MATHS

BOOKS - JBD PUBLICATION

MODEL PAPER (15)

Exercise

1. What is the set builder form of the set {1,2,3}.

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2. The range of the function $f(x) = \frac{x+2}{|x+2|}, x \neq -2$ is:

A. {-1,1}

B. {-1,-,1}

C. {1}

D. $(0, \infty)$

Answer:

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3. The solutions of the equation $\sin^2 x + 3\sin x = 0$ is:

A. $\frac{\pi}{3}$

B. $\frac{3\pi}{3}$

C. π

D. none of these

Answer:

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4. The value of $\left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)$ is:

A. 7

B. 3

C. -7

D. none of these

Answer:

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5. ${}^{n}C_{r} + {}^{n}C_{r+1} = {}^{n+1}C_{x}$, then x is equal to:

A. 2r

B. $\frac{r-1}{2}$

C. r+1

D. none of these

Answer:

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6. The nth term of a G.P. is 128 and the sum of its n terms is 225. If its common ratio is 2, then its first term is:

A. 1

B. 2

C. 3

D. none of these

Answer:

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7. The three striaght lines ax+by=c, bx+cy=a and cx+ay=b are collinear if:

A. a+b-c=0

B. a-b+c=0

C. a+b+c=0

D. none of these

Answer:

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8. If the circle $x^2 + y^2 + 2ax + 8y + 16 = 0$ touches x axis, then the vlaue of a is:

A. ± 1

B. ± 4

C. ± 8

D. none of these

Answer:

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9. In a single toss of three coins, the probability of getting head and tail alternatively is:

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\frac{1}{8}$

D. none of these

Answer:

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10. Prove that: $\frac{\sin x + \sin 3x}{\cos x + \cos 3x} = \tan 2x$

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11. Prove that $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$

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12. If $z_1 = 2 - i, z_2 = 1 + i$, find $\left| \frac{z_1 + z_2 + 1}{z_1 - z_2 + 1} \right|$.

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13. Show that $9^{n+1} - 8n - 9$ is divisible by 64, whenever n is a positive integer.

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14. Compute $(98)^5$

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15. Using distance formula, show that the points A(6,-7,1), B(2,-3,1) and C(4,-5,0) are collinear.

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16. Show that the statement is true by the method of contradiction. If x is an integer and x^2 is even, then x is also even.

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17. Find the component statement of the following and check whether they are true or not.

24 is a multiple of 2,4 and 8.

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18. Prove that $A^c - B^c = B - A$.

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19. If $f(x) = \log\left(\frac{x}{x-1}\right)$, show that $f(x+1) + f(x) = \log\left(\frac{x+1}{x-1}\right)$

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20. Prove that:$\cos 15^\circ - \sin 15^\circ = \frac{1}{\sqrt{2}}$

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21. Prove that : $\cos 24^\circ + \cos 55^\circ + \cos 125^\circ + \cos 204^\circ + \cos 300^\circ = \frac{1}{2}$.

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22. How many words, with or without meaning, each of 2 vowels and 3 consonants can be formed from the letters of the word DAUGHTER ?

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23. Find the value of n such that :

${}^{n}P_5 = 42{}^{n}P_3, n > 4.$

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24. Sum of first p,q and r terms of an A.P. are a,b,c respectively. Prove that

$\frac{a}{p}(q-r) + \frac{b}{q}(r-p) + \frac{c}{r}(p-q) = 0.$

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25. If the angle between two lines is $\frac{\pi}{3}$ and slope of one of the line is $\frac{1}{4}$. Find the slope of other line.

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26. If a parabolic reflector is 20 cm in diameter and 50 cm deep. Find the focus.

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27. Evaluate: $\lim_{x \to 1} \frac{\left(x + x^2 + x^3 + \ldots\ldots\ldots x^n\right) - n}{x - 1}$

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28. If y=asinx+bcosx, prove that$y^2 + \left(\frac{dy}{dx}\right)^2 = a^2 + b^2$

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29. A,B and C are three mutually exclusive and exhaustive events associated with a random experiment . Find P(A) given that $P(B) = \frac{3}{2}P(A)$ and $P(C) = \frac{1}{2}P(B)$.

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30. Find θ such that $\frac{3 + 2i\sin\theta}{1 - 2i\sin\theta}$ is purely real.

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31. If $a+ib=\frac{(x+i)^2}{2x^2+1}$, prove that $a^2+b^2=\frac{\left(x^2+1\right)^2}{\left(2x^2+1\right)^2}$.

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32. Solve the following system of inequalities graphically: $4x+3y\leq 60, y\geq 2x, x\geq 3, x, y\geq 0$

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33. IQ of a person is given by the formula $IQ=\frac{MA}{CA}\times 100$, where MA is mental age and CA is

chronological age. If $80 \leq IQ \leq 140$ for a group of 12 years old children, find the range of their mental age.

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34. Evaluate: $\lim_{x \to 0} \frac{\sqrt{1+2x} - \sqrt{1-2x}}{x}$

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35. Find the derivative of cos x w.r.t. x

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36. Find the mean marks from the following data :

Marks	No. of students
Below 10	3
Below 20	5
Below 30	9
Below 40	15
Below 50	20
Below 60	26
Below 70	34
Below 80	41
Below 90	45
Below 100	47

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37. Find the mean deviation from the mean for the following data. 38, 70, 48, 40, 42, 55, 63, 46, 54, 44.

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