# MATHS

## BOOKS - UNITED BOOK HOUSE

## MODEL QUESTION PAPERS-SET 15

**Exercise**

**1.** If B set is the power set of set A, then the correct option is.

A. a)A=B

B. b)$A \in B$

C. c)$A \supset B$

D. d)$B \supset A$

**Answer:**

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**2.** Amplitude of the complex number z= 1 is

A. a)$-\pi/2$

B. b)0

C. c)$\pi/2$

D. d)$\pi$

**Answer:**

3. In the expansion of $\left(C + \dfrac{1}{C}\right)^{10}$ ,the term independent of C is

A. a)^10C_4`

B. b)^10C_6`

C. c)^10C_5`

D. d)^10C_7`

**Answer:**

4. If the arithmetic mean of x and y is $\dfrac{x^n + y^n}{(x^{n-1} + y^{n-1})}$ ,then the value of n is

A. a)0

B. b)1

C. c)2

D. d)-1

**Answer:**

**5.** The gra'diant of the line perpendicular to the line

x/7-y/3+1=0is

    A. a)7/3

    B. b)3/7

    C. c)-3/7

    D. d)-7/3

**Answer:**

**6.** If the staight line x+ y= c touches the circlc

$x^2 + y^2 = 2$, then the value of $|c|$ is

A. a)2

B. b)$\sqrt{2}$

C. c)1

D. d)0

**Answer:**

**7.** If $\lim\limits_{x \to 0} \dfrac{\tan x - \sin x}{x^3} = \dfrac{M}{N}$ and M = 3, then the

value of N is

A. a)2

B. b)4

C. c)6

D. d)8

**Answer:**

**8.** If $y = \tan^{-1}\left(\dfrac{1 + x}{1 - x}\right)$ then dy/dx=

A. a)1

B. b)$\dfrac{1}{1 + x^2}$

C. c) $\dfrac{2}{1 + x^2}$

D. d) $\dfrac{1 - x^2}{1 + x^2}$

**Answer:**

**9.** An unbaised coin is tossed two times, the probability of getting 'head' in both case will be.

A. a)1/2

B. b)1

C. c)1/4

D. d)3/4

**Answer:**

**10.** If the coefficent of variation = 40% and variance =

16, the mean will be

A. a)5

B. b)10

C. c)15

D. d)20

**Answer:**

**11.** If n(X) = 4 and n(Y) = 7, then find the maximum and minimum value of $n(X \cup Y)$.

**12.** Given R = {(x, y) : x, $y \in N$ and 2x + 3y = 9}.' Find R as sets of ordered pair. '

**13.** Find the value of $\tan 20° \tan 40° \tan 80°$.

**14.** In $\triangle PQR$, $\angle P = 60°$, show that $q + r = \dfrac{q - p}{2}$

**15.** If $z = \dfrac{\sqrt{3} - i}{2}$, then Find the. value of $z^{33}$

**16.** If $^{25}C_r = {}^{25}C_{2r+1}$, the value of $^rC\_5$ is

**17.** If $(1+x)^n = C_0 + C_1 x + C_2 x^2 + \ldots + C_n x^n$

.then show that $C_1 + 2C_2 + \ldots$ nC_n=n.2^(n-1)`.

**18.** Calculate the sum of the series :
$$3 - \frac{3}{2} + \frac{3}{2^2} - \frac{3}{2^3} + \ldots$$

**19.** Find the length of the intercept of the staight line

3x +4y = 12 with the axes

**20.** Find the image of the co-ordinate of a point.(-3, 4,

7) with respect to yz plane.

**21.** Find the value of : $\lim\limits_{x \to 0} \dfrac{\sin 2x + \sin 6x}{\sin 5x - \sin 3x}$

**22.** If $4f(x) + 3f(-x) = 7 - 3x$, find the value of f(1).

**23.** A box contains 6 white balls and 4 black balls, A ball is drawn at random from the box. What is the probability that the ball is white.

**24.** Mean of the getting mathematics number of 70 students is 45. If SD is. 18, then find the co-efficient of

variation

**25.** A and B are two sets and if n(A) = 4 and n(B) = 7, then find the minimum value of $n(A \cup B)$ and the maximum value $n(A \cap B)$

**26.** Show that $\cot 7\left(\dfrac{1}{2}\right)^\circ = 2 + \sqrt{2} + \sqrt{3} + \sqrt{6}$

**27.** If $a^4 + b^4 + c^4 + a^2b^2 = 2c^2(a^2 + b^2),$, then show that $\angle C = 60°$ or $120°$

**28.** By ........in "Principle of Mathematical Induction" prove that for all n $\in$ N

$$1^2 + 2^2 + 3^2 + ....... + n^2 = \frac{n(n+1)(2n+1)}{6}$$

**29.** If w be a imaginary cube root of uniyt and a+b+c=0 then show that

$$\left(a + bw + cw^2\right)^3 + \left(a + bw^2 + cw\right)^3 = 27abc$$

**30.** How many different numbers of 5 digits each (without repetition of digits) can be formed with the digits-5, 6, 7, 8,0 so that the numbers are divisible by 4".

**31.** Prove that the middle term in the expansion of $(1 + x)^{2n}$ is $\dfrac{1.3.5....... (2n - 1)}{\lfloor n}.2^n. x^n$

**32.** Show that the points (-4, 0). (6, 4), (5, 0)and (0, -2)

form a trapezium. Find the equations of its two

diagonals and also find the angle (acute) between

the two diagonals.

**33.** If p and q are the lengths of perpendiculars from

the            origin            to            the            lines

$x \cos \theta - y \sin \theta = k \cos 2\theta$   and   $x \sec \theta + y \cos ec\theta = k$

, respectively, prove that $p^2 + 4q^2 = k^2$.

**34.** Find the equation to the circle described on the common chord of the given circles $x^2 + y^2 = 4x + 5$ and $x^2 + y^2 + 8x + 7 = 0$ as diameter.

**35.** Find the ratio in which the ZX plane divides the line segment joining the .points (2, 4, 5) and (3, -6, 8).

**36.** Evaluate : $\lim\limits_{x \to 0} \dfrac{x - \sin x}{x^3}$

**37.** If $y = \sin x°$ .find dy/dx from defination.

**38.** Prove that $\sqrt{2}$ irrational, (use the method of contradiction).

**39.** If x and y are odd integers, then xy is also an odd integer r examine its truth value.

**40.** The probability of' the solving a problems in mathematics of three students are 1/3,1/5,1/6 . If they try to solve the problem together, find the probability that the problem is solved by at least one student.

**41.** Scores of a batsman of 5 consecutive inings are 39, 51, 59, 62 and 74. Find the mean diviation of the samples .with respect to AM and median.

**42.** If $\alpha \neq \beta$ and $a\tan\alpha + b\tan\beta = (a+b)\tan\left(\dfrac{\alpha+\beta}{2}\right)$ ,then show that $\dfrac{\cos\alpha}{\cos\beta} = \dfrac{a}{b}$

**43.** Show that $\tan\alpha\tan\beta = \tan^2\gamma$ when

$$\frac{\tan(\alpha-\beta)}{\tan\alpha} + \frac{\sin^2\gamma}{\sin^2\alpha} = 1$$

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**44.** Sum of the square of three different terms, which are in GP is $s^2$. If the sum of the three terms is $\alpha s$, show that $1/3 < \alpha^2 < 3$.

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**45.** Draw the graph and find the common solution region of the . following system of inequations :

$2x + y \geq 6, 3x + 4y \geq 2.$

**46.** Solve. $\sqrt{3}x^2 - \sqrt{2}x + 3\sqrt{3} = 0$

**47.** If the roots of the quadratics $x^2 - qx + p = 0$ and $x^2 - px + q = 0(p \neq q)$ differ by a constant, show.that p + q + 4 = 0.

**48.** Find the equation of a hyperbola whose eccentricity is 5/4 and the. coordinate of foci are (2, -3)and (2, 5).

**49.** The co-ordinates of focus and its nearest vertex of an ellipse are (3, -5) and (4, -5) respectively and eccnetricity is 2/3 . Find the co ordinate of its centre and the co-ordinate of the point of contact of. the directrix and Major axis nearest to focus.

**50.** If l and l' be the lengths of the segment $\overline{PS}$ and $\overline{P'S}$ of a focal chord $\overline{PP'}$ of the parabola $y^2 = 4ax$ .then show that $1/l + 1/l' = 1/a$ when s is the focus of the parabola