MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

UNIT TEST PAPER NO. 6 (THREE - DIMENSIONAL GEOMETRY, VECTORS & PROBABILITY)

Select The Correct Answer

1. If the vectors $\vec{a}, \vec{b}, \vec{c}$ form the sides BC,CA and AB respectively of a triangle ABC then (A) $\vec{a}.\left(\vec{b}\times\vec{c}\right)=\vec{0}$ (B) $\vec{a}\times\left(\vec{b}x\vec{c}\right)=\vec{0}$ (C) $\vec{a}.\vec{b}=\vec{c}=\vec{c}=\vec{a}.a\neq 0$ (D) $\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a}\vec{0}$

A. $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}=0$

B. $\vec{a}\times\vec{b}=\vec{b}\times\vec{c}=\vec{c}\times\vec{a}$

C. $\vec{a}.\vec{b}=\vec{b}.\vec{c}=\vec{c}.\vec{a}$

D. $\vec{a} \times \vec{b} + \vec{b} \times \vec{c} \times \vec{a} = \vec{0}$

Answer: B

Watch Video Solution

2. If $\vec{a}, \vec{b}, \vec{c} areunit \longrightarrow rs, then$|veca-vecb|^2+|vecb-vec|^2+|vecc^2-veca^2|^2` does not exceed (A) 4 (B) 9 (C) 8 (D) 6

A. 4

B. 8

C. 9

D. 6

Answer: B

Watch Video Solution

3. If a variable takes the discrete values $\alpha - 4$, $\alpha - \frac{7}{2}, \alpha - \frac{5}{2}, \alpha - 2, \alpha + \frac{1}{2}, \alpha - \frac{1}{2}, \alpha + 5 (\alpha > 0)$, then the median is

A. $\alpha - \frac{5}{4}$

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

C. $\alpha - 2$

D. $\alpha + \frac{5}{4}$

Answer: A

Watch Video Solution

4. If different words are found from letters of the word 'UNIVERSITY', then the probability that two of I' s do not come together is :

A. $\frac{4}{5}$

B. $\frac{6}{5}$

C. $\frac{2}{5}$

D. $\frac{3}{2}$

Answer: A

Watch Video Solution

5. A problem in mathematics is given to three students A, B, C and their respective probability of solving the problem is 1/2, 1/3 and 1/4. Probability that the problem is solved is $3/4$ b. $1/2$ c. $2/3$ d. $1/3$

A. $\frac{3}{4}$

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

C. $\frac{2}{3}$

D. $\frac{1}{3}$

Answer: A

Watch Video Solution

6. $P(B) = \frac{3}{4}, P(\overline{A} \cap B \cap \overline{C}) = \frac{1}{3}, P(A \cap B \cap \overline{C}) = \frac{1}{3}$ then $P(B \cap \overline{C})$:

A. $\frac{1}{12}$

B. $\frac{3}{4}$

C. $\frac{5}{12}$

D. $\frac{23}{36}$

Answer: A

Watch Video Solution

7. The mean and the variance of a binomial distribution are 4 and 2 respectively. Then, the probability of 2 successes is

A. $\frac{37}{256}$

B. $\frac{219}{256}$

C. $\frac{128}{256}$

D. $\frac{28}{256}$

Answer: D

Watch Video Solution

8. Let $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$ and $\vec{b} = \hat{i} + \hat{j}$. If $\vec{c}$ is a vector such that $\vec{a} . \vec{=} \left|\vec{c}\right|, \left|\vec{c} - \vec{a}\right| = 2\sqrt{2}$ and the angle between $\vec{a} \times \vec{b}$ and $\vec{c}$ is 30°, then $\left|\left(\vec{a} \times \vec{b}\right) \times \vec{c}\right| = .$

A. $2/3$

B. $3/2$

C. 2

D. 3

Answer: B

Watch Video Solution

9. s. Given two vectors are $i-j$ and $i+2j$ the unit,vector coplanar with the two vectors and perpendicular to first is

A. $\frac{1}{\sqrt{2}}\left(\hat{i}+\hat{j}\right)$

B. $\frac{1}{\sqrt{5}}\left(2\hat{i}+\hat{j}\right)$

C. $\pm\frac{1}{\sqrt{2}}\left(\hat{i}+\hat{j}\right)$

D. None of these

Answer: C

Watch Video Solution

10. The unit vector which is orthgonal to the vector $\vec{a}=3\hat{i}+2\hat{j}+6\hat{k}$ and is coplanar with the vectors $\vec{b}=2\hat{i}+\hat{j}+\hat{k}$ and $\vec{c}=\hat{i}-\hat{j}+\hat{k}$ is :

A. $\frac{2\hat{i}-6\hat{j}+\hat{k}}{\sqrt{41}}$

B. $\frac{2\hat{i}-6\hat{j}}{\sqrt{13}}$

C. $\frac{3\hat{j}-\hat{k}}{\sqrt{10}}$

D. $\frac{4\hat{i}-3\hat{j}-3\hat{k}}{\sqrt{34}}$

Answer: C

Watch Video Solution

11. Let $\vec{a}, \vec{b}, \vec{c}$ be the three vectors such that $\vec{a}.\left(\vec{b}+\vec{c}\right)+\vec{b}.\left(\vec{c}+\vec{a}\right)+\vec{c}.\left(\vec{a}+\vec{b}\right)=0$ and $\left|\vec{a}\right|=1, \left|\vec{b}\right|$ then $\left|\vec{a}+\vec{b}+\vec{c}\right|$ equals :

A. 13

B. 81

C. 9

D. 5

Answer: B

Watch Video Solution

12. The pair of lines whose direction cosines are given by :

$3l + m + 5n = 0, 6mn - mn - 2nl + 5l = 0$ are :

A. parallel

B. perpendicular

C. inclined at $\cos^{-1}\left(\frac{1}{6}\right)$

D. None of these

Answer: C

View Text Solution

13. The length of the perpendicular from P(1,0,2) on the line $\frac{x+1}{3} = \frac{y-2}{-2} = \frac{z+1}{-1}$ is

A. $(1, 2, -3)$

B. $\left(\frac{1}{2}, 1, -\frac{3}{2}\right)$

C. $(2, 4, -6)$

D. $(2, 3, 6)$

Answer: B

Watch Video Solution

14. The lines whose vector equations are :

$\vec{r} = \vec{a} + t\vec{b}$, $\vec{r} = \vec{c} + t'\vec{d}$ are coplanar if :

A. $\left(\vec{a} - \vec{b}\right).\left(\vec{c} \times \vec{d}\right) = 0$

B. $\left(\vec{a} - \vec{c}\right).\left(\vec{b} \times \vec{d}\right) = 0$

C. $\left(\vec{b} - \vec{c}\right).\left(\vec{a} \times \vec{d}\right) = 0$

D. $\left(\vec{b} - \vec{d}\right).\left(\vec{a} \times \vec{d}\right) = 0$

Answer: B

View Text Solution

15. If from each of the three boxes containing 3 white and 1 black, 2 white and 2 black, 1 white and 3 black balls, one ball is drawn at random, then the probability that 2 white and 1 black balls will be drawn, is

A. $13/32$

B. $1/4$

C. $1/32$

D. $3/16$

Answer: A

Watch Video Solution

16. Five horses are in a race. Mr. A selects two of the horses at random and bets on them. The probability that Mr. A selected the winning horse is $3/5$ b. $1/5$ c. $2/5$ d. $4/5$

A. $\frac{3}{5}$

B. $\frac{1}{5}$

C. $\frac{2}{5}$

D. $\frac{4}{5}$

Answer: C

Watch Video Solution

17. The probability of India winning a test match against West Indies is 1/2. Assuming independence from match to match, find the probability that in a match series Indias second win occurs at the third test.

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

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

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

D. $\frac{2}{3}$

Answer: B

Watch Video Solution

18. The probability that A speaks truth is $\frac{4}{5}$, while this probability for B is $\frac{3}{4}$. The probability that they contradict each other when asked to speak on a fact is

A. $\frac{3}{20}$

B. $\frac{1}{5}$

C. $\frac{7}{20}$

D. $\frac{4}{5}$

Answer: C

Watch Video Solution

19. If E and F are events with $P(E) \leq P(F)$ and $P(E \cap F) > 0$, then :

A. occurrence of E $\Rightarrow$ occurrence of F

B. occurrence of $F \Rightarrow$ occurrence of E

C. non - occurrence of E $\Rightarrow$ non occurrence of F

D. None of the above implication holds.

Answer: D

Watch Video Solution

20. If $\overrightarrow{E}$ and $\overrightarrow{F}$ are complementary events of events E and F respectively and $0 < P(F) < 1$, then :

A. $P(E/F) + P\left(\overrightarrow{E}/F\right) = 1$ or $P\left(E/\overrightarrow{F}\right) + P\left(\overrightarrow{E}/\overrightarrow{F}\right) = 1$

B. $P(E/F) + P\left(E/\overrightarrow{F}\right) = 1$

C. $P\left(\overrightarrow{E}/F\right) + P\left(E/\overrightarrow{F}\right) = 1$

D. None of these

Answer: A

View Text Solution

21. If $\vec{a}, \vec{b}, \vec{c}$ are vectors such that $\vec{a} . \vec{b} = 0$ and $\vec{a} + \vec{b} = \vec{c}$ then:

A. $\left|\vec{a}\right|^2 + \left|\vec{b}\right|^2 = \left|\vec{c}\right|^2$

B. $\left|\vec{a}\right|^2 = \left|\vec{b}\right|^2 + \left|\vec{c}\right|^2$

C. $\left|\vec{b}\right|^2 = \left|\vec{a}\right|^2 + \left|\vec{c}\right|^2$

D. None of these

Answer: A

Watch Video Solution

22. If $\vec{a}$ satisfies $\vec{a} \times \left(\hat{i} + 2\hat{j} + \hat{k}\right) = \hat{i} - \hat{k}$ then $\vec{a}$ is equal to

A. $-\frac{1}{3}\left(2\hat{i} + \hat{j} + 2\hat{k}\right)$

B. $\hat{j}$

C. $\frac{1}{3}\left(\hat{i} + 2\hat{j} + 2\hat{k}\right)$

D. $\hat{i}$

Answer: A

Watch Video Solution

23. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar unit vectors such that $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \frac{\vec{b} + \vec{c}}{\sqrt{2}}$ then the angle between $\vec{a}$ and $\vec{b}$ is

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

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

C. π

D. $\frac{3\pi}{4}$

Answer: D

Watch Video Solution

24. Two system of rectangular axes have the same origin. If a plane cuts them at distance a,b,c and a', b' , c' from the origin , then :

A. $\frac{1}{a^2}+\frac{1}{b^2}+\frac{1}{c^2}+\frac{1}{a'^2}+\frac{1}{b'^2}+\frac{1}{c'^2}=0$

B. $\frac{1}{a^2}-\frac{1}{b^2}-\frac{1}{c^2}-\frac{1}{a'^2}-\frac{1}{b'^2}-\frac{1}{c'^2}=0$

C. $\frac{1}{a^2}+\frac{1}{b^2}-\frac{1}{c^2}-\frac{1}{a'^2}-\frac{1}{b'^2}-\frac{1}{c'^2}=0$

D. $\frac{1}{a^2}+\frac{1}{b^2}+\frac{1}{c^2}+\frac{1}{a'^2}+\frac{1}{b'^2}-\frac{1}{c'^2}=0$

Answer: C

Watch Video Solution

25. Dialing a telephone number, a man forgot the last two digits and remembering only that they are different . He dialled the number at random. The probability of the number dialled correctly is :

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

B. $\frac{1}{45}$

C. $\frac{1}{72}$

D. $\frac{1}{90}$

Answer: D

Watch Video Solution