TIME: 2:30 M.M. 300

CENTURION DEFENCE ACADEMY
NDA MODAL TEST PAPER – MATHEMATICS

INSTRUCTION: *Read questions carefully. For each wrong answer, one-third (0.833) of the marks assigned to that question will be deducted. Each question contains (2.5) marks. /* प्रश्नों को ध्यानपूर्वक पढ़िए। प्रत्येक गलत उत्तर के लिए, fn, x, vdk e l ,d&frgkbZ ¼0-833½ अंक काटे जायेंगे। प्रत्येक प्रश्न (2-5½ vad dk gA

1. Consider the following statements in respect of a histogram: /,d vk;r fp= d ckj e fuEufyf[kr dFkuk ij fopkj dhft ,%
1. The total area of the rectangles in a histogram is equal to the total area bounded by the corresponding frequency polygon and the x-axis. / ,d vk;r fp= e vk;rk dk dy {k=Qy lxr ckjckjrk cgHkt vkj $x-$v{k l ifjc) dy {k=Qy d cjkcj gkrk gA
2. When class intervals are unequal in a frequency distribution, the area of the rectangle is proportional to the frequency. / ,d ckjckjrk cVu e tc oxZ varjkyy vleku gkrs gS] rks vk;r dk {k=Qy ckjckjrk d lekuikfrd gkrk gA
Which of the above statements is/are correct? / mi;qDr dFkuk e l dku&lk@l lgh gS@gS\
(A) 1 only / dsoy 1 (B) 2 only / dsoy 2
(C) Both 1 and 2/ 1 vkj 2 nkuk (D) Neither 1 nor 2 / u rks 1 vkj u gh 2

2. Consider a parallelogram whose vertices are $A(1,2), B(4,y), C(x,6)$ and $D(3,5)$ taken in order. /,d lekarj prHkqt] ftlds 'kh"kZ, ,d Øe esa, $A(1,2), B(4,y), C(x,6)$ vkj $D(3,5)$ gS] ij fopkj dhft ,A
What is the point of intersection of the diagonals? /fod.kksZ dk çfrPNn fcUnq D;k gS\
(A) $\left(\frac{7}{2},4\right)$ (B) (3, 4)
(C) $\left(\frac{7}{2},5\right)$ (D) (3, 5)

3. Consider the function $f(x)=|x^2-5x+6|$ /Qyu $f(x)=|x^2-5x+6|$ ij fopkj dhft ,A
What is $f'(4)$ equal to? /$f'(4)$ fdlds cjkcj gS\
(A) -4 (B) -3
(C) 3 (D) 2

4. What is the probability of 5 Sundays in the month of December? / fnlEcj eksl e 5 jfookjksa d vkus dh çkf;drk D;k gS\
(A) $\frac{1}{7}$ (B) $\frac{2}{7}$
(C) $\frac{3}{7}$ (D) None of the above

5. If two dice are thrown, then what is the probability that the sum on the two faces is greater than or equal to 4? / ;fn nks ikls Qsds tkrs gS] rks og çkf;drk D;k gS fd nksuksa Qydksa dk ;ksx 4 ;k 4 ls vf/kd gS\
(A) $\frac{13}{18}$ (B) $\frac{5}{6}$
(C) $\frac{11}{12}$ (D) $\frac{35}{36}$

6. Let $f:R\to R$ be a function such that $f(x)=x^3+x^2f'(1)+xf"(2)+f'''(3)$ for $x\in R$. /eku yhft , fd ,d Qyu $f:R\to R$ bl çdkj gS fd $x\in R$ ds fy, $f(x)=x^3+x^2f'(1)+xf"(2)+f'''(3)$ gA
What is $f(1)$ equal to? / $f(1)$ fdlds cjkcj gS\
(A) -2 (B) -1
(C) 0 (D) 4

7. Consider the equation $k\sin x+\cos 2x=2k-7$ /lehdj.k $k\sin x+\cos 2x=2k-7$ ij fopkj dhft ,A
If the equation possesses solution, then what is the maximum value of k? / ;fn lehdj.k dk gy gS] rks k dk vf/kdre eku D;k gS\
(A) 1 (B) 2
(C) 4 (D) 6

8. Let z be a complex number satisfying $\left|\frac{z-4}{z-8}\right| = 1$ and $\left|\frac{z}{z-2}\right| = \frac{3}{2}$ /eku yhft, fd z ,d lfEeJ la[;k gS tks $\left|\frac{z-4}{z-8}\right| = 1$ vkSj $\left|\frac{z}{z-2}\right| = \frac{3}{2}$ को संतुष्ट करती है।
What is $\left|\frac{z-6}{z-6}\right|$ equal to? /$\left|\frac{z-6}{z-6}\right|$ fdlds cjkcj gS\
(A) 3 (B) 2
(C) 1 (D) 0

9. Consider the two lines $x + y + 1 = 0$ and $3x + 2y + 1 = 0$ /nks js[kkvksa $x + y + 1 = 0$ vkSj $3x + 2y + 1 = 0$ ij fopkj dhft,A
What is the equation of the line passing through the point of intersection of intersection of the given lines and parallel to y-axis? /nh xbZ js[kkvksa ds çfrPNsn fcUnq ls xqtjus okyh vkSj $y-$v{k ds lekarj js[kk dk lehdj.k D;k gS\
(A) $x + 1 = 0$ (B) $x - 1 = 0$
(C) $x - 2 = 0$ (D) $x + 2 = 0$

10. A plane P passes through the line of intersection of the planes $2x - y + 3z = 2$, $x + y - z = 1$ and the point (1, 0, 1). /,d lery P, leryksa $2x - y + 3z = 2$, $x + y - z = 1$ dh çfrPNsnu js[kk vkSj fcUnq (1, 0, 1) ls xqtjrk gSA
If the plane P touches the sphere $x^2 + y^2 + z^2 = r^2$, then what is r equal to? / ;fn lery P, xksys $x^2 + y^2 + z^2 = r^2$ को स्पर्श करता है, तो r fdlds cjkcj gS\
(A) $\frac{2}{\sqrt{29}}$ (B) $\frac{4}{\sqrt{29}}$
(C) $\frac{5}{\sqrt{29}}$ (D) 1

11. What is the number of four-digit decimal numbers (< 1) in which no digit is repeated? / चार अंकीय दशमलव संख्याओं (< 1) dh] ftlesa dksbZ Hkh vad nksgjk;k ugha tkrk gS] la[;k D;k gS\
(A) 3024 (B) 4536
(C) 5040 (D) None of the above

12. Suppose ω_1 and ω_2 are two distinct cube roots of unity different from 1. Then what is $(\omega_1 - \omega_2)^2$ equal to? / eku yhft, ω_1 vkSj ω_2 ,d ¼;fufV½ dh] la[;k ds vyx&vyx ?kuey gSA rc $(\omega_1 - \omega_2)^2$ fdlds cjkcj gS\
(A) 3 (B) 1
(C) -1 (D) -3

13. A plane P passes through the line of intersection of the planes $2x - y + 3z = 2$, $x + y - z = 1$ and the point (1, 0, 1). /,d lery P, leryksa $2x - y + 3z = 2$, $x + y - z = 1$ dh çfrPNsnu js[kk vkSj fcUnq (1, 0, 1) ls xqtjrk gSA
What is the equation of the plane P? /lery P dk lehdj.k D;k gS\
(A) $2x + 5y - 2 = 0$ (B) $5x + 2y - 5 = 0$
(C) $x + z - 2 = 0$ (D) $2x - y - 2z = 0$

14. What is the area of the parallelogram having diagonal $3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and $\hat{\imath} - 3\hat{\jmath} + 4\hat{k}$? / fod.kZ $3\hat{\imath} + \hat{\jmath} - 2\hat{k}$ vkSj $\hat{\imath} - 3\hat{\jmath} + 4\hat{k}$ okyk lekarj prqHkqt dk {ks=Qy D;k gS\
(A) $5\sqrt{5}$ square units / oxZ bdkbZ (B) $4\sqrt{5}$ square units/ oxZ bdkbZ
(C) $5\sqrt{3}$ square units/ oxZ bdkbZ (D) $15\sqrt{2}$ square units/ oxZ bdkbZ

15. Let z_1, z_2 and z_3 be non-zero complex numbers satisfying $z^2 = i\bar{z}$, where $i = \sqrt{-1}$. /eku yhft, fd z_1, z_2 vkSj z_3 शून्येतर सम्मिश्र संख्याएँ हैं, जो $z^2 = i\bar{z}$ को संतुष्ट करती हैं, जहाँ $i = \sqrt{-1}$ gSA
Consider the following statements: /fuEufyf[kr dFkuksa ij fopkj dhft,%
1. $z_1z_2z_3$ is purely imaginary. /शुद्धतः काल्पनिक है।
2. $z_1z_2 + z_2z_3 + z_3z_1$ is purely real./ $z_1z_2 + z_2z_3 + z_3z_1$ शुद्धतः वास्तविक है।
Which of the above statements is/ are correct?/mi;qDr dFkuksa esa ls dkSu&lk@ls lgh gS@gSa\
(A) 1 only /dsoy 1 (B) 2 Only /dsoy 2
(C) Both 1 and 2/1 vkSj 2 nksuksa (D) Neither 1 nor 2/u rks 1 vkSj u gh 2

16. Consider the function $f(x) = \frac{a^{|x|+x}-1}{|x|+x}$ where [.] denotes the greatest integer function. /Qyu $f(x) = \frac{a^{|x|+x}-1}{|x|+x}$, tgk [.] vf/kdre iw.kkZd Qyu fu:fir djrk gS] ij fopkj dhft,A
What is $\lim_{x\to 0-} f(x)$ equal to? /$\lim_{x\to 0-} f(x)$ fdlds cjkcj gS\
(A) 1 (B) $\ln a$
(C) $1 - a^{-1}$ (D) Limit does not exist

17. What is a vector of unit length orthogonal to both the vectors $\hat{\imath}+\hat{\jmath}+\hat{k}$ and $2\hat{\imath}+3\hat{\jmath}-\hat{k}$? / दो सदिशों $\hat{\imath}+\hat{\jmath}+\hat{k}$ vkj $2\hat{\imath}+3\hat{\jmath}-\hat{k}$ के लंबकोणिक एकक लंबाई का सदिश क्या है\

(A) $\frac{-4\hat{\imath}+3\hat{\jmath}-\hat{k}}{\sqrt{26}}$ (B) $\frac{-4\hat{\imath}+3\hat{\jmath}+\hat{k}}{\sqrt{26}}$

(C) $\frac{-3\hat{\imath}+2\hat{\jmath}-\hat{k}}{\sqrt{14}}$ (D) $\frac{-3\hat{\imath}+2\hat{\jmath}+\hat{k}}{\sqrt{14}}$

18. Let α and β $(\alpha<\beta)$ be the roots of the equation $x^2+bx+c=0$, where $b>0$ and $c>0$. /eku yhft, fd α vkj β $(\alpha<\beta)$ leehdj.k $x^2+bx+c=0$ dk ey gS] tgk $b>0$ vkj $c>0$ gSA
Consider the following: /fuEufyf[kr ij fopkj dhft,%
1. $\beta<-\alpha$
2. $\beta<|\alpha|$
Which of the above is/are correct? / mi;qDr dFkuksa esa ls dkSu&lk@ls lgh gS@gSa\

(A) 1 Only/dsoy 1 (B) 2 Only /dsoy 2

(C) both 1 and 2 /1 vkSj 2 nksuksa (D) Neither 1 nor 2/u rks 1 vkSj u gh 2

19. Consider the following in respect of the matrix $A=\begin{pmatrix}-1 & 1\\ 1 & -1\end{pmatrix}$: / vkO;wg $A=\begin{pmatrix}-1 & 1\\ 1 & -1\end{pmatrix}$ dh ckj esa fuEufyf[kr ij fopkj dhft,%
1. $A^2=-A$
2. $A^3=4A$
Which of the above is/are correct? / mi;qDr esa ls dkSu&lk@ls lgh gS@gSa\

(A) 1 only / dsoy 1 (B) 2 only/ dsoy 2

(C) Both 1 and 2 / 1 vkSj 2 nksuksa (D) Neither 1 nor 2 / u rks 1 vkSj u gh 2

20. Consider a parallelogram whose vertices are $A(1,2), B(4,y), C(x,6)$ and $D(3,5)$ taken in order. /,d lekarj prHkqt] ftlds 'kh"kZ, ,d Øe esa, $A(1,2), B(4,y), C(x,6)$ vkSj $D(3,5)$ gSa] ij fopkj dhft,A
What is the area of the parallelogram? / lekarj&prHkqt dk {ks=Qy D;k gS\

(A) $\frac{7}{2}$ square units / $\frac{7}{2}$ oxZ bdkbZ (B) 4 square units/ 4 oxZ bdkbZ

(C) $\frac{11}{2}$ square units/ $\frac{11}{2}$ oxZ bdkbZ (D) 7 square units/ 7 oxZ bdkbZ

21. Given that $\tan\alpha$ and $\tan\beta$ are the roots of the equation $x^2+bx+c=0$ with $b\neq 0$. /fn;k x;k gS fd $\tan\alpha$ vkSj $\tan\beta$ leehdj.k $x^2+bx+c=0$ dk ey gS] tgk $b\neq 0$ gSA
What is $\sin(\alpha+\beta)\sec\alpha\sec\beta$ equal to? / $\sin(\alpha+\beta)\sec\alpha\sec\beta$ fdlds cjkcj gS\

(A) b (B) -b

(C) c (D) -c

22. Given that $\tan\alpha$ and $\tan\beta$ are the roots of the equation $x^2+bx+c=0$ with $b\neq 0$. /fn;k x;k gS fd $\tan\alpha$ vkSj $\tan\beta$ leehdj.k $x^2+bx+c=0$ dk ey gS] tgk $b\neq 0$ gSA
What is $\tan(\alpha+\beta)$ equal to? /$\tan(\alpha+\beta)$ fdlds cjkcj gS\

(A) $b(c-1)$ (B) $c(b-1)$

(C) $c(b-1)^{-1}$ (D) $b(c-1)^{-1}$

23. Consider the two circles $(x-1)^2+(y-3)^2=r^2$ and $x^2+y^2-8x+2y+8=0$ /nks oRrksa $(x-1)^2+(y-3)^2=r^2$ vkSj $x^2+y^2-8x+2y+8=0$ ij fopkj dhft,A
What is the distance between the centres of the two circles? /nksuksa oRrksa ds dsUæksa ds chp dh nwjh D;k gS\

(A) 5units / 5 bdkbZ (B) 6 units / 6 bdkbZ

(C) 8 units /8 bdkbZ (D) 10 units /10 bdkbZ

24. Let $f:R\to R$ be a function such that $f(x)=x^3+x^2f'(1)+xf''(2)+f'''(3)$ for $x\in R$. /eku yhft, fd ,d Qyu $f:R\to R$ bl çdkj gS fd $x\in R$ ds fy, $f(x)=x^3+x^2f'(1)+xf''(2)+f'''(3)$ gSA
What is $f'''(10)$ equal to? / $f'''(10)$ fdlds cjkcj gS\

(A) 1 (B) 5

(C) 6 (D) 8

25. Consider a triangle ABC in which $\cos A+\cos B+\cos C=\sqrt{3}\sin\frac{\pi}{3}$/ ,d f=Hkqt ABC ftlesa $\cos A+\cos B+\cos C=\sqrt{3}\sin\frac{\pi}{3}$ gS] ij fopkj dhft,A
What is the value of $\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{B+C}{2}\right)\cos\left(\frac{C+A}{2}\right)$? /$\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{B+C}{2}\right)\cos\left(\frac{C+A}{2}\right)$ dk eku D;k gS\

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$

(C) $\frac{1}{16}$ (D) None of the above /mi;qDr esa ls dksbZ ugh

26. If $\vec{a}, \vec{b}$ and $\vec{c}$ are the position vectors of the vertices of an equilateral triangle whose orthocenter is at the origin, then which one of the following is correct? / ;fn $\vec{a}, \vec{b}$ vkj $\vec{c}$ leckg f=Hkt d] जिसका लंबकेन्द्र मूलबिंदू पर है, शीर्षों के स्थिति सदिश हैं, तो निम्नलिखित में से कौन सा एक सही है\

(A) $\vec{a} + \vec{b} + \vec{c} = 0$ (B) $\vec{a} + \vec{b} + \vec{c}$ =unit vector /एकक सदिश

(C) $\vec{a} + \vec{b} = \vec{c}$ (D) $\vec{a} = \vec{b} + \vec{c}$

27. Consider the two lines $x + y + 1 = 0$ and $3x + 2y + 1 = 0$ /nks j[kkvksa $x + y + 1 = 0$ vkj $3x + 2y + 1 = 0$ ij fopkj dhft,A

What is the equation of the line passing through the point of intersection of the given lines and parallel to x −axis? /nh xbZ j[kkvksa dk çfrPNsn fcUnq ls xtjus okyh vkj x −v{k dk lekarj j[kk dk lehdj.k D;k gS\

(A) $y + 1 = 0$ (B) $y - 1 = 0$

(C) $y - 2 = 0$ (D) $y + 2 = 0$

28. A function $f(x)$ is defined as follows: /,d Qyu $f(x)$ के रूप में परिभाषित है:

$$f(x) = \begin{cases} x + \pi \ for \ x\epsilon [-\pi, 0) \\ \pi \cos x \ for \ x\epsilon \left[0, \frac{\pi}{2}\right] \\ \left(x - \frac{\pi}{2}\right)^2 \ for \ x\epsilon \left(\frac{\pi}{2}, \pi\right] \end{cases}$$

Consider the following statements:/fuEufyf[kr dFkuksa ij fopkj dhft,%

1. The function $f(x)$ is differentiable at $x = 0$. / Qyu $f(x), x = 0$ ij vodyuh; gSA

2. The function $f(x)$ is differentiable at $x = \frac{\pi}{2}$ / Qyu $f(x), x = \frac{\pi}{2}$ ij vodyuh; gSA

Which of the above statements is/are correct?/ mi;qDr dFkuksa esa ls dkSu&lk@ls lgh gS@gSa\

(A) 1 Only/dsoy 1 (B) 2 Only /dsoy 2

(C) both 1 and 2 /1 vkSj 2 nksuksa (D) Neither 1 nor 2/u rks 1 vkSj u gh 2

29. A function $f(x)$ is defined as follows: /,d Qyu $f(x)$ के रूप में परिभाषित है:

$$f(x) = \begin{cases} x + \pi \ for \ x\epsilon [-\pi, 0) \\ \pi \cos x \ for \ x\epsilon \left[0, \frac{\pi}{2}\right] \\ \left(x - \frac{\pi}{2}\right)^2 \ for \ x\epsilon \left(\frac{\pi}{2}, \pi\right] \end{cases}$$

Consider the following statements: /fuEufyf[kr dFkuksa ij fopkj dhft,%

1. The function $f(x)$ is continuous at $x = 0$. /Qyu $f(x), x = 0$ ij lrr gSA

2. The function $f(x)$ is continuous at $x = \frac{\pi}{2}$. / Qyu $f(x), x = \frac{\pi}{2}$ ij lrr gSA

Which of the above statements is/are correct? /mi;qDr dFkuksa esa ls dkSu&lk@ls lgh gS@gSa\

(A) 1 Only/dsoy 1 (B) 2 Only /dsoy 2

(C) both 1 and 2 /1 vkSj 2 nksuksa (D) Neither 1 nor 2/u rks 1 vkSj u gh 2

30. Given that $\log_x y, \log_z x, \log_y z$ are in GP, $xyz = 64$ and x^3, y^3, z^3 are in AP. /fn;k x;k gS fd $\log_x y$, $\log_z x, \log_y z$ GP esa gSa] $xyz = 64$ gS vkSj x^3, y^3, z^3 esa AP gSA

Which one of the following is correct?/fuEufyf[kr esa ls dkSu&lk ,d lgh gS\

x, y and z /x, y vkSj z

(A) in AP Only/dsoy AP esa gSa (B) In GP Only/ dsoy GP esa gSa

(C) In both AP and GP / AP rFkk GP nksuksa esa gSa (D) neither in AP nor in GP /u rks AP esa vkSj u gh GP esa gSa

31. Consider the two circles $(x-1)^2 + (y-3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ /nks oRrksa $(x-1)^2 + (y-3)^2 = r^2$ vkSj $x^2 + y^2 - 8x + 2y + 8 = 0$ ij fopkj dhft,A

If the circles intersect at two distinct points, then which one of the following is correct? /;fn oRr nks vyx&vyx fcUnqvksa ij çfrPNsn djrs gSa] rks fuEufyf[kr esa dkSu&lk ,d lgh gS\

(A) $r = 1$ (B) $1 < r < 2$

(C) $r = 2$ (D) $2 < r < 8$

32. A fair coin is tossed 100 times. What is the probability of getting tails an odd number of times? / ,d U;k; flDdk 100 ckj mNkyk tkrk gSA उतनी बार, जो कि एक विषम संख्या हो, तो पट आने की प्रायिकता क्या है\

(A) $\frac{1}{2}$ (B) $\frac{3}{8}$

(C) $\frac{1}{4}$ (D) $\frac{1}{8}$

33. The system of linear equations $kx + y + z = 1, x + ky + z = 1$ and $x + y + kz = 1$ has a unique solution under which one of the following conditions? / jf[kd lehdj.k fudk; $kx + y + z = 1, x + ky + z = 1$ vkj $x + y + kz = 1$ dk ,dek= gy gkxk] ;fn

(A) $k \neq 1$ and $k \neq -2$ / $k \neq 1$ vkj $k \neq -2$ (B) $k \neq 1$ and $k \neq 2$ / $k \neq 1$ vkj $k \neq 2$

(C) $k \neq -1$ and $k \neq -2$ / $k \neq -1$ vkj $k \neq -2$ (D) $k \neq -1$ and $k \neq 2$ / $k \neq -1$ vkj $k \neq 2$

34. Given that $\log_x y, \log_z x, \log_y z$ are in GP, $xyz = 64$ and x^3, y^3, z^3 are in AP. /fn;k x;k gS fd $\log_x y, \log_z x, \log_y z$ GP esa gS] $xyz = 64$ gS vkj x^3, y^3, z^3 esa AP gSA
Which one of the following is correct? /fuEufyf[kr esa ls dkSu&lk lgh gS\
xy, yz and zx are / xy, yz vkj zx

(A) in AP Only /dsoy AP esa gS (B) In GP only /dsoy GP esa gS

(C) In both AP and GP / AP vkj GP nksuksa esa gS (D) Neither in AP nor in GP /u rks AP esa vkSj u gh GP esa gS

35. If $y = \log_{10} x + \log_x 10 + \log_x x + \log_{10} 10$ then what is $\left(\frac{dy}{dx}\right)_{x=10}$ equal to? / ;fn $y = \log_{10} x + \log_x 10 + \log_x x + \log_{10} 10$ gS] rks $\left(\frac{dy}{dx}\right)_{x=10}$ fdlds cjkcj gS\

(A) 10 (B) 2

(C) 1 (D) 0

36. A point is chosen at random inside a rectangle measuring 6 inches by 5 inches. What is the probability that the randomly selected point is at least one inch from the edge of the rectangle? / 6 bp yEch vkj 5 bp pkSM+h ,d vk;r ds vanj ,d fcUnq ;kn`PNdr% pquk tkrk gSA bldh çkf;drk D;k gS fd ;kn`PNdr% pquk x, ml fcUnq dh ml vk;r ds dkj ls nwjh de&ls&de ,d bp gS\

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$

(C) $\frac{1}{4}$ (D) $\frac{2}{5}$

37. What is the acute angle between the lines represented by the equations $y - \sqrt{3}x - 5 = 0$ and $\sqrt{3}y - x + 6 = 0$? / lehdj.kksa $y - \sqrt{3}x - 5 = 0$ vkj $\sqrt{3}y - x + 6 = 0$ }kjk fu:fir j[kkvksa ds chp dk U;wu dks.k D;k gS\

(A) 30° (B) 45°

(C) 60° (D) 75°

38. Let z_1, z_2 and z_3 be non-zero complex numbers satisfying $z^2 = i\bar{z}$, where $i = \sqrt{-1}$. /eku yhft, fd z_1, z_2 vkj z_3 शून्येतर सम्मिश्र संख्याएँ हैं, जो $z^2 = i\bar{z}$ को संतुष्ट करती हैं, जहाँ $i = \sqrt{-1}$ gSA
What is $z_1 + z_2 + z_3$ equal to? /$z_1 + z_2 + z_3$ fdlds cjkcj gS\

(A) i (B) $-i$

(C) 0 (D) 1

39. Consider a parallelogram whose vertices are $A(1,2), B(4,y), C(x,6)$ and $D(3,5)$ taken in order. /,d lekarj prHkqt] जिसके शीर्ष, एक क्रम में, $A(1,2), B(4,y), C(x,6)$ vkj $D(3,5)$ gSa] ij fopkj dhft,A
What is the value of $AC^2 - BD^2$? / $AC^2 - BD^2$ dk eku D;k gS\

(A) 25 (B) 30

(C) 36 (D) 40

40. Let $f: R \to R$ be a function such that $f(x) = x^3 + x^2 f'(1) + xf"(2) + f'''(3)$ for $x \in R$. /eku yhft, fd ,d Qyu $f: R \to R$ bl çdkj gS fd $x \in R$ ds fy, $f(x) = x^3 + x^2 f'(1) + xf"(2) + f'''(3)$ gSA
What is $f'(1)$ equal to? / $f'(1)$ fdlds cjkcj gS\

(A) -6 (B) -5

(C) 1 (D) 0

41. The mean of the series $x_1, x_2, \ldots\ldots, x_n$ is $\bar{X}$. If x_2 is replaced by λ, then what is the new mean? / Jsf.kh $x_1, x_2, \ldots\ldots, x_n$ dk ek/; $\bar{X}$ gS ;fn x_2 dk λ }kjk çfrLFkkfir fd;k tkrk gS] rks u;k ek/; D;k gksxk\

(A) $\bar{X} - x_2 + \lambda$ (B) $\frac{\bar{X} - x_2 - \lambda}{n}$

(C) $\frac{\bar{X} - x_2 + \lambda}{n}$ (D) $\frac{n\bar{X} - x_2 + \lambda}{n}$

42. Let $f: R \to R$ be a function such that $f(x) = x^3 + x^2 f'(1) + xf''(2) + f'''(3)$ for $x \in R$. /eku yhft, fd ,d Qyu $f: R \to R$ bl çdkj gS fd $x \in R$ ds fy, $f(x) = x^3 + x^2 f'(1) + xf''(2) + f'''(3)$ gSA
Consider the following:/fuEufyf[kr ij fopkj dhft,%
1. $f(2) = f(1) - f(10)$
2. $f''(2) - 2f'(1) = 12$
Which of the above is/are correct? /mi;qDr esa ls dkSu&lk@ls lgh gS@gSa\
(A) 1 Only/dsoy 1 (B) 2 Only /dsoy 2
(C) both 1 and 2 /1 vkSj 2 nksuksa (D) Neither 1 nor 2/u rks 1 vkSj u gh 2

43. The number 0.0011 in binary system represents/f}&vk/kkjh i}fr esa la[;k 0.0011 D;k fu:fir djrh gS
(A) rational number 3/8 in decimal system/ ifjes; la[;k 3/8 दशमिक पद्धति में
(B) rational number 1/8 in decimal system/ ifjes; la[;k 1/8 दशमिक पद्धति में
(C) rational number 3/16 in decimal system/ ifjes; la[;k 3/16 दशमिक पद्धति में
(D) rational number 5/16 in decimal system/ ifjes; la[;k 5/16 दशमिक पद्धति में

44. Let α and β $(\alpha < \beta)$ be the roots of the equation $x^2 + bx + c = 0$, where $b > 0$ and $c > 0$. /eku yhft, fd α vkSj β $(\alpha < \beta)$ lehdj.k $x^2 + bx + c = 0$ ds ey gSa] tgk¡ $b > 0$ vkSj $c > 0$ gSA
Consider the following / fuEufyf[kr ij fopkj dhft,%
1. $\alpha + \beta + \alpha\beta > 0$
2. $\alpha^2\beta + \beta^2\alpha > 0$
Which of the above is/are correct? / mi;qDr dFkuksa esa ls dkSu&lk@ls lgh gS@gSa\
(A) 1 Only/dsoy 1 (B) 2 Only /dsoy 2
(C) both 1 and 2 /1 vkSj 2 nksuksa (D) Neither 1 nor 2/u rks 1 vkSj u gh 2

45. A plane P passes through the line of intersection of the planes $2x - y + 3z = 2$, $x + y - z = 1$ and the point (1, 0, 1). /,d lery P, leryksa $2x - y + 3z = 2$, $x + y - z = 1$ dh çfrPNsnu js[kk vkSj fcUnq (1, 0, 1) ls xqtjrk gSA
What are direction ratios of the given planes? /fn, x, leryksa dh çfrPNsnu js[kk ds fnd&vuqikr D;k gS\
(A) (2, -5, -3) (B) (1, -5, -3)
(C) (2, 5, 3) (D) (1, 3, 5)

46. Consider the equation $k \sin x + \cos 2x = 2k - 7$ / lehdj.k $k \sin x + \cos 2x = 2k - 7$ ij fopkj dhft,A
If the equation possesses solution, then what is the minimum value of k? /;fn lehdj.k dk gy gS] rks k dk U;wure eku D;k gS\
(A) 1 (B) 2
(C) 4 (D) 6

47. For the data 3, 5, 1, 6, 5, 9, 5, 2, 8, 6 the mean, median and mode are x, y and z respectively. Which one of the following is correct? / vkadM+ksa 3, 5, 1, 6, 5, 9, 5, 2, 8, 6 के लिए माध्य, माध्यिका और बहुलक क्रमशः x, y vkSj z gSA fuEufyf[kr esa ls dkSu&lk ,d lgh gS\
(A) $x = y \neq z$ (B) $x \neq y = z$
(C) $x \neq y \neq z$ (D) $x = y = z$

48. Which of the following determinants have value 'zero'? / fuEufyf[kr lkjf.kdksa esa ls fdudk eku 'शून्य' हैं\
1. $\begin{vmatrix} 41 & 1 & 5 \\ 79 & 7 & 9 \\ 29 & 5 & 3 \end{vmatrix}$
2. $\begin{vmatrix} 1 & a' & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$
3. $\begin{vmatrix} 0 & c & b \\ -c & 0 & a \\ -b & -a & 0 \end{vmatrix}$
Select the correct answer using the code given below. / uhps fn, x, dksM dk ç;ksx dj lgh mRrj pquk,A
(A) 1 and 2 only / dsoy 1 vkSj 2 (B) 2 and 3 only / dsoy 2 vkSj 3
(C) 1 and 3 only / dsoy 1 vkSj 3 (D) 1, 2 and 3 / dsoy 1] 2 vkSj 3

49. If the total number of observations is 20, $\sum x_i = 1000$ and $\sum x_i^2 = 84000$, then what is the variance of the distribution? / ;fn ç{k.kksa dh dqy la[;k 20 gS] $\sum x_i = 1000$ vkSj $\sum x_i^2 = 84000$ gS] rks caVu dk çlj.k D;k gS\
(A) 1500 (B) 1600
(C) 1700 (D) 1800

50. If $\log_a(ab) = x$, then what is $\log_b(ab) = x$ equal to? / ;fn $\log_a(ab) = x$ g] rk $\log_b(ab) = x$ fdl d cjkcj g]
(A) $\frac{1}{x}$ (B) $\frac{x}{x+1}$
(C) $\frac{x}{1-x}$ (D) $\frac{x}{x-1}$

51. Let z be a complex number satisfying $\left|\frac{z-4}{z-8}\right| = 1$ and $\left|\frac{z}{z-2}\right| = \frac{3}{2}$ /eku yhft, fd z ,d lfEeJ l[;k g] tk $\left|\frac{z-4}{z-8}\right| = 1$ vkj $\left|\frac{z}{z-2}\right| = \frac{3}{2}$ को संतुष्ट करती है।
What is $|z|$ equal to? /$|z|$ fdl d cjkcj g\
(A) 6 (B) 12
(C) 18 (D) 36

52. What is the number of ways in which 3 holiday travel tickets are to be given to 10 employees of an organization, if each employee is eligible for any one or more of the tickets? / ,d lxBu d 10 deipkfj;k dk NqVVh&;k=k d 3 fVdV nku d rjhdk dh l[;k D;k g] ;fn çR;sd deipkjh ,d ;k ,d l vf/kd fVdV d ik= gS\
(A) 60 (B) 120
(C) 500 (D) 1000

53. A card is drawn from a well-shuffled deck of 52 cards. What is the probability that it is queen of spade? / 52 ताशों की एक अच्छी तरह फेंटी हुई गड्डी में से एक ताश निकाला जाता है। वह प्रायिकता क्या है कि यह हुकुम की रानी है\
(A) $\frac{1}{12}$ (B) $\frac{1}{13}$
(C) $\frac{1}{4}$ (D) $\frac{1}{8}$

54. What is the number of different messages that can be represented by three 0's and 1's ? / vyx&vyx संदेशों की, जो rhu 0 vkj nks 1 }kjk fu:fir fd, tk ldrs g] l[;k D;k g\
(A) 10 (B) 9
(C) 8 (D) 7

55. If one root of the equation $(l-m)x^2 + lx + 1 = 0$ is double the other and l is real, then what is the greatest value of m? / ;fn lehdj.k $(l-m)x^2 + lx + 1 = 0$ dk ,d ey nwljs ey dk nks xquk g vkj l okLrfod g] rks m dk vf/kdre eku D;k g\
(A) $-\frac{9}{8}$ (B) $\frac{9}{8}$
(C) $-\frac{8}{9}$ (D) $\frac{8}{9}$

56. For two mutually exclusive events A and B, $P(A) = 0.2$ and $P(\bar{A} \cap \bar{B}) = 0.3$. What is $\big(P(A|AUB)\big)$ equal to? / nks ijLij vioftZr ?kVukvksa A vkj B d fy, $P(A) = 0.2$ vkj $P(\bar{A} \cap \bar{B}) = 0.3$ gA $\big(P(A|AUB)\big)$ fdl d cjkcj g\
(A) $\frac{1}{2}$ (B) $\frac{2}{5}$
(C) $\frac{2}{7}$ (D) $\frac{2}{3}$

57. A certain type of missile hits the target with probability $p = 0.3$. What is the least number of missiles should be fired so that there is at least an 80% probability that the target is hit? / एक विशेष प्रकार के प्रक्षेपास्त्र की लक्ष्य भेदने की çkf;drk $p = 0.3$ gA U;wure fdrus çf{kkL= nkxs tkus pkfg, fd y{; dk Hknus dh çkf;drk de&l&de 80% gk\
(A) 5 (B) 6
(C) 7 (D) None of the above

58. If m is the geometric mean of $\left(\frac{y}{z}\right)^{\log(yz)}$, $\left(\frac{z}{x}\right)^{\log(zx)}$ and $\left(\frac{x}{y}\right)^{\log(xy)}$ then what is the value of m? / ;fn $\left(\frac{y}{z}\right)^{\log(yz)}$, $\left(\frac{z}{x}\right)^{\log(zx)}$ vkj $\left(\frac{x}{y}\right)^{\log(xy)}$ dk xq.kkRrj ek/; m g] rks m dk eku D;k g\
(A) 1 (B) 3
(C) 6 (D) 9

59. A coin is tossed three times. What is the probability of getting head and tail alternately? / ,d flDds dk rhu ckj mNkyk tkrk gA fpr vkj iV d ,dkarj Øe l vkus dh çkf;drk D;k g\
(A) $\frac{1}{8}$ (B) $\frac{1}{4}$
(C) $\frac{1}{2}$ (D) $\frac{3}{4}$

60. Two independent events A and B have $P(A) = \frac{1}{3}$ and $P(B) = \frac{3}{4}$. What is the probability that exactly one of the two events A or B occurs? / nk Lor= ?kVukvk A vkj B d: fy, $P(A) = \frac{1}{3}$ vkj $P(B) = \frac{3}{4}$ gA og çkf;drk D;k g fd A ;k B e: l: Bhd ,d gh ?kVuk ?kfVr gkxh\

(A) $\frac{1}{4}$ (B) $\frac{5}{6}$

(C) $\frac{5}{12}$ (D) $\frac{7}{12}$

61. A random sample of 20 people is classified in the following table according to their ages: 20 ykxk d: ,d ;knjfPNd प्रतिदर्श को उनकी आयु के अनुसार निम्नलिखित सारणी में oxhdr fd;k x;k g%

Age/ vk;q	Frequency/ ckjackjrk
15-25	2
25-35	4
35-45	6
45-55	5
55-65	3

What is the mean age of this group of people?/ ykxk d: bl leg dh ek/; vk;q D;k g\

(A) 41.0 (B) 41.5

(C) 42.0 (D) 42.5

62. Three independent events, A_1, A_2 and A_3 occur with probabilities $P(A_i) = \frac{1}{1+i}$, i= 1,2,3. What is the probability that at least one of the three events occurs?/ rhu Lor= ?kVuk,] A_1, A_2 vkj A_3 ijf;Drk,a $P(A_i) = \frac{1}{1+i}$, i= 1,2,3. l: ?kfVr gkrh gA bldh D;k ijkf;drk g fd rhuk ?kVukvk e: l: de&l: de ,d ?kfVr gk\

(A) $\frac{1}{4}$ (B) $\frac{2}{3}$

(C) $\frac{3}{4}$ (D) $\frac{1}{24}$

63. Let Q be the image of the point P(-2,1,-5) in the plane 3x-2y+2z+1=0 / eku yhft, Q fcnq P(-2,1,-5) dk lery 3x-2y+2z+1=0 e: ijfrfcEc gA

Consider the following: / fuEufyf[kr ij fopkj dhft,%

1. The coordinates of Q are (4,-3,-1) / Q के निर्देशांक . (4,-3,-1) gA
2. PQ is of length more than 8 units./ PQ dh yEckbZ 8 bdkbZ;k l: T;knk gA
3. The point (1,-1,-3) is the mid-Point of the line segment PQ and lies on the given plane./ fcnq (1,-1,-3) j[kk[kM PQ dk e/;&fcnq g vkj fn, x, lery ij fLFkr gA

Which of the above statements is/are correct?/ mi;qDr dFkuk e: l: dkSu l: gh g\

(A) 1 and 2 only (B) 2 and 3 only

(C) 1 and 3 only (D) 1, 2 and 3

64. Which one of the following differential equations represents the family of straight lines which are at unit distance from the origin?/ fuEufyf[kr vody lehdj.kk e: l: dkSu&lk ,d mu ljy d: dy dk fu:fir djrk g tks ewy-fcnq l: ,dd nwjh ij g\

(A) $\left(y - x\frac{dy}{dx}\right)^2 = 1 - \left(\frac{dy}{dx}\right)^2$ (B) $\left(y + x\frac{dy}{dx}\right)^2 = 1 + \left(\frac{dy}{dx}\right)^2$

(C) $\left(y - x\frac{dy}{dx}\right)^2 = 1 + \left(\frac{dy}{dx}\right)^2$ (D) $\left(y + x\frac{dy}{dx}\right)^2 = 1 - \left(\frac{dy}{dx}\right)^2$

65. A coin is tossed is three times. Consider the following events:/ ,d flDdk dk rhu ckj mNkyk tkrk gA fuEufyf[kr ?kVukvk ij fopkj dhft,%

A: No head appears/ dkbZ fpr (gM) ugh vkrk

B: Exactly one head appears/ ;FkkrFk ,d fpr vkrk g

C: At least two heads appear/ de&l&de nks fpr vkrs g

Which one of the following is correct?/ fuEufyf[kr e: l: dkSu&lk ,d lgh g\

(A) (A∪B) U(A∪C)=B∪C (B) (A∪B') ∩(A∪C')=B'∪C'

(C) A∩(B'∪C')=A∪B∪C (D) A∩(B'∪C')=B'∩C'

66. Let $f(x) = [|x| - |x-1|]^2$. / eku yhft, $f(x) = [|x| - |x-1|]^2$ gA

What is f'(x) equal to when x>1?/ tc x>1 g] rks f'(x) fdldk cjkcj g\

(A) 0 (B) 2x-1

(C) 4x-2 (D) 8x-4

67. A force $\vec{F} = 3\hat{\imath}+2\hat{\jmath}-4\hat{k}$ is applied at the point (1,-1, 2). What is the moment of the force about the point (2,-1, 3)?/ fcn(1,-1, 2) ij cy $\vec{F} = 3\hat{\imath}+2\hat{\jmath}-4\hat{k}$ yxk;k tkrk gA fcn (2,-1, 3) d ifjr% cy dk vk?k.k D;k gS\

(A) $\hat{\imath}+4\hat{\jmath}+4\hat{k}$ (B) $2\hat{\imath}+\hat{\jmath}+2\hat{k}$

(C) $2\hat{\imath}-7\hat{\jmath}-2\hat{k}$ (D) $2\hat{\imath}+4\hat{\jmath}-\hat{k}$

68. In a series of 3 one-day cricket matches between teams A and B of a college, the probability of team A winning or drawing are 1/3 and 1/6 respectively. If a win, loss or draw gives 2, 0 and 1 point respectively, then what is the probability that team A will score 5 Points in the series?/ ,d dkyst dh Vheksa A vkj B d chp] 3 ,d&fnolh; fdsdsV eSpksa dh ,d Jà[kyk esa Vheksa A d thr d vifj.kkeh (Mjk) होने की प्रायिकता करमशः 1/3 vkj 1/6 gA ;fn thr] हार या अपरिणाम के करमशः 2, 0 vkj 1 vad gksa] rks bldh D;k izkf;drk gS fd bl Jà[kyk esa Vheksa A, 5 vad izkIr djsxh\

(A) $\frac{17}{18}$ (B) $\frac{11}{12}$

(C) $\frac{1}{12}$ (D) $\frac{1}{18}$

69. In a study of two groups, the following results were obtained:/ nks legksa d v/;;u esa] fuEufyf[kr ifj.kke izkIr fd, x,%

	Group A/ leg A	Group B/ leg B
Sample size / प्रतिदर्श आमाप	20	25
Sample mean/ प्रतिदर्श माध्य	22	23
Sample standard deviation/ प्रतिदर्श ekud fopyu	10	12

Which of the following statements is correct?/ fuEufyf[kr dFkuksa esa l dku&lk lgh gS\

(A) Group A is less variable than group B because Group A's standard deviation is smaller. / leg A, leg B dh vi{kk de ifjorh gS] D;kfd leg A dk ekud fopyu y?kqrj gA

(B) Group A is less variable than Group B because Group A's sample size is smaller. / leg A, leg B dh vi{kk de ifjorh gS] D;kfd leg A dk प्रतिदर्श आमान लघुतर है।

(C) Group A is less variable than Group B because Group A's sample mean is smaller./ leg A, leg B dh vi{kk de ifjorh gS] D;kfd leg A dk प्रतिदर्श माध्य लघुतर है।

(D) Group A is less variable than Group B because Group A's coefficient of variation is smaller. / leg A, leg B dh vi{kk de ifjorh gS] D;kfd leg A dk fopj.k xq.kkad y?kqrj gA

70. Which of the following statements are correct?/ fuEufyf[kr dFkuksa esa l dku&l lgh gS\

1. (fof) (x) = f(x).
2. (gog)(x)=g(x) only when x=0. / (gog)(x)=g(x) dsoy rHkh tc x=0. gA
3. (go (fog)) (x) can take only three values. / (go (fog)) (x) dsoy rhu eku ys ldrk gA

Select the correct answer using the code given below: / uhps fn, x, dksM dk iz;ksx dj lgh mRrj pquh,%

(A) 1 and 2 only (B) 2 and 3 only

(C) 1 and 3 only (D) 1, 2 and 3

71. Consider the following statements in respect of class intervals of grouped frequency distribution:/ oxhZdr ckjackjrk cVu d oxZ varjkyksa d ckj esa fuEufyf[kr dFkuksa ij fopkj dhft,%

1. Class intervals need not be mutually exclusive./ यह आवश्यक नहीं है fd oxZ varjky ijLij vioftZr gksA
2. Class intervals should be exhaustive./ वर्ग अंतराल निश्शेष होने चाहिए।
3. Class intervals need not be of equal width./ यह आवश्यक नहीं है कि वर्ग अंतराल समान चौड़ाई के हों।

Which of the above statements are correct?/ mi;qZDr dFkuksa esa l dku&l lgh gS\

(A) 1 and 2 only (B) 2 and 3 only

(C) 1 and 3 only (D) 1, 2 and 3

72. Three candidates solve a question. Odds in favour of the correct answer are 5:2, 4:3 and 3:4 respectively for the three candidates. What is the probability that at least two of them solve the question correctly?/ rhu mEehnokj ,d प्रश्न हल करते है। तीनो उम्मीदवारों के लिए सही उत्तर के पक्ष में संयोगानुपात करमशः 5:2, 4:3 vkj 3:4 gA bldh D;k izkf;drk है कि उनमें से कम–से कम दो उम्मीदवार प्रश्न को सही –सही हल हैं\

(A) 209/343 (B) 134/343

(C) 149/343 (D) 60/343

73. What is the curve which passes through the point (1,1) and whose slope is $\frac{2y}{x}$? / fcUnq (1,1) ls xqtjus okyk odz] ftldh izo.krk $\frac{2y}{x}$ gS] D;k gS\

(A) Circle /o`Rr (B) Parabola/ijoy;
(C) Ellipse/ nh?kZo`Rr (D) Hyperbola/vfrijoy;

74. A salesman has a 70% chance to sell a product to any customer. The behavior of successive customers is independent . If two customers A and B enter, what is the probability A and B enter, what is the probability that the salesman will sell the product to customer A or B? / ,d fodzsrk }kjk fdlh xzkgd dk ,d mRikn cspus dk lEHkkouk 70% gSA mRrjkrj xzkgdksa dk O;ogkj Lora=r gSA ;fn nks xzkgd A vkSj B vkrs gSa] rks bldh izkf;drk D;k gS fd fodzsrk xzkgd A ;k B dk og mRikn cspus esa lQy gksrk gS\

(A) 0.98 (B) 0.91
(C) 0.70 (D) 0.49

75. Let f(x) = [x], where [.] is the greatest integer function and g(x) = sin x be two real valued functions over R. / eku yhft, f(x) = [x], tgk¡ [.] egRre iw.kkZd Qyu gS vkSj g(x) = sin x R ij nks okLrfod eku Qyu gSA
Which one of the following statements is correct?/ fuEufyf[kr dFkuksa esa ls dkSu &lk ,d lgh gS\

(A) $\lim_{x \to 0}$(fog) (x) exists./ $\lim_{x \to 0}$(fog) (x) dk vfLrRo gSA (B) $\lim_{x \to 0}$(gof) (x) exists. / $\lim_{x \to 0}$(gof) (x) dk vfLrRo gSA
(C) $\lim_{x \to 0-}$ (fog) (x) =$\lim_{x \to 0-}$(gof) (x) (D) $\lim_{x \to 0+}$(fog) (x) = $\lim_{x \to 0+}$(gof) (x)

76. Two variates, x and y, are uncorrelated and have standard deviations σ_x and σ_y respectively. What is the correlation coefficient between x+y and x-y?/ nks fopj x और ल सहसंबंधित नहीं है उनके मानक विचलन क्रमशः σ_x vkSj σ_y gSA x+y vkSj x-y ds chp lglaca/k xq.kkad D;k gS\

(A) $\frac{\sigma_x\sigma_y}{\sigma_x^2+\sigma_y^2}$ (B) $\frac{\sigma_x+\sigma_y}{2\sigma_x\sigma_y}$
(C) $\frac{\sigma_x^2-\sigma_y^2}{\sigma_x^2+\sigma_y^2}$ (D) $\frac{\sigma_x-\sigma_y}{\sigma_x\sigma_y}$

77. Consider the following statements:/ fuEufyf[kr dFkuksa ij fopkj dhft,%
1. The mean and median are equal in symmetric distribution./ lefer caVu esa ek/; vkSj ekf/;dk cjkcj gksrs gSA
2. The range is the difference between the maximum value and minimum value in the data./ nRr (MVk) esa vf/kdre eku vkSj U;wure eku ds chp dk varj ifjlj (jsat) gksrk gSA
3. The sum of the areas of the rectangles in the histogram is equal to the total area bounded by the frequency polygon and the horizontal axis./ vk;r&fprz esa vk;rksa ds {ks=Qyksa dk ;ksxQy] ckjackjrk cgqHkqt vkSj {kfrt v{k}kjk ifjc) dqy {ks=Qy ds cjkcj gksrk gSA
Which of the above statements are correct?/ mi;qDr dFkuksa esa ls dkSu&ls lgh gSa\

(A) 1 and 2 only (B) 2 and 3 only
(C) 1 and 3 only (D) 1, 2 and 3

78. What is $\int e^{sinx}\ \frac{xcos^3x-\sin x}{cos^2x}$ equal to?/ $\int e^{sinx}\ \frac{xcos^3x-\sin x}{cos^2x}$ fdlds cjkcj gS\

(A) (x+secx) e^{sinx}+ c (B) (x-secx) e^{sinx}+ c
(C) (x+tanx) e^{sinx}+c (D) (x-tanx) e^{sinx}+ c

79. Let f(x) = $\begin{cases} -2, & -3 \le x \le 0 \\ x-2, & 0 < x \le 3 \end{cases}$ and
g(x) = f(|x|)+|f(x)| Ekku yhft, f(x) = $\begin{cases} -2, & -3 \le x \le 0 \\ x-2, & 0 < x \le 3 \end{cases}$
What is the value of the differential coefficient of g(x) at x=-2?/ x=-2 ij] g(x) ds vody xq.kkad dk eku D;k gS\

(A) -1 (B) 0
(C) 1 (D) 2

80. Let f(x) = $\begin{cases} -2, & -3 \le x \le 0 \\ x-2, & 0 < x \le 3 \end{cases}$ and
g(x) = f(|x|)+|f(x)| Ekku yhft , f(x) = $\begin{cases} -2, & -3 \le x \le 0 \\ x-2, & 0 < x \le 3 \end{cases}$ vkj g(x) = f(|x|)+|f(x)|
Which of the following statements is/are correct?/ fuEufyf[kr dFkuksa esa ls dkSu&lk/ls lgh gS/gSa\
1. g(x) is differentiable at x=0./ x=0 ij g(x) vodyuh; gSA
2. g(x) is differentiable at x=2./ x=2 ij g(x) vodyuh; gSA
Select the correct answer using the code given below: uhps fn, x, dksM dk iz;ksx dj lgh mRrj pqusa %
(A) 1 only (B) 2 only
(C) Both 1 nor 2 (D) neither 1 nor 2

81. Let the random variable X follow B (6, p). If 16P(X=4)=P(X=2), then what is the value of p?/ eku yhft , fd ;kn;fPpd pj X, B(6, p) dk vuqlj.k djrk gS ;fn 16P(X=4)=P(X=2), rks p dk eku D;k gS\
(A) $\frac{1}{3}$ (B) $\frac{1}{4}$
(C) $\frac{1}{5}$ (D) $\frac{1}{6}$

82. f(x)= $\begin{cases} \frac{e^x-1}{x}, & x > 0 \\ 0, & x = 0 \end{cases}$ be a real valued function.
Ekku yhft , f(x)= $\begin{cases} \frac{e^x-1}{x}, & x > 0 \\ 0, & x = 0 \end{cases}$,d okLrfod eku Qyu gSA
Which of the following statements is/are correct?/ fuEufyf[kr dFkuksa esa ls dkSu &lk ,d lgh gS\
1. f(x) is right continuous at x =0./ x =0 ij f(x)nf{k.k lrr gSA
2. f(x) is discontinuous at x =1./ x =1 ij f(x) vlrr gSA
Select the correct answer using the code given below: uhps fn, x, dksM dk iz;ksx dj lgh mRrj pquas,%
(A) 1 only (B) 2 only
(C) Both 1 nor 2 (D) Neither 1 nor 2

83. A medicine is known to be 75% effective to cure a patient . If the medicine is given to 5 patients , what is the probability that at least one patient is cured by this medicine?/ dksbZ nok fdlh jksxh dk jksxefDr djus esa 75% dkjxj tkuh tkrh gSA ;fn ;g nok 5 jksfx;ksa dks nh tkrh gS] rks bldh D;k izkf;drk gS fd bl nok ls de&lsde ,d jksxh jksxeDr gks tk,\
(A) $\frac{1}{1024}$ (B) $\frac{243}{1024}$
(C) $\frac{1023}{1024}$ (D) $\frac{781}{1024}$

84. A line L, passes through the point P(5,-6,7) and is parallel to the planes x+y+z=1 and 2x-y-2z=3. ,d js[kk L, fcUnq P(5,-6,7) ls gksdj xtjrh gS vkSj leryksa x+y+z=1 vkSj 2x-y-2z=3. ds lekarj gSA
What are the direction ratios of the line of intersection of the given planes?/ fn, x, leryksa dh izfrPNsn js[kk ds fnd vuqikr D;k gS\
(A) <1,4 ,3> (B) <-1,-4,3>
(C) <1,-4, 3> (D) <1,-4,-3>

85. What is the order of the differential equation $\frac{dx}{dy} + \int y\,dx = x^3$?/ vody leehdj.k $\frac{dx}{dy} + \int y\,dx = x^3$ dh dksfV D;k gS\
(A) 1 (B) 2
(C) 3 (D) Cannot be determined/ fu/kkfjr ugha dh tk ldrh

86. For 10 observations on price (x) and supply (y), the following data was obtained:/ dher (x) vkSj ifrwfr (y) ds 10 i{k.kksa esa fuEufyf[kr vkdM+s izkIr fd, x,%
$\sum x = 130, \sum y = 220, \sum x^2 = 2288,$
$\sum y^2 = 5506$ and $\sum xy = 3467.$
What is the line of regression of y on x?/ X ij y की समाश्रयण रेखा क्या है\
(A) Y= 0.91x+8.74 (B) Y = 1.02x+8.74
(C) Y =1.02x-7.02 (D) Y = 0.91x-7.02

87. If $\int_0^{\pi/2} \frac{dx}{3cosx+5}$ = k $\cot^{-1}2$, then what is the value of k ?/ ;fn $\int_0^{\pi/2} \frac{dx}{3cosx+5}$ = k $\cot^{-1}2$, rks k dk eku D;k gS\
(A) 1/4 (B) 1/2
(C) 1 (D) 2

88. Which of the following statements are correct?
fuEufyf[kr dFkuk e: l: dku&l: lgh g\
1. g(x) is continuous at x=0./ x=0 ij g(x) lrr gA
2. g(x) is continuous at x=2. / x=2 ij g(x) lrr gA
3. g(x) is continuous at x=-1./ x=-1 ij g(x) lrr gA
Select the correct answer using the code given below: uhp fn, x, dV dk i;kx dj lgh mRrj pfu,%
(A) 1 and 2 only (B) 2 and 3 only
(C) 1 and 3 only (D) 1, 2 and 3

89. What are the degree and order respectively of the differential equation satisfying $e^{y\sqrt{1-x^2}}+x\sqrt{1-y^2}=ce^{x}$, (where c>0, |x|<1, |y|<1)?/ $e^{y\sqrt{1-x^2}}+x\sqrt{1-y^2}=ce^{x}$, (tgk c>0, |x|<1, |y|<1) को संतुष्ट करने वाले अवकल समीकरण की घात (fMxjh) vkj dkfV (vkMj) कमशः क्या हैं\
(A) 1,1 (B) 1,2
(C) 2,1 (D) 2,2

90. Let f(x) = $[|x|-|x-1|]^2$. / eku yhft, f(x) = $[|x|-|x-1|]^2$ gA
What is f'(x) equal to when 0 < x < 1?/ tc 0 < x < 1 g] rk f'(x) fdl dk cjkcj g\
(A) 0 (B) 2x-1
(C) 4x-2 (D) 8x-4

91. $f(x)=\begin{cases}3x^2+12x-1, & -1\le x\le 2\\ 37-x, & 2<x\le 3\end{cases}$
Which of the following statements are correct?/ fuEufyf[kr dFkuk e: l: dku & l: lgh gA
1. f(x) is continuous at x=2./ x=2 ij f(x) lrr gA
2. f(x) attains greatest value at x=2./ x=2 ij f(x)vf/kdre eku izkIr djrk gA
3. f(x) is differentiable at x=2./ x=2 ij f(x) vodyuh; gA
Select the correct answer using the code given below: uhp fn, x, dV dk i;kx dj lgh mRrj pfu,%
(A) 1 and 2 only (B) 2 and 3 only
(C) 1 and 3 only (D) 1, 2 and 3

92. $f(x)=\begin{cases}3x^2+12x-1, & -1\le x\le 2\\ 37-x, & 2<x\le 3\end{cases}$
Which of the following statements is/are correct?/ fuEufyf[kr dFkuk e: l: dku&lk /l: lgh g\/g\
1. f(x) is increasing in the interval [-1,2]./ f(x) varjky [-1,2] e o/keku gA
2. f(x) is decreasing in the interval [2,3]./ f(x) varjky [2,3] e gjkleku gA
Select the correct answer using the code given below: uhp fn, x, dV dk i;kx dj lgh mRrj pfu,
(A) 1 only (B) 2 only
(C) Both 1 nor 2 (D) neither 1 nor 2

93. The expansion of $(x-y)^n, n\ge 5$ is done in the descending powers of x. If the sum of the fifth and sixth terms is zero, then $\frac{x}{y}$ is equal to/$(x-y)^n, n\ge 5$ dk izlkj x dh ?kkr dk vojkgh dze e fd;k x;k है। यदि पाँचवें वा छठे पदों का योग शून्य है, तक $\frac{x}{y}$ fdl dk cjkcj gA

(A) $\frac{n-5}{6}$ (B) $\frac{n-4}{5}$
(C) $\frac{5}{n-4}$ (D) $\frac{6}{n-5}$

94. A student appears for tests I, II and III. The student is considered successful if he passes in tests I, II or I, III or all the three. The probabilities of the student passing in tests I, II and III are m, n and 1/2 respectively. If the probability of the student to be successful is 1/2 , then which one of the following is correct?/ dkbZ Nk= ijh{kkvk I, II vkj III e cBrk gA ml Nk= dk lQy ekuk tkrk g tk ijh{kkvk I, II ;k I, III ;k lHkh rhuk e mRrh.k gk tkrk gA bl Nk= dh ijh{kkvk I, II vkj III में उत्तीर्ण होने की प्रायिकता कमशः m, n vkj 1/2 gA ;fn Nk= dh lQy gkus dh çkf;drk 1/2 g] rk fuEufyf[kr e: l: dku&lk ,d lgh g\
(A) m(1+n)=1 (B) n(1+m)=1
(C) m=1 (D) mn=1

95. What is the domain of the function f(x) = $\frac{1}{\sqrt{|x|-x}}$?/ Qyu f(x) = $\frac{1}{\sqrt{|x|-x}}$ dk ijkr (Mkeu) D;k g\
(A) (-∞,0) (B) (0,∞)
(C) 0<x<1 (D) x>1

96. f(x)= $\begin{cases} \frac{e^x-1}{x}, & x>0 \\ 0, & x=0 \end{cases}$ be a real valued function.

Ekku yhft, f(x)= $\begin{cases} \frac{e^x-1}{x}, & x>0 \\ 0, & x=0 \end{cases}$,d okLrfod eku Qyu gA

Which one of the following statements is correct?/ fuEufyf[kr dFkuksa esa ls dkSu &lk ,d lgh gS\

(A) f(x) is a strictly decreasing function in (0,x)./ f(x) ,(0,x) esa fujarj gzkleku Qyu gA

(B) f(x) is a strictly increasing function in (0,x). / f(x), (0,x) esa fujarj o/keku Qyu gA

(C) f(x) is neither increasing nor decreasing in (0,x)./ f(x), (0,x) esa u rks o/keku gS u gh gzkleku

(D) (d) f(x) is not decreasing in (0,x)./ f(x), (0,x) esa gzkleku ugha gA

97. A special dice with numbers 1,-1,2,-2,0 and 3 is thrown thrice. What is the probability that the sum of the numbers occurring on the upper face is zero?/ 1,-1,2,-2,0 vkSj 3 संख्याओं वाले एक विशेष पांसे को तीन बार फेंका गया । ऊपरी Qyd पर आने वाली संख्याओं के योगफल के शून्य होने की प्रायिकता क्या है\

(A) 1/72 (B) 1/8

(C) 7/72 (D) 25/216

98. Let f(x) = [x], where [.] is the greatest integer function and g(x) = sin x be two real valued functions over R. / eku yhft, f(x) = [x], tgk [.] egRre iw.kkZd Qyu gS vkSj g(x) = sin x R ij nks okLrfod eku Qyu gA

Which of the following statements is correct?/ fuEufyf[kr dFkuksa esa ls dkSu &lk lgh gS\

(A) Both f(x) and g(x) are continuous at x=0./ f(x) vkSj g(x) nksuksa x=0 ij lrr gA

(B) f(x) is continuous at x=0, but g(x) is not continuous at x=0./ f(x), x=0, ij lrr gS] fdUrq g(x) x=0, ij lrr ugha gA

(C) g(x) is continuous at x =0, but f(x) is not continuous at x=0./ g(x) x=0, ij lrr gS] fdUrq f(x), x=0 ij lrr ugha gA

(D) Both f(x) and g(x) are discontinuous at x=0./ f(x)nksuksa g(x) x=0 ij vlrr gA

99. A machine has three parts, A, B and C, whose chances of being defective are 0.02 , 0.10 and 0.05 respectively. The machine stops working if any one of the parts becomes defective. What is the probability that the machine will not stop working?/ एक मशीन के तीन पुर्जे A, B vkSj C है, जिनके सदोष (fMQfDVo) होने की प्रायिकताएँ कमशः 0.02, 0.10 vkSj 0.05 है। यदि इन पुर्जों में से कोई भी एक पुर्जा सदोष हो जाए , तो मशीन काम करना बंद कर देती है। इसकी क्या प्रायिकत है कि मशीन काम करना बंद नहीं करेगी\

(A) 0.06 (B) 0.16

(C) 0.84 (D) 0.94

100. Let f(x) be a function such that f'$\left(\frac{1}{x}\right)$+x^{3}f'(x)=0. What is $\int_{-1}^{1} f(x)\,dx$ equal to?/ eku yhft, f(x) ,d ,slk Qyu gS fd f'$\left(\frac{1}{x}\right)$+x^{3}f'(x)=0. $\int_{-1}^{1} f(x)\,dx$ fdlds cjkcj gS\

(A) 2f (1) (B) 0

(C) 2f (-1) (D) 4f (1)

101. If the covariance between x and y is 30, variance of x is 25 and variance of y is 144, then what is the correlation coefficient?/ ;fn x vkSj y ds chp lgizlj.k 30 gS] x dk izlj.k 25 gS vkSj y dk izlj.k 144 gS] rks lglEcU/k xq.kkad D;k gS\

(A) 0.4 (B) 0.5

(C) 0.6 (D) 0.7

102. For two events, A and B , it is given that P(A)=$\frac{3}{5}$, P(B)=$\frac{3}{10}$ and P (A|B)= $\frac{2}{3}$. If $\bar{A}$ and $\bar{B}$ are the complementary events of A and B, then what is P($\bar{A}$|$\bar{B}$) equal to?/ A vkSj B nks ?kVukvksa ds fy, ;g fn;k x;k gS fd P(A)=$\frac{3}{5}$, P(B)=$\frac{3}{10}$ vkSj P (A|B)= $\frac{2}{3}$ gA ;fn $\bar{A}$ vkSj $\bar{B}$, A vkSj B dh ijd ?kVuk, gSa] rks P($\bar{A}$|$\bar{B}$) fdlds cjkcj gS\

(A) $\frac{3}{7}$ (B) $\frac{3}{4}$

(C) $\frac{1}{3}$ (D) $\frac{4}{7}$

103. What is $\int_1^3 |1-x^4|\,dx$ equal to?/ $\int_1^3 |1-x^4|\,dx$ fdlds cjkcj gS\

(A) -232/5 (B) -116/5

(C) 116/5 (D) 232/5

104. Which of the following equations is /are correct?/ fuEufyf[kr lehdj.kksa esa ls dkSu&lk/ls lgh gS/gSa\

1. f(-2)=f(5)
2. f'(-2) + f'(0.5)+f'(3)=4

Select the correct answer using the code given below: uhps fn, x, dksM dk iz;ksx dj lgh mRrj pquk,%

(A) 1 only (B) 2 only

(C) Both 1 and 2 (D) neither 1 nor 2

105. Consider the following in respect of the function f(x) = $\begin{cases} 2+x & x \geq 0 \\ 2-x & x < 0 \end{cases}$

1. $\lim_{x \to 1} f(x)$ does not exist.
2. f(x) is differentiable at x =0.
3. f(x) is continuous at x=0.

Which of the above statements is / are correct?

Qyu f(x) = $\begin{cases} 2+x & x \geq 0 \\ 2-x & x < 0 \end{cases}$ d; lEc/k esa fuEufyf[kr ij foPkkj dhft,%

1. $\lim_{x \to 1} f(x)$ dk vfLrRo ugha gSA
2. f(x) x =0. ij vodyuh; gSA
3. f(x) x=0. ij lrr gSA

(A) 1 only (B) 3 only
(C) 2 and 3 only (D) 1 and 3 only

106. The scores of 15 students in an examination were recorded as 10, 5, 8, 16, 18, 20, 8, 10, 16,20,18,11,16,14 and 12. After calculating the mean, median and mode , an error is found . One of the values is wrongly written as 16 instead of 18. Which of the following measures of central tendency will change?/ fdlh ijh{kk esa 15 Nk=ksa dh çkIrkadksa 10, 5, 8, 16, 18, ,8, 10, 16, 20, 18, 11, 16,14 vkSj 12 vFkkfyf[kr fd, x,A ek/;] ekf/;dk vkSj cgqyd (ekM) dk ifjdyu djus ds ckn ,d =qfV ikbZ xbZA bu ekuksa esa ls ,d eku xyrh ls 18 ds cnys 16 fy[kk x;k gSA dsUnzh; izofRr dh fuEufyf[kr ekiksa esa ls dkSu&lk /ls cny tk,xk/ tk,xs\

(A) Mean and median/ ek/; vkSj ekf/;dk (B) Median and mode / ekf/;dk vkSj cgqyd
(C) mode only/ dsoy cgqyd (D) Mean and mode/ ek/; vkSj cgqyd

107. In a right – angled triangle ABC, if the hypotenuse AB= p, then what is $\overrightarrow{AB} \cdot \overrightarrow{AC} + \overrightarrow{BC} \cdot \overrightarrow{BA} + \overrightarrow{CA} \cdot \overrightarrow{CB}$ equal to?/ ,d ledks.k f=Hkqt ABC, esa ;fn d.kZ AB=p] rks $\overrightarrow{AB} \cdot \overrightarrow{AC} + \overrightarrow{BC} \cdot \overrightarrow{BA} + \overrightarrow{CA} \cdot \overrightarrow{CB}$ fdlds cjkcj gS\

(A) p (B) p^2
(C) $2p^2$ (D) $\frac{p^2}{2}$

108. There is 25% chance that it rains on any particular day. What is the probability that there is at least one rainy day within a period of 7 days?/ किसी भी एक विशिष्ट दिन वर्षा होने का संयोग 25% gSA 7 दिनों की अवधि में वर्षा का कम–से–कम ,d fnu gksus dh izkf;drk D;k gS\

(A) $1-\left(\frac{1}{4}\right)^7$ (B) $\left(\frac{1}{4}\right)^7$
(C) $\left(\frac{3}{4}\right)^7$ (D) $1-\left(\frac{3}{4}\right)^7$

109. Which one of the following statements is correct in respect of the function $f(x) = x^3 \sin x$?/ Qyu $f(x) = x^3 \sin x$ dh lEc/k esa fuEufyf[kr dFkuksa esa ls dkSu &lk ,d lgh gS\

(A) It has local maximum at x=0./ bldk LFkkuh; mPpf"B x=0 ij gSA (B) It has local minimum at x=0./ इसका स्थानीय निमिष्ठ x=0 ij gSA
(C) It has neither maximum nor minimum at x=0./ x=0 पर न तो इसका उच्चिष्ट है, न ही निमिष्ठ। (D) It has maximum value 1./ bldk vf/kdre eku 1 gSA

110. What is $\int \frac{x^4-1}{x^2\sqrt{x^4+x^2+1}} dx$ equal to?/ $\int \frac{x^4-1}{x^2\sqrt{x^4+x^2+1}}$ fdlds cjkcj gS\

(A) $\sqrt{\frac{x^4+x^2+1}{x}} + c$ (B) $\sqrt{x^4+2-\frac{1}{x^2}} + c$
(C) $\sqrt{x^2+\frac{1}{x^2}+1} + c$ (D) $\sqrt{\frac{x^4-x^2+1}{x}} + c$

111. Let f : A→R where A= R \ [0] is such that f(x) = $\frac{X+|X|}{X}$. On which one of the following sets is f(x) continuous?/ eku yhft, f : A→R tgk A= R \ [0] bl izdkj gS fd f(x) = $\frac{X+|X|}{X}$ gSA fuEufyf[kr leqPp;ksa esa ls fdl ij f(x) lrr gS\

(A) A (B) B= { x ϵ R : x ≥0}
(C) C= { x ϵ R : x ≤0} (D) D=R

112. Consider the parabola $y = x^2+7x+2$ and the straight line $y=3x-3$./ ijoy; $y = x^2+7x+2$ vkj ljy j[kk $y=3x-3$. ij fopkj dhft,A
What is the shortest distance from the above point on the parabola to the line?/ ijoy; ij fLFkr mi;qDr fcnq ls j[kk dh y?kqre nwjh D;k gS\
(A) $\frac{\sqrt{10}}{2}$ (B) $\frac{\sqrt{10}}{5}$
(C) $\frac{1}{\sqrt{10}}$ (D) $\frac{\sqrt{5}}{4}$

113. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, and $|\vec{a}|=10$, $|\vec{b}| = 6$ and $|\vec{c}| = 14$./ eku yhft, $\vec{a}, \vec{b}$ vkj $\vec{c}$ rhu lfn'k bl izdkj gS fd $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, vkj $|\vec{a}|=10$, $|\vec{b}| = 6$ vkj $|\vec{c}| = 14$ gSA
What is the angle between $\vec{a}$ and $\vec{b}$?/ $\vec{a}$ vkj $\vec{b}$ ds chp dk dks.k D;k gS\
(A) 30° (B) 45°
(C) 60° (D) 75°

114. If $x\,dy= y\,dx+y^2dy$, $y>0$ and $y(1) =1$, then what is $y(-3)$ equal to?/ ;fn $x\,dy= y\,dx+y^2dy$, $y>0$ vkj $y(1)=1$, rks $y(-3)$ fdlds cjkcj gS\
(A) 3 only (B) -1 only
(C) Both -1 and 3 (D) neither -1 nor 3

115. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, and $|\vec{a}|=10$, $|\vec{b}| = 6$ and $|\vec{c}| = 14$./ eku yhft, $\vec{a}, \vec{b}$ vkj $\vec{c}$ rhu lfn'k bl izdkj gS fd $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, vkj $|\vec{a}|=10$, $|\vec{b}| = 6$ vkj $|\vec{c}| = 14$ gSA
What is $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ equal to?/ $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ fdlds cjkcj gS\
(A) -332 (B) -166
(C) 0 (D) 166

116. Let $\vec{a} = \hat{\imath} + \hat{\jmath}$, $\vec{b} = 3\hat{\imath} + 4\hat{k}$ and $\vec{b} = \vec{c} + \vec{d}$, where $\vec{c}$ is parallel to $\vec{a}$ and $\vec{d}$ is perpendicular to $\vec{a}$ / eku yhft, $\vec{a} = \hat{\imath} + \hat{\jmath}$, $\vec{b} = 3\hat{\imath} + 4\hat{k}$ vkj $\vec{b} = \vec{c} + \vec{d}$, tgk $\vec{c}$] $\vec{a}$ ds lekarj gS vkj $\vec{d}$] $\vec{a}$ ij yac gSA
If $\vec{d} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, then which of the following equations is/are correct? / ;fn $\vec{d} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, rks fuEufyf[kr lehdj.kksa esa ls dkSu&lk/ls lgh gS/gSa\
1. $y-x=4$
2. $2z-3=0$
Select the correct answer using the code given below: uhps fn, x, dksM dk iz;ksx dj lgh mRrj pqusa,
(A) 1 only (B) 2 only
(C) Both 1 and 2 (D) neither 1 nor 2

117. What is the area bounded by the curves $|y|=1-x^2$?/ odjksa $|y|=1-x^2$ }kjk ifjc) {ks=Qy D;k gS\
(A) 4/3 square units (B) 8/3 square units
(C) 4 square units (D) 16/3 square units

118. Let $\vec{a} = \hat{\imath} + \hat{\jmath}$, $\vec{b} = 3\hat{\imath} + 4\hat{k}$ and $\vec{b} = \vec{c} + \vec{d}$, where $\vec{c}$ is parallel to $\vec{a}$ and $\vec{d}$ is perpendicular to $\vec{a}$ / eku yhft, $\vec{a} = \hat{\imath} + \hat{\jmath}$, $\vec{b} = 3\hat{\imath} + 4\hat{k}$ vkj $\vec{b} = \vec{c} + \vec{d}$, tgk $\vec{c}$] $\vec{a}$ ds lekarj gS vkj $\vec{d}$] $\vec{a}$ ij yac gSA
What is $\vec{c}$ equal to?/ $\vec{c}$ fdlds cjkcj gS\
(A) $\frac{3(\hat{\imath} + \hat{\jmath})}{2}$ (B) $\frac{2(\hat{\imath} + \hat{\jmath})}{3}$
(C) $\frac{(\hat{\imath} + \hat{\jmath})}{2}$ (D) $\frac{(\hat{\imath} + \hat{\jmath})}{3}$

119. A line L, passes through the point P(5,-6,7) and is parallel to the planes $x+y+z=1$ and $2x-y-2z=3$. ,d js[kk L, fcUnq P(5,-6,7) ls gksdj xqtjrh gS vkj leryksa $x+y+z=1$ vkj $2x-y-2z=3$ ds lekarj gSA
What is the equation of the line L?/ js[kk L dk lehdj.k D;k gS\
(A) $\frac{x-5}{-1} = \frac{y+6}{4} = \frac{z-7}{-3}$ (B) $\frac{x+5}{-1} = \frac{y-6}{4} = \frac{z+7}{-3}$
(C) $\frac{x-5}{-1} = \frac{y+6}{-4} = \frac{z-7}{3}$ (D) $\frac{x-5}{-1} = \frac{y+6}{-4} = \frac{z-7}{-3}$

120. Let Q be the image of the point P(-2,1,-5) in the plane $3x-2y+2z+1=0$ / eku yhft, Q fcUnq P(-2,1,-5) dk lery $3x-2y+2z+1=0$ esa ijfrfcEc gSA
Consider the following:/ fuEufyf[kr ij fopkj dhft,%
1. The direction ratios of the line segment PQ are <3,-2, 2>./ js[kk[kaM PQ ds fnd~ vuqikr <3,-2, 2> gSa
2. The sum of the squares of direction cosines of the line segment PQ is unity./ js[kk[kaM PQ ds fnd&dkSlkbu ds oxksZa dk ;ksxQy ,d gSA
Which of the above statements is/are correct?/ mi;qDr dFkuksa esa ls dkSu&ls lgh gS\
(A) 1 only (B) 2 only
(C) Both 1 and 2 (D) neither 1 nor 2

NDA MODAL TEST MATHEMATICS

1.	C
2.	A
3.	C
4.	C
5.	C
6.	D
7.	D
8.	D
9.	B
10.	C
11.	B
12.	D
13.	B
14.	C
15.	C
16.	C
17.	B
18.	C
19.	B
20.	D
21.	B
22.	D
23.	A
24.	C
25.	D
26.	A
27.	D
28.	D
29.	C
30.	C

31.	D
32.	A
33.	A
34.	C
35.	D
36.	D
37.	A
38.	C
39.	C
40.	B
41.	D
42.	C
43.	C
44.	B
45.	A
46.	B
47.	D
48.	D
49.	C
50.	D
51.	A
52.	D
53.	A
54.	A
55.	B
56.	B
57.	A
58.	A
59.	B
60.	D

61.	B
62.	C
63.	D
64.	C
65.	D
66.	A
67.	C
68.	D
69.	D
70.	C
71.	B
72.	A
73.	B
74.	B
75.	D
76.	C
77.	D
78.	B
79.	C
80.	D
81.	C
82.	D
83.	C
84.	C
85.	B
86.	B
87.	B
88.	D
89.	A
90.	D

91.	A
92.	C
93.	B
94.	A
95.	A
96.	B
97.	D
98.	C
99.	C
100.	C
101.	B
102.	A
103.	D
104.	A
105.	B
106.	D
107.	B
108.	D
109.	B
110.	C
111.	A
112.	C
113.	C
114.	A
115.	B
116.	D
117.	B
118.	A
119.	A
120.	C