) $2\,|Z|$ (d) $2|Z|^2$

156) If $|Z-Z_1| = |Z-Z_2|$ then the locus of Z is

(a) a circle with centre at the origin (b) a circle with centre at Z_1 (c) a straight line passing through the origin

(d) is a perpendicular bisector of the line joining $Z_1 \quad and \quad Z_2$

157) If ω is a cube root of unity then

(a) $\omega^2 = 1$ (b) $1 + \omega = 0$ (c) $1 + \omega + \omega^2 = 0$ (d) $1 - \omega + \omega^2 = 0$

158) The principal value of$argZ$ lies in the interval

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

159) If Z_1 and $Z_2$are any two complex numbers then which one of the following is false

(a) $Re(Z_1 + Z_2) = Re(Z_1) + Re(Z_2)$ (b) $Im(Z_1 + Z_2) = Im(Z_1) + Im(Z_2)$ (c) $arg(Z_1 + Z_2) = arg(Z_1) + arg(Z_2)$ (d) $|Z_1 Z_2| = |Z_1| \, |Z_2|$

160) The fourth roots of unity are

(a) $1 \pm i, -1 \pm i$ (b) $\pm i, 1 \pm i$ (c) $\pm 1, \pm i$ (d) $1, -1$

161) The fourth roots of unity form the vertices of

(a) an equilateral triangle (b) a square (c) a hexagon (d) a rectangle

162) Cube roots of unity are

(a) $1, \frac{-1 \pm i\sqrt{3}}{2}$ (b) $i - 1 \pm \frac{i\sqrt{3}}{2}$ (c) $1, \frac{1 \pm i\sqrt{3}}{2}$ (d) $i, \frac{1 \pm i\sqrt{3}}{2}$

163) The number distinct values of $(cos\theta + i \quad sin\theta)^{\pi/q}$ where p and q are non-zero integers prime to each other is

(a) P (b) q (c) $p + q$ (d) $p - q$

164) The value of $e^{i\theta} + e^{-i\theta}$ is

(a) $2cos\theta$ (b) $cos\theta$ (c) $2sin\theta$ (d) $sin\theta$

165) The value of $e^{i\theta} - e^{-i\theta}$ is

(a) $\sin\theta$ (b) $2\sin\theta$ (c) $i\sin\theta$ (d) $2i\sin\theta$

166) Geometrical interpretation of $\bar{z}$ is

(a) reflection of Z on real axis (b) reflection of Z on imaginary axis (c) rotation of$Z$ about origin

(d) rotation of Z about origin through $\pi/2$ in clockwise direction

167) If $Z_1 = a + ib, Z_2 = -a + ib$ then $Z_1 + Z_2$ lies on

(a) real axis (b) imaginary axis (c) the line$y = x$ (d) the line $y = -x$

168) Which one of the following is incorrect ?

(a) $(cos\theta + isin\theta)^n = \quad cosn\theta + i \quad sinn\theta$ (b) $(cos\theta - isin\theta)^n = \quad cosn\theta - isinn\theta$ (c) $(sin\theta + isin\theta)^n = \quad sinn\theta + icosn\theta$

(d) $\frac{1}{cos\theta + isin\theta} = \quad cos\theta - isin\theta$

169) Polynomial equation$P(x) = 0$ admits conjugate pairs of imaginary roots only if the coefficients are

(a) imaginary (b) complex (c) real (d) either real or complex

170) Identify the correct statement

(a) Sum of the moduli of two complex numbers is equal to their modulus of the sum (b) Modulus of the product of the complex numbers is equal to sum of the moduli

(c) Arguments of the product of two complex numbers is the product of their arguments

(d) Arguments of the product of two complex numbers is equal to the sum of their arguments

171) Which of the following is not true?

(a) $\overline{Z_1 + Z_1} = \overline{Z_1} + \overline{Z_2}$ (b) $\overline{Z_1 Z_2} = \bar{Z}_1 \bar{Z}_2$ (c) $Re(z) = \frac{\bar{z} + z}{2}$ (d) $Im(z) = \frac{\bar{z} - z}{2i}$

172) If $Z_1 \quad and \quad Z_2$are complex numbers then which of the following is meaningful ?

(a) $Z_1 < Z_2$ (b) $Z_1 > Z_2$ (c) $Z_1 \geq Z_2$ (d) $Z_1 \neq Z_2$

173) Which of the following is incorrect ?

(a) $Re(Z) \leq |Z|$ (b) $Im(Z) \leq |Z|$ (c) $Z\bar{Z} = |Z|^2$ (d) $Re(z) \geq |Z|$

174) Which of the following is incorrect ?

(a) $|z_1 + z_2| \leq |z_1| + |z_2|$ (b) $|z_1 - z_2| \leq |z_1| + |z_2|$ (c) $|z_1 - z_2| \geq |z_1| - |z_2|$ (d) $|z_1 + z_2| \geq |z_1| + |z_2|$

175) Which of the following is incorrect ?

(a) $\bar{Z}$ is the mirror image of on the real axis (b) The polar form of $\bar{Z}$ is (r,-θ) (c) -Z is the point symmetrical to about the origin

(d) The polar form of $-Z$ is $(-r, -\theta)$

176) Which of the following is incorrect ?

(a) Multiplying a complex number by i is equivalent to rotating the number counter clockwise about the origin through an angle of 90°

(b) Multiplying a complex number by -i is equivalent to rotating the number clockwise about the origin through an angle of 90°

(c) Dividing a complex number by i is equivalent to rotating the number counter clockwise about the origin through an angle of 90°

(d) Dividing a complex number by i is equivalent to rotating the number clockwise about the origin through an angle of 90°

177) Which of the following is incorrect regarding nth roots of unity ?

(a) the number of distinct roots is n (b) the roots are in G.P. with common ratio $cis\frac{2\pi}{n}$ (c) the arguments are in A.P. with common difference $\frac{2\pi}{n}$

(d) product of the roots is 0 and the sum of the roots is ± 1

178) Which of the following are true? i) If n is a positive integer then $(cos\theta + isin\theta)^n = cosn\theta + isinn\theta$ ii) If n is a negative integer then $(cos\theta + isin\theta)^n = cosn\theta - isinn\theta$ iii) If n is a fraction then $cosn\theta + isinn\theta$ is one of the values of $(cos\theta + isin\theta)^n$ iv) If n is a negative integer then $(cos\theta + isin\theta)^n = cosn\theta + isin\theta$

(a) $(i), (ii), (iii), (iv)$ (b) $(i), (iii), (iv)$ (c) $(i), (iv)$ (d) $(i) only$

179) If $0(0,0), A(z_1), B(z_2), B(-z_2)$ are the complex numbers in a argand plane then which of the following are correct? i) In the parallelogram $OACB$, C represents $z_1 + z_2$ ii) In the argand plane E represents where $OE = OA.OB$ and OE makes an angle $arg(z_1) + arg(z_2)$ with positive real axis iii) In the argand parallelogram OB'DA, D represents $z_1 - z_2$ iv) In the argand plane F represents $\frac{z_1}{z_2}$ where $OF = \frac{OA}{OB}$ and OF makes an angle $arg\,(z_1) - arg\,(z_2)$ with positive real axis.

(a) $(i), (ii), (iii), (iv)$ (b) $(i), (iii), (iv)$ (c) $(i), (iv)$ (d) $(i) only$

180) If $Z = 0$ then the $arg(z)$ is

(a) 0 (b) π (c) $\frac{\pi}{2}$ (d) indeterminate

****