# MATHS

# BOOKS - OSWAAL PUBLICATION

# SAMPLE PAPER 4

**Exercise**

**1.** If A={1,2},B={3,4} then show that $A \times (B \cap \emptyset) = \emptyset$.

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**2.** If $\cos x = \left(-\dfrac{3}{5}\right)$ , x lies in the 3rd Quadrant .

Find the value of : (i) sinx (ii) tanx?

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**3.** Evaluate: $i^{24} + \left(\dfrac{1}{i}\right)^{26}$.

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**4.** Find the number of 4 digit numbers that can be formed using the digits 1,2,3,4,5.If no digits is repeated.

**5.** Which terms of the GP: $2, 2\sqrt{2}, 4,\ldots\ldots\ldots$ Is 128 ?

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**6.** Reduce $6x + 3y - 5 = 0$ into slope- intercept

form

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**7.** Find $\lim_{x \to 5} |x| - 5.$

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**8.** Write the negation of the statement "Every natural number is greater than zero"?

**9.** If $\dfrac{2}{11}$ is the probability of an event.What is the probability the event 'not A '

**10.** If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{2, 4, 6, 8\}$ and $B = \{2, 3, 5, 7\}$. Verify that :

$(A \cup B)' = A' \cap B'$

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**11.** If X and Y are two sets such that $X \cup Y$ has 50 elements, X has 28 elements and Y has 32 elements, how many elements does $X \cap Y$ have ?

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**12.** Let A={1,2} and B={3,4}. Write $A \times B$. How many subsets will $A \times B$ have? List them.

**13.** The minute hand of a watch is 1.5 cm long. How far foes its tip move in 40 minutes?

**14.** Prove that : $\sin 3x = 3 \sin x - 4 \sin^3 x$

**15.** If $x + iy = \dfrac{a + ib}{a - ib}$, prove that $x^2 + y^2 = 1$

**16.** Solve the inequality $(2x - 5) > (1 - 5x)$ and represent the solution graphically on the number line.

**17.** By using the concept of equation of the line prove that the three points(3,0),(-2,-2) and (8,2) are

collinear.

**18.** Find the equation of the line parallel to the line $3x - 4y + 2 = 0$ and passing through the point $(-2, 3)$

**19.** Find the ratio in which the y-z plane divides the line segment formed by joining points (-2,4,7) and (3,-5,8)

**20.** Compute the derivative of $f(x) = \sin^2 x$.

**21.** By giving counter example, show that the following statement is false.

P : If n is an odd integer, then n is prime

**22.** The mean and variance of heights of XI students are 162.6 cm and $127.69cm^2$ respectively.Find the C.V.

**23.** A card is selected from a pack of 52 cards.Calculate the probability that the card(i)an ace.

**24.** A card is selected from a pack of 52 cards.Find the probability that the card drawn is
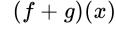
(i) an ace

(ii) black card

25. In a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice.

**26.** Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real values functions, find

$(f + g)(x)$

**27.** Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real values functions, find

$(f - g)(x)$

**28.** Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real functions. Find $(f + g)(x), (f - g)(x), (fg)(x), \left(\dfrac{f}{g}\right)(x)$.

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**29.** Find the genral solution of $\sec^2 2x = 1 - \tan 2x$

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**30.** Express $\dfrac{1 + i}{1 - i}$ into polar form.

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**31.** Solve: $2x^2 + \sqrt{3}x + 1 = 0$

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**32.** Find r, if $5^4 P_r = 6^5 P_{r-1}$

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**33.** Find the co-efficient of $x^5$ in $(x+3)^8$ ?

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**34.** Insert five numbers between 8 and 26 such that the resulting sequence is in AP.

**35.** The sum of first three terms of a G.P. is $\dfrac{13}{12}$ and their product is – 1. Find the common ratio and the terms.

**36.** Find the equation of the parabola with vertex at the origin axis along x- axis and pass-ing through

the point $(2, 3)$ also find its focus.

**37.** Differentiate:$x + \dfrac{1}{x}$ from first principle.

**38.** Verify by the method of contradiction that $\sqrt{7}$ is irrational number

**39.** A bag contains 9 dics of which 4 are red,3 are blue and 2 are yellow. The discs are similar in shape and size. A disc is drawn at random from the bag. Calculate the probability that it be

Red.

**40.** A bag contains 9 discs of which 4 are red 3 are blue and 2 are yellow.The discs are similar in shape and size.The disc is drawn at random from the bag.Calculate the probability that the disc drawn will be(ii)not blue

**41.** A bag contains 9 discs of which 4 are red 3 are blue and 2 are yellow.The discs are similar in shape and size.The disc is drawn at random from the bag.Calculate the probability that the disc drawn will be(iii) either red or blue.

**42.** If E and F are events such that $P(E) = \dfrac{1}{4}, P(F) = \dfrac{1}{2}$ and $P(E \text{ and } F) = \dfrac{1}{8}.$

Find

P(E or F).

**43.** If E and F are two events such that

$$P(E) = \frac{1}{4}, P(E) = \frac{1}{2} \text{ and } P(E \text{ and } F) = \frac{1}{8}.$$

Find P (not E and not F).

**44.** Draw the graph of the signum function write its

domain and range.

**45.** Prove that

$$\cos 2x \cos \frac{x}{2} - \cos 3x \cos \ (9\text{x})/(2) = \sin 5\text{x} \sin \ \frac{5x}{2}.$$

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**46.** $10^{2n-1} + 1$ is divisible by 11.

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**47.** Find the number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue balls such that

the selection consists of 3 balls of each colour.

**48.** P(a,b) is the midpoint of the line segment between axes,Show that the equation of the line is $\dfrac{x}{a} + \dfrac{y}{b} = 2$.

**49.** Derive the formula for the distance between two points $(x_1, y_1, z_1)$ and $(x_2, y_2, z_2)$ and hence find the distance between P(1,-3,4) and Q(-4,1,2).

**50.** Prove that $\lim\limits_{x \to 0} \dfrac{\sin x}{x} = 1$, where x is in radian and hence evaluate: $\lim\limits_{x \to 0} \dfrac{\sin 4x}{\sin 2x}$.

**51.** The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?

**52.** Derive the equation of the ellipse in the form

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

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**53.** Find the derivative of

$$\frac{2}{x+1} - \frac{x^2}{3x-1}$$

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**54.** Find the sum to n terms of the series ,

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots. ?$$