Padasalai’s
Telegram Groups!

(தாசைர்ப்பரு் செழு வந்தாய் விளக்கு செய்தி செய்து குறிப்பிட்டமிட்டும்!)

- Padasalai's NEWS - Group
  https://t.me/joinchat/NIfCqVRBNj9hhV4wu6_NqA

- Padasalai's Channel - Group
  https://t.me/padasalaichannel

- Lesson Plan - Group
  https://t.me/joinchat/NIfCqVWwo5iL-21gpzrXLw

- 12th Standard - Group
  https://t.me/Padasalai_12th

- 11th Standard - Group
  https://t.me/Padasalai_11th

- 10th Standard - Group
  https://t.me/Padasalai_10th

- 9th Standard - Group
  https://t.me/Padasalai_9th

- 6th to 8th Standard - Group
  https://t.me/Padasalai_6to8

- 1st to 5th Standard - Group
  https://t.me/Padasalai_1to5

- TET - Group
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- PGTRB - Group
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- TNPSC - Group
  https://t.me/Padasalai_TNPSC
FIRST REVISION EXAMINATION-2019-2020

I Choose the suitable answer

1. If $n((A \times B) \cap (A \times C)) = 8$ and $n(B \cap C) = 2$, then $n(A) =$
   a) 6   b) 4   c) 8   d) 16

2. Let $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = 1 - |x|$, then the range of $f$ is
   a) $\mathbb{R}$   b) $(-1,\infty)$   c) $(-\infty,1]$   d) $(-\infty,1]$ and $(B \cap C) = 2$

3. The number of roots of $(x+3)^4 + (x+5)^4 = 16$ is
   a) 4   b) 2   c) 3   d) 0

4. The triangle of maximum area with constant perimeter 12m
   a) is an equilateral triangle with side 4m
   b) is an isosceles triangle with sides 2m,5m,5m
   c) is a triangle with sides 3m,4m,5m
   d) does not exists

5. In a $\triangle ABC$, if
   i) $\sin \frac{A}{2} \sin \frac{B}{2} \sin \frac{C}{2} > 0$ ii) $\sin A \sin B \sin C > 0$ then
   a) both (i) and (ii) are true   b) only (i) is true   c) only (ii) is true   d) neither (i) nor (ii) is true

6. The product of $r$ consecutive positive integers is divisible by
   a) $r!$   b) $(r-1)!$   c) $(r+1)!$   d) $r^r$

7. Everybody in a room shakes hands with everybody else, the total number of shake hands is 66. The number of persons in the room is
   a) 11   b) 12   c) 10   d) 6

8. The $n^{th}$ term of the sequence 1,2,4,7,11,…… is

9. The value of $\frac{1}{2} + \frac{1}{4} + \frac{1}{6} + \ldots$ is
   a) $\frac{e^2 + 1}{2e}$   b) $\frac{(e+1)^2}{2e}$   c) $\frac{(e-1)^2}{2e}$   d) $\frac{e^2 - 1}{2e}$

10. The image of the point (2,3) in the line $y = -x$ is
    a) (-3,-2)   b) (-3,2)   c) (-2,-3)   d) (3,2)

11. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, $B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then the values of $a$ and $b$ are
    a) $a = 4, b = 1$   b) $a = 1, b = 4$   c) $a = 0, b = 4$   d) $a = 2, b = 4$

12. If $A = \begin{bmatrix} -1 & 2 & 4 \\ -1 & 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 4 & 2 \\ 6 & 2 & 0 \end{bmatrix}$, then $B$ is given by
    a) $B = 4A$   b) $B = -4A$   c) $B = -A$   d) $B = 6A$

13. If $\lambda \hat{i} + 2\lambda \hat{j} + 2\lambda \hat{k}$ is a unit vector, then the value of $\lambda$ is
    a) $\frac{1}{3}$   b) $\frac{1}{4}$   c) $\frac{1}{9}$   d) $\frac{1}{2}$

14. If the points whose position vectors $10\hat{i} + 3\hat{j}, 12\hat{i} - 5\hat{j}$ and $a\hat{i} + 11\hat{j}$ are collinear, then $a$ is
    a) 6   b) 3   c) 5   d) 8

15. If $\lim_{x \to 0} \frac{\sin px}{\tan 3x} = 4$, then the value of $p$ is
    a) 6   b) 9   c) 12   d) 4

16. If $y = mx + c$ and $f(0) = f'(0) = 1$, then $f(2) =$
    a) 1   b) 2   c) 3   d) -3
17. If \( f(x) = x^2 - 3x \), then the points at which \( f(x) = f'(x) \) are
a) both positive integers    b) both negative integers
b) both irrational    d) one rational and another irrational

18. \( \int \frac{e^x(1+x)}{\cos^2(xe^x)} \, dx \)
   a) \( \cot(xe^x) + c \)    b) \( \sec(xe^x) + c \)    c) \( \tan(xe^x) + c \)    d) \( \cos(xe^x) + c \)

19. \( \int \frac{\sec^2 x}{\tan^2 x - 1} \, dx \)
   a) \( 2 \log \left| \frac{1 - \tan x}{1 + \tan x} \right| + c \)    b) \( 2 \log \left| \frac{1 + \tan x}{1 - \tan x} \right| + c \)
   c) \( \frac{1}{2} \log \left| \frac{\tan x + 1}{\tan x - 1} \right| + c \)    d) \( \frac{1}{2} \log \left| \frac{\tan x - 1}{\tan x + 1} \right| + c \)

20. If \( X \) and \( Y \) be two events such that
   \( P(X \cap Y) = \frac{1}{2}, P(Y \cap X) = \frac{1}{3} \) and
   \( P(X \cup Y) = \frac{1}{6} \), then \( P(X \cup Y) \) is
   a) \( \frac{1}{3} \)    b) \( \frac{2}{5} \)    c) \( \frac{1}{6} \)    d) \( \frac{2}{3} \)

II Answer any SEVEN questions (Q.No 30 is compulsory)

21. For a set \( A \), \( A \times A \) contains 16 elements and two of its elements are (1,3) and (0,2). Find the elements of \( A \)
22. If \( \alpha \) and \( \beta \) are the roots of the quadratic equation \( x^2 + \sqrt{2}x + 3 = 0 \), form a quadratic polynomial with zeroes \( \frac{1}{\alpha}, \frac{1}{\beta} \)
23. Find the principal value of \( \cos^{-1} \frac{\sqrt{3}}{2} \)
24. The AM of two numbers exceeds their GM by 10 and HM by 16. Find the numbers
25. Find the length of the perpendicular and the co-ordinates of the foot of the perpendicular from \((-10, -2)\) to the line \( x + y - 2 = 0 \)

26. Find the left and right limits of \( f(x) = \tan x \) at \( x = \frac{\pi}{2} \)
27. Draw the function \( f'(x) \) if \( f(x) = 2x^2 - 5x + 3 \)
28. Differentiate \( y = x^\sqrt{c} \)
29. Integrate: \( \frac{x^2 - x + 1}{x^3} \)

30. Eight coins are tossed once, find the probability of getting i) exactly two tails ii) at least two tails iii) at most two tails

III Answer any SEVEN questions (Q.No 40 is compulsory)

31. Write the values of \( f \) at -3,5,2,-1,0 if
   \[
   f(x) = \begin{cases} 
   x^2 + x - 5 & \text{if } x \in (-\infty, 0) \\
   x^2 + 3x - 2 & \text{if } x \in (3, \infty) \\
   x^2 & \text{if } x \in (0, 2) \\
   x^2 - 3 & \text{otherwise}
   \end{cases}
   \]
32. If \( a^2 + b^2 = 7ab \), show that \( \log \frac{a + b}{3} = \frac{1}{2} (\log a + \log b) \)
33. A box contains two white balls, three black balls and four red balls. In how many ways can three balls be drawn from the box, if at least one black ball is to be included in the draw?
34. Find the coefficient of \( x^4 \) in the expansion of \( \frac{3 - 4x + x^2}{e^{2x}} \)
35. Show that the points \((1, 3), (2, 1)\) and \(\left(\frac{1}{2}, 4\right)\) are collinear, by using
   i) concept of slope ii) using a straight line and iii) any other method
36. Show that
   \[
   \begin{vmatrix}
   0 & c & b^2 \\
   c & 0 & a \\
   b & a & 0
   \end{vmatrix} = \begin{vmatrix}
   b^2 + c^2 & ab & ac \\
   ab & c^2 + a^2 & bc \\
   ac & bc & a^2 + b^2
   \end{vmatrix}
   \]
37. A quadrilateral is a parallelogram if and only if its diagonals bisect each other.

38. Find the slope of tangent line to the graph of \( f(x) = -5x^2 + 7x \) at \((5, f(5))\).

39. Find the integral: \( \frac{1}{\sqrt{9 + 8x - x^2}} \)

40. A year is selected at random. What is the probability that i) it contains 53 Sundays ii) it is a leap year which contains 53 Sundays

II Answer any SEVEN questions (7 x 5 = 35)

41. a) From the curve \( y = \sin x \), draw \( y = \sin|x|\)

   b) A model rocket is launched from the ground. The height \( h \) reached by the rocket after \( t \) seconds from lift off is given by \( h(t) = -5t^2 + 100t, 0 \leq t \leq 20 \). At what time the rocket is 495 feet above the ground?

42. a) Simplify \( \frac{1}{\sqrt{3 - \sqrt{8}}} - \frac{1}{\sqrt{8 - \sqrt{7}}} + \frac{1}{\sqrt{7 - \sqrt{6}}} - \frac{1}{\sqrt{6 - \sqrt{5}}} + \frac{1}{\sqrt{5 - 2}} \)

   b) If the letter of the word GARDEN are permuted in all possible ways and the strings thus formed are arranged in the dictionary order, then find the ranks of the words i) GARDEN ii) DANGER

43. a) By the principle of mathematical induction, prove that, for \( n \geq 1 \)

\[ 1.2 + 2.3 + 3.4 + \ldots + n(n+1) = \frac{n(n+1)(n+2)}{3} \]

b) Prove that

\[ \begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix} = (x-y)(y-z)(z-x) \]

44. a) Show that the points \((-3, 1), (2, -4), 5) and (1, -1, 0) form a right angled triangle

b) For what value of \( \alpha \) is this function \( f(x) = \begin{cases} \frac{x^4 - 1}{x - 1}, & \text{if } x \neq 1 \\ \alpha, & \text{if } x = 1 \end{cases} \) continuous at \( x = 1 ? \)

45. a) Find \( \frac{d^2 y}{dx^2} \) if \( x^2 + y^2 = 4 \)

   b) Integrate \( \frac{8}{\sqrt{1-(4x^2)}} + \frac{27}{\sqrt{1-9x^2}} - \frac{15}{1+25x^2} \)

46. a) Integrate: \( \frac{3x-9}{(x-1)(x+2)(x^2+1)} \)

   b) A problem in Mathematics is given to three students whose chances of solving it are \( \frac{1}{3}, \frac{1}{4}, \text{ and } \frac{1}{5} \). i) what is the probability that the problem is solved? ii) what is the probability that exactly one of them will solve it?

47. a) There are two identical urns containing respectively 6 black and 4 red balls, 2 black and 2 red balls. An urn is chosen at random and a ball is drawn from it i) find the probability that the ball is black ii) if the ball is black, what is the probability that it is from the first urn?

   b) A single card is drawn from a pack of 52 cards. What is the probability that

   i) the card is an ace or a king

   ii) the card will be 6 or smaller

   iii) the card is either a queen or 9?

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