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CAREER INSTITUTE LIMITED

CLASS - 11

Core Mathematics (2025-26)

Question Paper **Date - 06.12.2025**

Time: 3 Hour **M.M. – 80**

General Instructions

This Question Paper is divided into 4 Sections

Section A Consists of 20 Questions

Section B Consists of 5 Questions

Section C Consists of 6 Questions

Section D Consists of 7 Questions

Section: A (MCQs) 1 Mark each

Q. No.

1. **Log 6 + log 5 is expressed as-** 1

(a) $\log \frac{5}{6}$ (b) $\log \frac{6}{5}$

(c) $\log 30$ (d) $\log 11$

2. **$2 \cos 45^0 \cos 15^0$ = ?** 1

(a) $\sqrt{(3) - 1)/3}$ (b) $\sqrt{(3) + 1)/2}$

(c) $\sqrt{(3) - 1)/2}$ (d) $\sqrt{(3))/2}$

3. **The equation of the circle having centre (1, –2) and radius 5 is** 1

(a) $x^2 + y^2 + 2x - 4y - 20 = 0$ (b) $x^2 + y^2 - 2x + 4y - 20 = 0$

(c) $x^2 + y^2 + 2x + 4y - 20 = 0$ (d) $x^2 + y^2 - 2x - 4y - 20 = 0$

4. **$\lim_{x \to 0}(1 + x)^n - 1$ is equal to :** 1

(a) n (b) 1

(c) –n (d) 0

5 **A shopkeeper bought a TV from a distributor at a discount of 25% of the listed price of ₹ 32000. The shopkeeper sells the TV to a consumer at the listed price. If the sales are intra-state and the rate of GST is 18%, the tax (under GST) received by the State Government is:** 1

(a) ₹ 1440 (b) ₹ 5760

(c) ₹ 2880 (d) ₹ 4320

6. **A bag contains 5 black balls, 4 white balls, and 3 red balls. If a ball is selected randomize, the probability that it is the black or red ball is** 1

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$

(c) $\frac{2}{3}$ (d) $\frac{1}{4}$

7. **The difference between compound and simple interest on an amount of ₹ 1000 for 2 years is ₹ 64. What is the rate of interest per annum?** 1

(a) 8% (b) 9%
(c) 10% (d) 6%

8. **Walking at 6/7th of his usual speed a man is 12 minutes late. The usual time to cover the distance is** 1

(a) 1 hour 12 min (b) 1 hour 20 min
(c) 48 min (d) 1 hour

9. **If A and B are events such that P(A) = 0.2, P(B) = 0.4 and P(A ∪ B) = 0.5, the value of $P\left(\frac{A}{B}\right)$ is** 1

(a) 0.1 (b) 0.25
(c) 0.5 (d) 0.05

10. **A woman introduces a man as the son of the brother of her mother. How is that man related to the woman?** 1

(a) Nephew (b) Son
(c) Uncle (d) Cousin

11. **If CUP is coded as DSQ then MEN will be coded as** 1

(a) MCR (b) LCO
(c) NCO (d) NFO

12. **If n(A) = 3, n(B) = 2, then number of non-empty relations from set A to set B are** 1

(a) 8 (b) 63
(c) 64 (d) 4

13. **The 10th term of the arithmetic progression 1, 5, 9, 13 is:** 1

(a) 36 (b) 33
(c) 37 (d) 41

14. **All the letters of the word 'EAMCOT are arranged in different possible ways. The number of such arrangements in which no two vowels are adjacent to each other is** 1

(a) 360 (b) 144
(c) 72 (d) 54

15. **If a = 2 + 3i and b = 5 + 2i then find a–b.** 1

(a) 3-i (b) – 3 + i
(c) 7 +5i (d) 7–5i

16. **If $\frac{\log 243}{\log 27}$ = x, then x is** 1

(a) $\frac{5}{3}$ (b) $\frac{3}{5}$

(c) 3 (d) 5

17. **If A = {(x,y): $x^2 + y^2 = 169$, $x,y \in W$ } then domain of R is** 1

(a) {0,5,12,13} (b) {-13,-12,-5,0,5,12,13}

(c) W (d) I

18. **Domain of $\sqrt{(a^2 - x^2)}$ is** 1

(a) (-a,a) (b) [-a, a]

(c) [0,a] (d) (-a,0)

Direction (Q.19 & Q. 20)

In the following questions, a statement of Assertion (A) is followed by a Statement of Reason (R).

Choose the correct answer out of the following choices.

(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 and (R) is true.

19. **Assertion (A):** If each of the observations x^1, x^2, ..., x_n is increased by a, where a is a negative or positive number, then the variance remains unchanged. 1

Reason (R): Adding or subtracting a positive or negative number to (or from) each observation of a group does not affect the variance.

20. **Assertion (A):** If 5th term of an A.P. is 10 and 10th term is 5, then 15th term is 0. 1

Reason (R): If pth term of an A.P. is q and qth term is p, then rth term is p + q – r.

Section: B (Subjective) (2 Marks)

21. Find the equation of hyperbola having Foci (0, ±13) and the conjugate axis is of length 24. 2

22. Workout four the day of week on the given date 13th Aug. 1975. 2

23. If x = log t and y = $\frac{1}{t}$, find $\frac{dy}{dx}$. 2

24. **Which of the two conclusions is/are true on the basis of given statements:** 2

Statements **I:** Some rats are cats
II: Some cats are not dogs

Conclusions **I:** Some cats are rats
II: Some dogs are rats

OR

Which of the two conclusions is/are true on the basis of given statements: 2

Statements **I:** Some cups are plates
II: All plates are pots

Conclusions **I:** Some plates are cups
II: Some pots are cups

25. Find the modulas of ; 3 - 2(1+i) 2

Section: C (Subjective) (3 Marks)

26. Solve the inequality ; 2x +7< 9 3

27. **Find the domain and the range of the given function:** 3

f(x) = $\frac{1}{\sqrt{5-x}}$

28. **Let X = {x : x ∈ N and x ≤ 8}, A = {x : 5 < x^2 < 50} and B = (x : x is prime}.** 3

list elements of the following sets:

(a) A'

(b) B'

(c) A – B. is A – B = A ∩ B ' ?

29. In a survey of 450 people, it was found that 110 play cricket, 160 play tennis and 70 play both cricket as well tennis. How many play neither cricket nor tennis? 3

30. Prove that: cos 10° cos 30° cos 50° cos 70° = $\frac{3}{16}$ 3

31. The simple interest on a certain sum of money for 3 years at 5% per annum is ₹ 1200. Find the amount due and the compound interest on this sum of money at the same rate after 3 years, interest is reckoned annually. 3

Section: D (Subjective) (5 Marks)

32. Differentiate log sin x by first principal 5

33. Find the modulus and argument of complex number $\frac{1}{1+i}$ 5

34. Prove that: sin 6º sin 42° sin 66° sin 78 º = $\frac{1}{16}$. 5

35. Find the middle term in the expansion of $(3-\frac{x^2}{6})^7$ 5

36. How many 4-letter code words are possible using the first 10 letters of English alphabet if 5
(i) no letter can be repeated?
(ii) letters can be repeated?

37. Read the following text carefully and answer the questions that follow:
A triangular park has two of its vertices as B(-4, 1) and C(2, 11). The third vertex A is a point dividing the line joining the points (3, 1) and (6, 4) in the ratio 2: 1.

(i) Find the coordinates of third vertex A. 1

(ii) Find the equation of line passing through A and parallel to BC. 1

(iii) Find the equation of the line passing through A and perpendicular to BC. 2

38. (i) In how many ways can 6 women draw water from 6 taps if no tap remains unused? 4

(ii) Seven candidates are contesting an election. In how many ways can their names listed on the ballot paper?

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