MATHS

BOOKS - SAI MATHS (TELUGU ENGLISH)

EAMCET - 2018 (TS) SHIFT - 2

Mathematics

1. The set of all value of x and the set of all values of a for which the real valued function $f(x) = \sqrt{\log_a(x - [x])}$ is defined are respectively.

A. $R - Z \& (0, 1)$

B. $Z \& R - \{0, 1\}$

C. $Z \& (1, \infty)$

D. $R \& R$

Answer: A

2. A function $f: R - \{0\} \rightarrow R$ is defined as

$$f(x) = \begin{cases} x^2 + 3x - 7, & x > 0 \\ h(x), & x < 0 \end{cases}$$

If f is an odd function then $h(x) =$

A. $x^2 + 3x + 7$

B. $x^2 + 3x - 7$

C. $-x^2 + 3x + 7$

D. $-x^2 - 3x + 7$

Answer: D

3. $x^n + y^n$ is divisible by

A. $x - y$ for all $n \in N$

B. $x + y$ for all $n \in N$

C. $x + y$ for all $n = 2m - 1, m \in N$

D. $x + y$ for all $n = 2m, m \in N$

Answer: C

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4. Let A be the set of all 3×3 determinants with entries 0 or 1 only and B the subset of A consisting of all determinants with value 1. If C is the subset of A consisting of all determinants with value - 1, then

A. $n(C) = 0$

B. $n(B) = n(C)$

C. $A = B \cup C$

D. $n(B) - 2n(A)$

Answer: B

5. $\begin{vmatrix} 1bc + ad & b^2c^2 + a^2d^2 \\ 1ca + bd & c^2a^2 + b^2d^2 \\ 1ab + cd & a^2b^2 + c^2d^2 \end{vmatrix} =$

A. $(a - b)(b - c)(c - d)(a - d)(a - c)(d - b)$

B. $(a - b)(a - c)(b - c)(b - d)(a - d)(c - d)$

C. $(a - b)(a - c)(a - d)(b - c)(b - d)(d - c)$

D. $(a - b)(b - c)(c - d)(b - d)$

Answer: B

6. The set of real values of α for which the system of linear equations:

$(x) + (\sin \alpha)y + (\cos \alpha)z = 0$

$(x) + (\cos \alpha)y + (\sin \alpha)z = 0$

$$(-x) + (\sin\alpha)y - (\cos\alpha)z = 0$$

has a non-trivia solution is

A. $\dfrac{n\pi}{2} + (-1)^n \dfrac{\pi}{4} + \dfrac{\pi}{8}$ (n is an integer)

B. $\dfrac{n\pi}{2} + (-1)^n \dfrac{\pi}{8}$ (n is an integer)

C. $\dfrac{n\pi}{2} + (-1)^n \dfrac{\pi}{8} - \dfrac{\pi}{8}$ (n is an integer)

D. $\dfrac{n\pi}{2} + (-1)^n \dfrac{\pi}{8} - \dfrac{\pi}{8}$ (n is an integer)

Answer: C

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7. If $\dfrac{1 - 10i\cos\theta}{1 - 10\sqrt{3}i\sin\theta}$ is purely real, then one of the values of θ is

A. $\dfrac{\pi}{6}$

B. $\dfrac{\pi}{4}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{\pi}{2}$

Answer: A

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8. If z and w are comple numbers such that

$\bar{z} - i\bar{w} = 0$ and $\mathrm{Arg}(zw) = \dfrac{3\pi}{4}$, Then Arg z =

A. $\dfrac{\pi}{16}$

B. $\dfrac{\pi}{8}$

C. $\dfrac{\pi}{4}$

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

Answer: B

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9. The number of complex roots of the equation $x^{11} - x^7 + x^4 - 1 = 0$

whose arguments lie in the first quadrants is

A. 2

B. 3

C. 7

D. 9

Answer: B

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10. If α is a root of $z^2 - z + 1 = 0$ then

$$\left(\alpha^{2014} + \frac{1}{\alpha^{2014}} \right) + \left(\alpha^{2015} \frac{1}{\alpha^{2015}} \right)^2 + \left(\alpha^{2016} + \frac{1}{\alpha^{2016}} \right)^3 + \left(\alpha^{2017} + \frac{1}{\alpha^{201}} \right)$$

A. 8

B. 5

C. 3

D. -5

Answer: A

11.   Let

$E_1 \equiv ax^2 + bx + ce, \ E_2 \equiv bx^2 + cx + a, \ E_3 \equiv cx^2 + bx + a$ and $\dfrac{a^2}{bc} + \dfrac{b}{c}$

. If these quadratic expressions have a common zero, then the quadratic

expression having zeroes that are common to E_2 and E_3 and different

from the zeroes of E_1 is

A. $x^2 - \dfrac{a(b+c)}{bc}x + bc$

B. $ax^2 + bx + c$

C. $x^2 - b(c+a)x + ac$

D. $x^3 - \dfrac{a(b+c)}{bc}x + \dfrac{a^2}{bc}$

Answer: D

12. If for real x, $\dfrac{11x^2 + 12x + 6}{x^2 + 4x + 2} = y$ is such that $y < a$ or $y > b$ then a , b are

A. 3, 5

B. $- 5, 3$

C. $- 4, 5$

D. $- 6, 4$

Answer: B

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13. Give that the roots of $x^3 3px^2 + r = 0$ are in harmonic progression. Then

A. $2q^3 = r(3pq - r)$

B. $q^3 = r(3pq - r)$

C. $q^3 = - r(3pq - r)$

D. $3pq = r(r + 3pq)$

Answer: A

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14. If α, β, γ are the roots of $x^3 + px^2 + qx + r = 0$, then $\alpha^2 + \beta^2 + \gamma^2 =$

A. $p^3 - 3pq + r$

B. $p^2 - 2pq + r$

C. $3pq - 3r - p^3$

D. $3pq + 3r + p^3$

Answer: C

15. The number of proper divisors of the number of obtained by dividing 13! With 100 is

A. 216

B. 430

C. 214

D. 790

Answer: B

16. In an admission test, there are 15 multiple choice questions. Each question is followed by 4 alternatives to choose. Out of these there may be one or more than correct answers. If a student attempts all the 15 questions and marks the answers randomly, then number of different ways he can answer the question the question paper is

A. $4 \times {}^{15}C_4$

B. 15^{15}

C. 4^{15}

D. $4!.\ 15!$

Answer: B

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17. The absolute value of numerically greatest term in the expansion of $(2x - 3y)^{12}$ when $x = 3, y = 2$ is

A. $^{12}C_5 6^{12}$

B. $^{12}C_6 6^{12}$

C. $^{12}C_4 6^{12}$

D. $^{12}C_9 6^{12}$

Answer: B

18. The sum of infinite terms of series

$$\frac{3}{10} + \frac{3.7}{10.15} + \frac{3.7.9}{10.15.20} + \ldots \text{ to } \infty \text{ is}$$

A. $\sqrt[4]{125} - 1$

B. $\dfrac{5\sqrt{5}}{3\sqrt{3}} - \dfrac{8}{5}$

C. $\sqrt[3]{4} - \dfrac{4}{3}$

D. $\sqrt{\dfrac{5}{3}} - \dfrac{6}{5}$

Answer: B

19. If $\dfrac{3x + 2}{(x + 1)(2x^2 + 3)} = \dfrac{A}{x + 1} + \dfrac{Bx + C}{2x^2 + 3}$ then $A - B + C =$

A. 1

B. 2

C. 3

D. 5

Answer: B

20.

$\sin 10° \sin 50° \sin 60° \sin 70° = m$ and $\tan 20° \tan 40° \tan 60° \tan 80° = n$

then $\dfrac{n}{m} =$

A. $\dfrac{3\sqrt{3}}{16}$

B. $16\sqrt{3}$

C. $\dfrac{16}{\sqrt{3}}$

D. $8\sqrt{3}$

Answer: B

21. Assertion (A) : If $\alpha = 12°, \beta = 15°, \gamma = 18°$ then

$\tan 2\alpha \tan 2\beta + \tan \beta \tan 2\gamma + \tan 2\gamma \tan 2\alpha = 1$

Reason (R): in $\triangle ABC$, $\tan. \dfrac{A}{2} \tan. \dfrac{B}{2} \tan. \dfrac{C}{2} + \tan. \dfrac{C}{2} \tan. \dfrac{A}{2} =$

Which of the following is true?

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true, but (R) is not the correct explanation of

(A)

C. (A) is true, but (R) is false

D. (A) is false, but (R) is true

Answer: A

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22. $\cot \theta - \tan \theta - 2 \tan 2\theta - 4 \tan 4\theta$

A. $4 \cot 8\theta - \tan 6\theta$

B. $\cot 8\theta + \tan 3\theta$

C. $\cot 8\theta + \cot 6\theta$

D. $8 \cot 8\theta$

Answer: D

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23. If the general solution of $\sin x + 3 \sin x + \sin 5x = 0$ is $x = y$ then the set of all values of cos y is

A. $\left\{ -1, \ -\dfrac{\sqrt{3}}{2}, \ \dfrac{\sqrt{3}}{2}, 1 \right\}$

B. $\left\{ -1, \dfrac{1}{2}, 1 \right\}$

C. $\left\{ -\dfrac{\sqrt{3}}{2}, 0, 1, \ \dfrac{\sqrt{3}}{2} \right\}$

D. $\left\{ -1, \ -\dfrac{1}{2}, \dfrac{1}{2}, 1 \right\}$

Answer: D

24. If $\cos^{-1} 2x + \cos^{-1} 3x = \dfrac{\pi}{3}$ then $x =$

A. $\dfrac{\sqrt{3}}{2\sqrt{7}}$

B. $\dfrac{\sqrt{3}}{\sqrt{7}}$

C. $\dfrac{\sqrt{2}}{\sqrt{5}}$

D. $\dfrac{\sqrt{3}}{2\sqrt{5}}$

Answer: A

25. If $\cosh \beta = \sec \alpha \cos \theta$, $\sin h\beta = \cos ec\alpha \sin \theta$ then $\sinh^2 \beta =$

A. $\sin \alpha \cos \alpha$

B. $\cos^2 \alpha$

C. $\sin^2 \alpha$

D. $\sin \alpha + \cos \alpha$

Answer: C

26. In $\triangle ABC$, $\sin A$ and $\sin B$ satisfy $c^2 x^2 - c(a+b)x + ab = 0$, then

A. the triangle is acute angled

B. the triangle is obtuse angled

C. $\sin C = \dfrac{\sqrt{3}}{2}$

D. $\sin A + \cos A = \dfrac{a+b}{c}$

Answer: D

27. Let ABC be an isoceles triangled with BC as its base. Then $rr_1 =$

A. a^2

B. $\dfrac{a^2}{2}$

C. $R^2 \sin^2 A$

D. $R^2 \sin^2 2B$

Answer: A

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28. In a $\triangle ABC$, $a^4 + b^4 + c^4 = 2b^2c^2 + 2a^2b^2$ then $B =$

A. $\dfrac{\pi}{4}$ or $\dfrac{3\pi}{4}$

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

C. $\dfrac{\pi}{3}$ or $\dfrac{2\pi}{3}$

D. $\dfrac{\pi}{6}$ or $\dfrac{5\pi}{6}$

Answer: A

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29. If $\bar{a} = 2\bar{i} + 3\bar{j} + \bar{k}$, $\bar{b} = \bar{i} - 3\bar{j} - 5\bar{k}$ and $\bar{c} = 3\bar{i} - 4\bar{k}$ then match the items of list I with those of List II.

List I

(a) Unit vector in the direction opposite to that of $\bar{a} - \bar{b}$ is

(b) If $\overline{AB} = \bar{a}, \overline{BC} = \bar{b}$ then $\overline{CA}$

(c) If $\bar{a}, \bar{b}, \bar{c}$, are the position vectors of the vertice a triangle then, its centro

(d) If $\bar{d}$ is a vector of magnitude $2\sqrt{14}$ and parallel to the vector $\bar{a}$, then $\bar{b} - \bar{d}$

A.
a	b	c	d
iv	iii	ii	i

B.
a	b	c	d
iv	ii	ii	i

C.
a	b	c	d
iv	iii	i	ii

D.
a	b	c	d
i	ii	iii	v

Answer: A

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30. If $2\bar{i} - \bar{j} + 3\bar{k},\ -12\bar{i} - \bar{j} - 3\bar{k},\ -\bar{i} + 2\bar{j} - \bar{k}$ and $\lambda(i) - 4\bar{k}$ are the position vectors of four coplanar points then $\lambda =$

A. -2

B. 6

C. 3

D. -6

Answer: B

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31. A point lying on the plane that passes through the points $\bar{i} + \bar{j} + \bar{k},\ \bar{i} - 2\bar{j} + 3\bar{k}$ and $\bar{i} + 2\bar{j} - 3\bar{k}$ is

A. $-\bar{i} + 2\bar{j} - 3\bar{k}$

B. $-\bar{i} + \bar{j} - \bar{k}$

C. $\bar{i} + \bar{j} - \bar{k}$

D. $4\bar{i} + 2\bar{j} + 3\bar{k}$

Answer: C

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32. A non zero vector $\bar{a}$ is parallel to the line of intersection of the plane

determine by the vectors $\bar{i}, \bar{i} + \bar{j}$ and the plane determined by vectors

$\bar{i} - \bar{j}, \bar{i} + \bar{k}.$ The angle between $\bar{a}$ and $\left(\bar{i} - 2\bar{j} + 2\bar{k}\right)$ is

A. $\dfrac{\pi}{6}$

B. $\dfrac{\pi}{4}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{2\pi}{5}$

Answer: B

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33. The equation of the plane passing through the points with position vectors $A(- 2\bar{i} + 6\bar{j} - 6\bar{k})$, $B(- 3\bar{i} + 10\bar{j} - 9\bar{k})$ and $C(- 5\bar{i} - 6\bar{k})$ is

A. $\bar{r} . (2I - j - 2k) = 2$

B. $\bar{r} . (i - 2j - k) = 1$

C. $\bar{r} . (2i + j - 2k) = 3$

D. $\bar{r} . (i + 2j - 2k) = 3$

Answer: A

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34. If $\bar{a}, \bar{b}$ and $\bar{c}$, are three vectors with magnitude 1,1 and 2 respectively and $\bar{a}, (\bar{a} \times \bar{c}) + \bar{b} = 0$, then the angle between $\bar{a}$ and $\bar{c}$ is

A. $\dfrac{2\pi}{5}$

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

C. $\dfrac{\pi}{4}$

D. $\dfrac{\pi}{6}$

Answer: D

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35. The coefficient of variation of the first n natural numbers is

A. $\dfrac{100}{\sqrt{3}}(n - 1)$

B. $\dfrac{100}{\sqrt{3}}\sqrt{\dfrac{n + 1}{n - 1}}$

C. $\dfrac{\sqrt{3}}{100}\sqrt{\dfrac{n + 1}{n - 1}}$

D. $\dfrac{100}{\sqrt{3}}\sqrt{\dfrac{n - 1}{n + 1}}$

Answer: D

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36. Two distributions A and B have the same mean. If their coefficients of variations are 6 and 2 respectively and σ_A, σ_B are their standard deviations, then

A. $\sigma_A = 3\sigma_B$

B. $3\sigma_A = \sigma_B$

C. $\sigma_A = 2\sigma_B$

D. $2\sigma_A = \sigma_B$

Answer: A

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37. From a certain population, the probability of choosing a colour blind man is $\frac{1}{20}$ and that of a colour blind woman is $\frac{1}{10}$. If a randomly chosen person is found to be colour blind, then the probability that the person is a man is

A. $\dfrac{2}{9}$

B. $\dfrac{2}{3}$

C. $\dfrac{1}{3}$

D. $\dfrac{1}{9}$

Answer: C

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38. From a lot containing n good and m bad articles, if 2 articles, are picked at random in succession without replacement, then the probability that the second article picked is bad is

A. $\dfrac{m}{m+n}$

B. $\dfrac{m-1}{m+n}$

C. $\dfrac{(n-1)(m-1)}{(m+n)^2}$

D. $\dfrac{mn}{(m+n)^2}$

Answer: A

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39. In a class room 5% of the boys and 2% of the girls are taller than 1.6 metres. The class consists of 60% girl students. The probability that a randomly selected student is taller than 1.6 metres is

A. $\dfrac{121}{125}$

B. $\dfrac{5}{8}$

C. $\dfrac{3}{8}$

D. $\dfrac{4}{125}$

Answer: D

40. The probability of securing a success in a trial is three times that of a failure. The probability of getting at least 4 successes in 5 trails is

A. $\dfrac{649}{1024}$

B. $\dfrac{81}{128}$

C. $\dfrac{27}{64}$

D. $\dfrac{243}{1024}$

Answer: B

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41. If the line joining the points $A(b\cos\alpha, b\sin\alpha$ and $B(a\cos\beta, a\sin\beta)$ is extended to the point N (x, y) such that $AN:NB = b:a$ then

A. $x\dfrac{\cos(\alpha - \beta)}{2} + y\dfrac{\sin(\alpha + \beta)}{2} = 0$

B. $x\dfrac{\cos(\alpha - \beta)}{2} + y\dfrac{\sin(\alpha - \beta)}{2} = 0$

C. $x\dfrac{\cos(\alpha + \beta)}{2} + y\dfrac{\sin(\alpha + \beta)}{2} = 0$

D. $x\dfrac{\cos(\alpha + \beta)}{2} + y\dfrac{\sin(\alpha + \beta)}{2} = 0$

Answer: C

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42. A straight line $x - 2y - 4 = 0$ is shifted parallel to it by 3 units away from the origin and the rotated by an angle of $30°$ in the anti-clockwise direction. If the slope of the new line formed is m, then the integral part of 'm' is

A. -1

B. 0

C. 1

D. 2

Answer: C

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43. If α and β are then angles made by the normals drawn from the origin to the lines $x + y + \sqrt{2} = 0$ and $x - \sqrt{3}y - 2 = 0$ with the positive direction of the X - axis respectively measured in anti - clockwise direction, then $\alpha + \beta =$

A. $\dfrac{13\pi}{12}$

B. $\dfrac{29\pi}{12}$

C. $\dfrac{11\pi}{12}$

D. $\dfrac{35\pi}{12}$

Answer: D

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44. The straight lines

$x + 3y - 4 = 0, x + y - 4 = 0$ and $3x + y - 4 = 0$

A. form an isosceles triangle

B. are concurrent

C. form an equilateral triangle

D. form a right angled isoceles triangle

Answer: A

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45. The combined equation of the straight lines passing lines $12x^2 - 20xy + 7y^2 = 0$ and the line $2x - 3y + 4 = 0$ is (α, β). Then $\alpha = 2\beta =$

A. $2x^2 + 3xy - 2y^2 - 7x + y + 1 = 0$

B. $xy - x - y + 1 = 0$

C. $xy + 2y^2 - x - 5y - 3 = 0$

D. $2x^2 - xy + y + 1 = 0$

Answer: B

46. The centroid of the triangle formed by the pair of straight lines $12x^2 - 20xy + 7y^2 = 0$ and the line $2x - 3y + 4 = 0$ is (α, β). Then $\alpha + 2\beta =$

A. $-\dfrac{4}{3}$

B. 2

C. 8

D. $-\dfrac{8}{3}$

Answer: C

47. The equation of the bisector of the angles between the lines joining the origin to the points of intersection of the curve $x^2 + xy + y^2 + x + 3y + 1 = 0$ and the straight line $x + y + 2 = 0$ is

A. $2x^2 - 4xy + y^2 = 0$

B. $x^2 - 4x + y^2 = 0$

C. $2x^2 + 4xy + y^2 = 0$

D. $x^2 + 4xy - y^2 = 0$

Answer:

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48. Consider the following statement I. The intercept made by the circle

$x^2 + y^2 - 2x - 4y + 1 = 0$ on Y - axis is $2\sqrt{3}$

II. The intercept made by the circle $x^2 + y^2 - 4x - 2y + 6 = 0$ on X - axis

is $2\sqrt{2}$

III. The straight line $y = 2x + 1$ cuts the circle $x^2 + y^2 = 9$ at two

distinct points

Then which one of the following options is correct?

	I	II	III
A.	True	True	True

	I	II	III
B.	True	True	False
C.	True	False	True
D.	False	False	True

Answer: C

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49. If the circles

$x^2 + y^2 + 2kx - 4y + 1 = 0$ and $x^2 + y^2 - 8x - 12y + 43 = 0$ touch

each other then $k =$

A. 2

B. 1

C. -1

D. -2

Answer: C

50. For all real values of k, the point which lies on the polar of $(k, k + 1)$ with respect to the circle $x^2 + y^2 + 4x - 8y - 5 = 0$ is

A. $(3, -1)$

B. $(3, 1)$

C. $(2, -2)$

D. $(2, 3)$

Answer: A

51. The number of common tangents to the circles $x^2 + y^2 + 4x = 0$ and $x^2 + y^2 - 2x = 0$ is

A. 4

B. 3

C. 2

D. 1

Answer: B

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52. If $\dfrac{2}{\sqrt{5}}$ is the length of the common chord of the circles

$x^2 + y^2 + 2x + 1 = 0$ and $x^2 + y^2 + x3y + 2 = 0, \alpha \neq 0$ then $\alpha =$

A. 4

B. 3

C. 2

D. 1

Answer: A

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53. Match the items of List - I with those of List - II

List - I

(a) Equation of the tangent drawn at $\left(2, \sqrt{8}\right)$ on the curve $y^2 = 4x$ is

(b) Equation of the normal to the curve $y^2 = 16x$, that makes an angle of 45

(c) The chord joining the points (x_1, y_1) and (x_2, y_2) on the curve $y^2 = 12x$

(d) A value of k for which $x - 3 = 0$ is the directrix of the curve $y^2 - kx +$

A.
a	b	c	d
v	iv	iii	ii

B.
a	b	c	d
vi	v	ii	i

C.
a	b	c	d
iv	vi	i	ii

D.
a	b	c	d
iv	vi	ii	iii

Answer: C

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54. An equilateral triangle is inscribed in the parabola $y^2 = 16ax$ with one of its vertices at the origin. Then the centroid of that triangle is

A. $(8a, 0)$

B. $(16a, 0)$

C. $(32a, 0)$

D. $(48a, 0)$

Answer: C

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55. If the straight line $8x + 3\sqrt{2}y = 36$ touches the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 2$ at (a, b) then $a + \sqrt{2}b =$

A. $\dfrac{36}{5\sqrt{2}}$

B. $\dfrac{8}{3}$

C. $\dfrac{12 + 2\sqrt{2}}{3}$

D. $\dfrac{16}{3}$

Answer: D

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56. For an ellipse with eccentricity $\dfrac{1}{2}$, the centre is at the origin. If one of its directrices is $x = 4$, then the equation of the ellipse is

A. $3x^2 + 4y^2 = 12$

B. $3x^2 + 4y^2 = 49$

C. $3x^2 + 4y^2 = 1$

D. $4x^2 + 3y^2 = 12$

Answer: A

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57. If the product of the slopes of the tangents drawn from an external point P to the hyperbola $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$ is a constant k^2, then the locus of P is

A. $y^2 + b^2 = k^2 \left(x^2 - a^2 \right)$

B. $y^2 - b^2 = k^2 \left(x^2 - a^2 \right)$

C. $x^2 + b^2 = k^2 \left(y^2 - a^2 \right)$

D. $x^2 - b^2 = k^2 \left(y^2 - a^2 \right)$

Answer: A

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58. Let A, B, C be three points on $\overrightarrow{OX}, \overrightarrow{OY}, \overrightarrow{OZ}$ respectively at the distances $3, 6, 9$ from origin, Let Q be the point $(2, 5, 8)$ and P be the point equidistant from O, A , B, C. Then the coordinates of the point R which divides PQ in the ration $3 : 2$ is

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59. If the direction cosines of two lines are such that $l + m + n = 0$, $l^2 + m^2 - n^2$ then the angle between them is

A. $\dfrac{\pi}{6}$

B. $\dfrac{\pi}{4}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{\pi}{2}$

Answer: C

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60. If the line joining the point A $(1, 0, 0)$ and $B(0, 0, 1)$ is a normal to the plane π which passes through the point A, then the angle between the planes π and $x + y + z = 6$ is

A. $\dfrac{\pi}{6}$

B. $\dfrac{\pi}{4}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{\pi}{2}$

Answer: D

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61. The number of points of which the function

$$f(x) = \dfrac{\sqrt{11 + |x| - 6\sqrt{2 + |x|}}}{6 - 2\sqrt{2 + |x|}}$$ is discontinuous in $(-\infty, \infty)$ is

A. 1

B. 0

C. 2

D. 3

Answer:

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62. If $f(x) = \begin{cases} \dfrac{\sqrt{1+px} - \sqrt{1-px}}{x}, & -1 \le x < 0 \\ \dfrac{2x+1}{x-2} & 0 \le x \le 1 \end{cases}$ is continues on $[-1, 1]$

then $p =$

A. $-\dfrac{1}{2}$

B. $-\dfrac{1}{4}$

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

D. 2

Answer: A

63. If $y = \tan^{-1}\left(\sin \sqrt{x}\right) + \cos ec^{-1}\left(e^{2x+1}\right)$ then $\dfrac{dy}{dx} =$

A. $\dfrac{1}{\sqrt{x}\left(1 + \sin^2 \sqrt{x}\right)}$

B. $\dfrac{\cos \sqrt{x}}{2\sqrt{x}\left(1 + \sin^2 \sqrt{x}\right)} - \dfrac{2}{e^{4x+2} - 1}$

C. $\dfrac{\cos \sqrt{x}}{\left(1 + \sin^2 \sqrt{x}\right)} + \dfrac{2}{\sqrt{e^{4x+2}+1}}$

D. $\dfrac{1}{2\sqrt{x}} \dfrac{\cos \sqrt{x}}{\left(1 + \sin^2 \sqrt{x}\right)} - \dfrac{2}{\sqrt{e^{2x+1}-1}}$

Answer: B

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64. If $f: R \to R$ is such that $f(3) = 16,\ f'(3) = 4,$ then

$$\lim_{x \to 3} \dfrac{x f(3) - 3f(x)}{x - 3} =$$

A. 4

B. 6

C. 8

D. 12

Answer: A

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65. If $y = e^x (\log x)$, then $xy_2 + (x - 1)y =$

A. $(2x - 1)y_1$

B. $(x - 1)y_1$

C. $(4 - xy)y_1$

D. $(3x - 1)y_1$

Answer: A

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66. Let $f(x) = e^x \cos x + 1$. Which of the following statements is always true?

A. Between any two consecutive roots $f(x) = 0$ of there is always a

   roots of $e^x \sin x + 1 = 0$

B. Between any two consecutive roots of $f(x) = 0$ there is always a

   roots of $e^x \sin x - 1 = 0$

C. Between any two consecutive roots $f(x) = 0$ of there is always a

root of $e^x \cos x = 0$

D. Between any two consecutive roots $f(x) = 0$ of there is always a

root of $e^x \sin x = 0$

Answer: A

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67. The radius of a circular plate is increasing at the rate of 0.01 cm/ sec.

When the radius is 12 cm, the rate at which the area increases is (in

square cm/sec)

A. 60π

B. 24π

C. 1.2π

D. 0.24π

Answer: D

---

68. Let $f(x) = x^2 e^{-2x}$, $x > 0$. The maximum value of $f(x)$ is

A. 0

B. $\dfrac{1}{e^2}$

C. $\dfrac{1}{4e^2}$

D. $\dfrac{1}{2e}$

Answer: B

---

69. Let f(x) be differentiable on $[1, 6]$ and $f(1) = -2$. If f(x) has only one root in $(1, 6)$ then there exists $c \in (1, 6)$ such that

A. $f'(c) = \dfrac{1}{10}$

B. $f'(c) < \dfrac{2}{5}$

C. $f'(c) < \dfrac{1}{5}$

D. $f'(c) > \dfrac{2}{5}$

Answer: D

▶ View Text Solution

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70. If $\displaystyle\int \phi(x)\,dx = \psi(x)$ then $\displaystyle\int (\phi oh)(x)h(x)h'(x)\,dx =$

A. $(\phi oh)(x)\phi'(x) - \displaystyle\int (\phi oh)(x)h'(x)\,dx + c$

B. $(\psi oh)(x)h(x) - \displaystyle\int (\psi' oh)(x)h'(x)\,dx + c$

C. $(\psi oh)(x)\phi(x) - \displaystyle\int (\psi oh)(x)\phi'(x)\,dx + c$

D. $(\psi o\phi)(x)h(x) - \displaystyle\int (\psi o\phi)(x)h'(x)\,dx + c$

Answer: B

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71. If $f\left(\dfrac{t+1}{2t+1}\right) = t+1$, then $\displaystyle\int f(x)\,dx =$

A. $\dfrac{x^2}{2} + c$

B. $\log(2x-1) + \dfrac{1}{2}\log(x+1) + c$

C. $\dfrac{1}{2}\log(2x-1) + c$

D. $\dfrac{x}{2} + \dfrac{1}{4}\log(2x-1) + c$

Answer: D

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72. $\displaystyle\int \dfrac{x^B - 9x^2 + 18}{x^4 - 3x^2 + 3}\,dx =$

A. $\dfrac{x^4}{4} + x^3 + 6x^2 + c$

B. $\dfrac{x^5}{5} + \dfrac{x^4}{4} + 6x + c$

C. $\dfrac{x^5}{5} + \dfrac{x^3}{2} + 6x + c$

D. $\dfrac{x^5}{5} - \dfrac{x^3}{2} + 6x^2 + c$

Answer: C

---

73. $\displaystyle\int (\cot x \cot(x + \alpha) + 1)dx =$

A. $\cot \alpha \log\left(\left|\dfrac{\sin x}{\sin(x + \alpha)}\right|\right) + c$

B. $\log|\sin x \sin(x + \alpha)| + x + c$

C. $\log|\sin x \cos(x + \alpha)| + x + c$

D. $\tan \alpha \log\left(\left|\dfrac{\cos x}{\sin(x + \alpha)}\right|\right) + c$

Answer: D

---

74. If $\displaystyle\lim_{n \to \infty} \sum_{r=1}^{n} \dfrac{4r^3}{r^4 + n^4} = p$, then $e^p =$

A. 4

B. 3

C. 2

D. 1

Answer: C

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75. $\displaystyle\int_{e^0}^{\frac{\pi}{2}} \sqrt{\frac{1-\sin 2x}{1+\sin 2x}}\,dx =$

A. 1

B. $2\log 2$

C. $2\log \sqrt{3}$

D. 2

Answer:

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76. The area bounded by the curve $y = x^3 - 3x^2 + 2x$ and the X - axis si

(in square units)

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

B. $\dfrac{5}{2}$

C. 1

D. 4

Answer: A

77. The general solution of the differential equation $\cos(x + y)dy = dx$

is

A. $y = \sec(x + y) + c$

B. $y - \dfrac{\tan(y)}{2} = x + c$

C. $y = \tan\left(\dfrac{x+y}{2}\right) + c$

D. $y = \dfrac{1}{2}\tan(x+y) + c$

Answer: C

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78. The general solution of the differential equation $\left(x^3 - 3xy^2\right)dx = \left(y^3 - 3x^2y\right)dy$ is

A. $c^2\left(x^2 + y^2\right) = \left(y^2 - x^2\right)$

B. $c^2\left(x^2 + y^2\right) = \left(y^2 - x^2\right)^2$

C. $c^2\left(x^2 + y^2\right)^2 = \left(y^2 - x^2\right)$

D. $c^2\left(x^2 - y^2\right)^2 = \left(y^2 - x^2\right)$

Answer: C

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79. The differential equation corresponding to all the circles lying in the first quadrant and touching the coordinates axes is

A. $(x - y)^2 \left[1 + \left(\dfrac{dy}{dx} \right)^2 \right] = \left(x + y\dfrac{dy}{dx} \right)^2$

B. $(x - y)^2 \left[1 + \dfrac{dy}{dx} \right]^2 = \left(x + y\dfrac{dy}{dx} \right)^2$

C. $(x - y)^2 \left[1 + \left(\dfrac{dy}{dx} \right)^2 \right] = x + y\left(\dfrac{dy}{dx} \right)^2$

D. $(x - y)^2 \left[1 + \dfrac{dy}{dx} \right] = \left(x + y\dfrac{dy}{dx} \right)^2$

Answer: A

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Physics

1. Match the entries in column A with those in column B.

Column - A

(a) Unified interaction reducing the number of fundamental forces from fou

(b) Force between two molecules separated by a distance near about the su

(c) Nuclear binding force

(d) Bodies of astronomical proportions

	a	b	c	d
A.	iii	iv	i	ii

	a	b	c	d
B.	iii	i	ii	iv

	a	b	c	d
C.	iii	i	iv	ii

	a	b	c	d
D.	ii	i	iii	iv

Answer: A

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2. Assertion (A) : Electromagnetic force is enormously strong as compared to gravitational force. Yet, gravity domination in the large - scale phenomena (e.g. formation of galaxies).

Reason (R) : Existence of positive and negative charges make matter mostly electrically neutral.

Which of the following is true?

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true, but (R) is not the correct explanation of

(A)

C. (A) is true, but (R) is false

D. (A) is false, but (R) is true

Answer: A

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3. An object moves in a straight line with deceleration whose magnitude varies with velocity s $3v^{\frac{2}{3}}$. If at an initial point, the velocity is 8/m sec, then the distance travelled by the object before it stops is

A. 2m

B. 4m

C. 6m

D. 8m

Answer: B

4. A particle starts from origin at time $t = 0$ and moves in positive X -direction. Its velocity $\bar{v} = 10t \,\hat{i}$ cm/ sec. The distance covered by the particle in 8 sec. will be

   A. 320 cm

   B. 80 cm

   C. 120 cm

   D. 640 cm

Answer: A

5. Consider an object kept at the centre, in the XY plane, on which five coplanar force act as shown in the figure. The resultant force on the object is

   A. 6.5 N, $330°$

   B. 6.5 N, $300°$

   C. 6.5 N, $30°$

   D. 5.7 N, $331°$

Answer: A

  ▶ **View Text Solution**

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6. Consider an object making uniform motion around a circle of radius 5m with tangential velocity 2 ms^{-1}. The time it takes to complete 2 revolutions and the magnitude of acceleration respectively are

A. $0.2\pi \& 0.8ms^{-2}$

B. $0.5\pi \& 1.0ms^{-2}$

C. $10\pi s \& 0.8ms^{-2}$

D. $5\pi s 5ms^{-2}$

Answer: C

▶ **View Text Solution**

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7. A small block starts sliding down an inclined plane forming an angle $45°$ with horizontal. The coefficient of friction μ, x varies with distance covered by the block before it stops is

A. $\sqrt{\dfrac{3}{c}}$

B. $\sqrt{3c}$

C. $\sqrt{c}$

D. $\sqrt{\dfrac{1}{c}}$

Answer: A

8. A moveable steel plate is placed between fixed steel and brass plates and the stack of plates is subjected to a weight of 100 N as shown in the figure. The coefficient of kinetic friction for steel one steel is 0.57 and for steel on brass is 0.44. Assuming that the entire weight comes onto the stack and that the weight of the plates is negligible in comparison to the applied weight, the force required to move the middle plate in N is

A. 13

B. 101

C. 440

D. 570

Answer: B

9. A car of mass 1200 kg (together with driver) is moving with a constant acceleration of $2m/s^2$. How much power does the speed reaches $20m/s^2$.? (assume that the coefficient of friction between the car and the road is 0.5)

    A. 48000 W

    B. 120000 W

    C. 168000 W

    D. 288000 W

Answer: C

10. A ball moving with a velocity v, collides head on with a stationary second ball of same mass. After collision the velocity of the first ball is

reduced to 0.15 v. The kinetic energy of the system is decreased nearly by

A. 0.2

B. 0.25

C. 0.3

D. 0.4

Answer: B

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11. A uniform disk of mass 100 kg and radius 2 m is rotating at 1 rad/s about a perpendicular axis passing through its centre A boy of mass 60 kg. standing at the centre of the disk. The final angular velocity of the (rad/s) is

A. 0.77

B. 0.5

C. 1

D. 2

Answer: A

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12. A force is $\vec{F} = A\,\hat{j}$ applied to a point whose radius vector $\vec{r}1 = a\,\hat{i}$ while a force $\vec{F_2} = B\,\hat{i}$ is applied to the point whose radius vector $\vec{r}_2 = b\,\hat{j}$. Both the radius vectors are determined relative to the origin of the coordinates axes 'O' . The moment of the force relative to 'O' is

A. $(aA - bB)\,\hat{k}$

B. $(aA - bB)\,\hat{j}$

C. $(ab - AB)\,\hat{k}$

D. $(aB - bA)\,\hat{j}$

Answer: A

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13. The density of a solid sphere of radius R is $\rho(r) = 20\dfrac{r^2}{R^2}$ where r is the distance from is center. If the gravitational field due to this sphere at a distance 4 R from its center is E and G is the gravitational constant, the ratio $\dfrac{E}{GR}$ is

A. $\dfrac{\pi}{5}$

B. 3π

C. $3\dfrac{\pi}{2}$

D. π

Answer: D

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14. In a ten silt on a metal bar of diameter 0.015 m and length 0.2 m, the relation limit is found to be $F = 97.2 \times 10^6 (\Delta L)$, where F is the load in N and ΔL is the elongation in m. The young's modulus of the material in Gpa is

A. 75.5

B. 85.6

C. 98.7

D. 110

Answer: D

---

15. An ideal gas has molar heat capacity C_v at constant volume. The gas undergoes a process where in the temperature changes as $T = T_0(1 + \alpha V^2)$, where T and V are temperature and volume respectively, T_0 and a are positive constants. The molar heat capacity C of the gas is given as $C = C_v + Rf(v)$, where $f(v)$ is a function of volume. The expression for $f(v)$ is

A. $\dfrac{\alpha V^2}{1 + \alpha V^2}$

B. $\dfrac{1 + \alpha V^2}{2\alpha V^2}$

C. $\left(\alpha V^2 \left(2 + \alpha V^2\right)\right)$

D. $\dfrac{1}{2\alpha V^2 \left(1 + \alpha V^2\right)}$

Answer: B

▶ **View Text Solution**

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16. A container is filled with liquid that cools from $100°\,C$ to $70°\,C$ in 5 min. when kept at room temperature of $30°\,C$. The time that it must have taken to cool down to $80°\,C$ from its initial temperature approximately is

A. 1.7 min

B. 2.6 min

C. 8.2 min

D. 4.1 min

Answer:

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17. An ideal gas in a cylinder is compressed adiabatically to one - third of its original volume. A work of 45 J is done on the gs by the process. The charge in internal energy of the gas and the heat flowed into the gas, respectively are

A. 45 J and zero

B. − 45 J and zero

C. 45 J and heat flows out of the gas

D. − 45 J and heat flows into the gas

Answer: A

18. In a cubic container of inner side length 10 cm, nitrogen gas of 100 kPa pressure is maintained at 300 K. If the pressure inside the gas is

increased to 300 kPa by adding oxygen gas, the ratio of number of N_2 to O_2 molecules in the container is

A. 1.5 g, 4.5 g

B. 2.8g, 3.2g

C. 3.0 g, 3.0 g

D. 2.4 , 3.6 g

Answer: A

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19. A source of sound whose frequency is 1000 Hz is moving with a speed 33 m/s. The waves reflected by a fixed obstacle are registered by a receiver that moves together with the source. (the speed of the sound waves is 330 m/s), the frequency registered by the receiver is

A. 0.9 kHz

B. 1.1 kHz

C. 1.2 kHz

D. 2.2 kHz

Answer: C

> ▶ **View Text Solution**

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20. figure shows a ray of light entering and passing through a dense glass slab and emerging from the other side. If the angle $i = 60°$, slab thickness b = 0.04 m and the refractive index of glass $= \sqrt{3}$, the parallel shift 'd' between the emerging and entering rays in mm is

A. $\sqrt{\dfrac{3}{4}}$

B. $\sqrt{\dfrac{4}{5}}$

C. $\dfrac{40}{\sqrt{3}}$

D. $5\sqrt{3}$

Answer: C

21. Let S_1 be the amount of Rayleigh scattered light of wavelength λ_1 and S_2 that of light of wavelength λ_2 from a particle of size 'a'. Which of the following statements is true?

A. $\dfrac{S_1}{S_2} = \left(\dfrac{\lambda_2}{\lambda_1}\right)^4$ if $\lambda_1, \lambda_2 > > a$

B. $\dfrac{S_1}{S_2} = \left(\dfrac{\lambda_1}{\lambda_2}\right)^4$ if $\lambda_1, \lambda_2 > > a$

C. $\dfrac{S_1}{S_2} = \left(\dfrac{\lambda_2}{\lambda_1}\right)^4$ if $\lambda_1, \lambda_2 < < a$

D. $\dfrac{S_1}{S_2} = \left(\dfrac{\lambda_1}{\lambda_2}\right)^4$ if $\lambda_1, \lambda_2 < < a$

Answer: A

22. In a Young's double slit experiment, a monochromatic light of wavelength 600 nm is used. If the two slits are covered by transparent

sheets of thickness 0.132 mm and 0.1 mm of refractive index 1.5, the number of fringes that will shift due to introduction of the sheets are

A. 20

B. 40

C. 60

D. 80

Answer: D

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23. The volume charge density in a spherical ball of radius R varies with distance r from the centre s $\rho(r) = \rho_0 \left[1 - \left(\frac{r}{R}\right)^3\right]$ where ρ_0 is a constant. The radius at which the field be maximum is

A. $\dfrac{R}{2^{1/3}}$

B. R

C. $\dfrac{R}{2}$

D. $\dfrac{R^{1/3}}{2}$

Answer: A

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24. The potential $\phi(x, y)$ of an electrostatic field $\vec{E} = a\left(y\,\hat{i} + x\,\hat{j}\right)$ si [a is constant and $\hat{i}$ and $\hat{j}$ are unit vectors along X and Y axes]

A. $-2axy + c$ (c is a constant)

B. $axy + c$ (c is a constant)

C. $a^2xy + c$ (c is a constant)

D. $a(xy)^2 + c$ (c is a constant)

Answer: A

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25. A moving coil galvanometer has a rectangular wire coil of enclosed are 0.001 m^2 and 500 turns. The coil operates in a radial magnetic field of 0.2 T and carries a current of $6\pi \times 10^{-8}10^{-8}A$. If the torsional spring constant is 6×10^{-7} N.m/r the angular deflection of the coil in radians is

A. $\dfrac{\pi}{100}$

B. $\dfrac{\pi}{200}$

C. $\dfrac{\pi}{300}$

D. $\dfrac{\pi}{400}$

Answer: A

▶ View Text Solution

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26. A charge q enters a region having electric field $\overrightarrow{E}$ and magnetic field $\overrightarrow{B}$ with velocity $\overrightarrow{v}$. If it continues to move with the same velocity then which of the following statements is not true

A. $\overrightarrow{E} . \overrightarrow{B} = 0$

B. $\vec{E}.\vec{v} = 0$

C. If $\vec{v}.\vec{B} = 0$ then $\vec{v} = \dfrac{\vec{E} \times \vec{B}}{\vec{B}.\vec{B}}$

D. $\vec{v} \times \vec{E} = \vec{B}$

Answer: D

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27. A conducting rod of length L lies in X - Y plane and makes an angle $30°$ with the X - axis . One end of the rod lies at origin initially. A magnetic field also exists in the region pointing along positive Z - direction. The magnitude of the magnetic field varies with Y as $B_0\left(\dfrac{y}{L}\right)^3$ where B_0 is a constant. At some instant the rod starts moving with a velocity v_0 along X - axis. The emf induced in the rod is

A. $\dfrac{B_0 V_0 L}{64}$

B. $\dfrac{B_0 V_0 L}{16}$

C. $B_0 V_0 L$

D. $64B_0V_0L$

Answer: A

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28. An oscillating circuit of a capacitor with capacitance $C = 10\mu F$, a coil with inductance $L = 6.0\mu H$ and active resistance $R = 10\Omega$. The mean power that should be fed to the circuit to maintain undamped harmonic oscillations with an external driving power with 50 Hz and a V_m of 280 V is

A. 3.8 W

B. 48 W

C. 3 m W

D. 48 m W

Answer: A

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29. If the magnetic field of a plane electromagnetic wave is given by $5 \times 10^{-6} \sin(0.6 \times 10^2 x + 0.5 \times 10^{10} t)$, then the speed of the wave is

A. 0.83×10^7 m/s

B. 0.83×10^8 m/s

C. 5.24×10^8 m/s

D. 5.24×10^9 m/s

Answer: B

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30. An isolated lead ball is charged upon continuous irradiation by EM radiation of wavelength $(\lambda) = 221$ nm. The maximum potential attained by the lead ball, if its work function is $4.14 eV$, is

(Take $h = 6.63 \times 10^{-34} J. s, c = 3 \times 10^6 m/s, e = 1.6 \times 10^{-19}$)

A. 1.49 V

B. 2.67 V

C. 3.14 V

D. 0.51 V

Answer: A

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31. An energy of 13.6 eV is equal to

A. 0.518×10^{-25} Kcal

B. 6.04×10^{-25} kWh

C. $2.17 \times 10^{-10} j$

D. 2.17×10^{-15} kN. M

Answer: B

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32. The frequency of light emitted when the electron makes transition from the level of principal quantum number $n = 2$ to the level with $n = 1$ is

(Take the ionization energy of hydrogen to be $13.6eV$ and $h = 4 \times 10^{-15}eV - \sec$)

A. 2.55×10^{15} Hz

B. 1.7×10^{15} Hz

C. 3.4×10^{15} Hz

D. 5.1×10^{15} Hz

Answer: A

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33. In a junction transistor, the collector current changes by 6.8 mA if the emitter current is changed by 7 mA. For such transistor the current

amplification factor is

A. 30

B. 34

C. 40

D. 45

Answer: B

▶ View Text Solution

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34. In $p - n$ junction diode, and electric field of magnitude 2×10^5 V/m exists in the depletion region. A particle with charge $-3|e|$ can diffuse from n - side to P - side, if it has minimum kinetic energy $0.6eV$. The width of the depletion region of the P - n junction is

A. 300 nm

B. 600 nm

C. 1000 nm

D. 1200 nm

Answer: C

▶ **View Text Solution**

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35. A person tries to broadcast with the same antenna both the signal at 10^7 Hz and 10^6 Hz. If he receiver at some distance has to receive an equal strength for both the frequencies, the broadcaster has to approximately increase the signal strength at 10^6 Hz to 10^7 Hz by

A. $\dfrac{1}{10}$ times

B. 10 times

C. 100 times

D. $\dfrac{1}{100}$ times

Answer: C

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1. Statement (a) : $Na_2O < MgO < ZnO < P_4O_{16} -$ Acidic property

Statement (b) : $F > CI > Br -$ Electron gain enthalpy

Statement (c) : $M^{2-} > M^{->}M^+ > M^{2+}$ - ionic size

Statement (d) : The second ionisation enthalpy of Cu is more than second

ionisation enthalpy of K.

Which of the following is the correct representation of True (T) / Fale(F)

for the given statements

A.
a	b	c	d
T	T	F	F

B.
a	b	c	d
F	T	F	T

C.
a	b	c	d
F	F	F	T

D.
a	b	c	d
T	F	T	F

Answer: A

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2. Group the molecules/ ions according to bond order

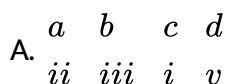A. $\left(O_2^{2-}, Li_2, O_2^{2+}\right)\left(F_2, N_2, He_2^{2+}\right)$

B. $\left(F_2, O_2^{2+}, N_2\right)\left(O_2^{2-}, He_2^{2+}, Li_2\right)$

C. $\left(O_2^-, Li_2, F_2He_2^{2+}\right)\left(N_2, O_2^{2+}\right)$

D. $\left(Li_2, F_2, O_2^{2+}\right)\left(N_2, O_2^{2-}, He_2^{2+}\right)$
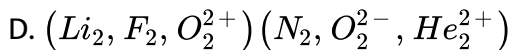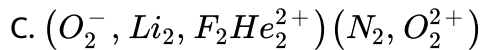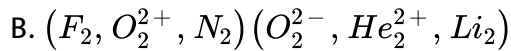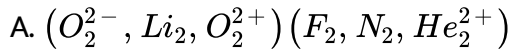
Answer: C

▶ **View Text Solution**

3. Match the bond order for the following molecules.

List - I   List - II
$(a) Li_2$ $(i) 3$
$(b) N_2$ $(ii) 1.5$
$(c) Bc_2$ $(iii) 1.0$
$(d) O_2$ $(iv) 0$
            $(v) 2$
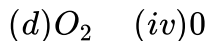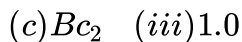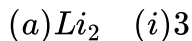
The correct answer is

A.
a	b	c	d
ii	iii	i	v

$$
\text{B.} \quad
\begin{array}{cccc}
a & b & c & d \\
iii & i & iv & v
\end{array}
$$

$$
\text{C.} \quad
\begin{array}{cccc}
a & b & c & d \\
iv & i & v & iii
\end{array}
$$

$$
\text{D.} \quad
\begin{array}{cccc}
a & b & c & d \\
iii & ii & v & i
\end{array}
$$

Answer: B

▶ **View Text Solution**

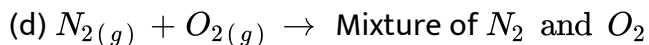**4.** Calculate the molality of 1 litre solution of 93% H_2SO_4 by w/v
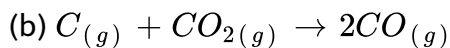
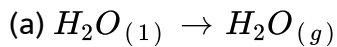*[Math Processing Error]*

A. 3.17

B. 8.5

C. 12.4

D. 10.42

Answer: D

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5. Amongst the chemical reactions given below, the reactions with increasing entropy are

(a) $H_2O_{(1)} \rightarrow H_2O_{(g)}$

(b) $C_{(g)} + CO_{2(g)} \rightarrow 2CO_{(g)}$

(c) $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(1)}$

(d) $N_{2(g)} + O_{2(g)} \rightarrow$ Mixture of N_2 and O_2
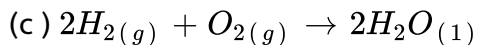
    A. a, b, c, d

    B. a, b, c

    C. a, b, d

    D. b, c, d

Answer: C

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6. The IUPAC name of the following compound is

    A. 2 - Hydroxy - 5 - oxoethyl cyclohexane

    B. 2 - Ethyl - 4 - oxo cyclohexanol

    C. 3 - Ethyl - 4 - hydroxy cyclohexanone

    D. 6 - Hydroxy - 3 - oxoethyl cyclohexane

Answer: C

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7. NaCI is heated in an atmosphere of sodium vapour. The resultant yellow colour is due to the formation of

    A. Frenket defect

    B. Schottky defect

    C. F - centers

D. Impurity defects

Answer: C

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8. Henry's law constant for CO_2 in water is 1.67 kbar at $25°C$. The quantity of CO_2 in 1000 mL of soda water when packed under 5 bar CO_2 pressure at $25°C$ is

A. 0.084 mol

B. 0.167 mol

C. 0.252 mol

D. 0.336 mol

Answer: B

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9. For a particular reaction, the rate constant becomes double on increasing temperature from $27°C$ to $37°C$. Calculate the approximate activation energy (in kcal mol^{-1})

$\left(R = 2\text{cal mol}^{-1}K^{-1} \right)$

A. 1289

B. 12.89

C. 1.28

D. 53.41

Answer: B

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10. Identify the correct statements from the following

(a) In the oxidation of oxalic acid with $KMnO_4$ in acid medium, Mn^{2+} acts as auto catalyst

(b) CdS colloidal solution can be precipitated by the addition of CI^- ions

(c) The gold numbers of three protective colloids (A, B, C) is 0.03, 25 and 0.25 respectively. Their protective power follows the order $A > C > B$

(d) Physisorption is an irreversible process

A. a,d

B. b, c

C. a, c

D. a, b, c

Answer: C

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11. The oxidising and reducing agents respectively for the cyanide extraction of silver from agentite ore are?
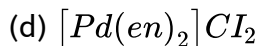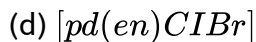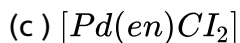
A. O_2, CO

B. HNO_3, CO

C. O_2, Zn dust

D. HNO_3, Zn dust

Answer: C

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12. Consider the complexes

(a) $\left[Pd(NH_3)_2CIBr\right]$

(b) $\left[Pd(NH_3)_2CI_2\right]$

(c) $\left[Pd(en)CI_2\right]$

(d) $\left[pd(en)CIBr\right]$

(d) $\left[Pd(en)_2\right]CI_2$

(en = ethylenediamine)

The total number of geometrical isomers of (a) is same as the total number of geometrical isomers of

A. b

B. c

C. d

D. e

Answer: A

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13. Identify the monomers used in the manufacture of glyptal (X), dacron (Y) and nylon 2 - nylon 6 (Z).

A.

B.

C.

D.

Answer: C

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14. Which of the following is presents in RNA only?

A.

B.

C.

D.

Answer: D

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15. Match the following

A.
a	b	c	d
iv	ii	ii	i

B.
a	b	c	d
iii	i	ii	iv

C.
a	b	c	d
ii	iii	i	iv

D.
a	b	c	d
i	ii	iv	iii

Answer: A

---

16. The major product of the following reaction is

A.

B.

C.

D.

Answer: C

---

17. From the following reaction, identify the reactions that give carboxylic acids as products

A. (i, iii)

B. (i, iv)

C. (ii, iii)

D. (ii, iv)

Answer: B

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18. In the following reaction, the major product (P) formed is

A.

B.

C.

D.

Answer: D

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