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CUMMULATIVE EXAMINATION
Session-(2023-24)
Class:-XI (MATHS-041) SET-3

Time: 3 hours Maximum marks: 80

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.

2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.

3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.

4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.

5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.

6. Section E has 3 source based/case based/passage based/integrated units of assessment of 4 marks each with sub-parts.

Section A- each carries 1 mark

Q.1 Let A = {x : x ϵ R, x > 4} and B = {x ϵ R : x <5}. Then A ∩ B =

(a) (4,5] (b) (4,5) (c) [4,5) (d) [4,5]

Q.2 For any set A, (A') ' is equals to

(a) A ∩ B (b) A ' ∩ B (c) A ∩ B ' (d) None

Q.3 The difference of A and B is equals to – where A = {1, 2, 3} and {3, 4, 5}

(a) {5} (b) {1,2} (c) {1,2,3} (d) ϕ

Q.4 If (x+3, 5) = (6, 2x + y) then x, y is equals to

(a) 3,-1 (b) 3,0 (c) 0,-1 (d) None

Q.5 The range of the function f(x) = = $\frac{x^2-x}{x^2+2x}$ is

(a) R (b) R –{1} (c) R – {- ½, 1} (d) None

Q.6 The radius of the circle whose arc of length 15π cm makes an angle of 3π/4 radius at the centre is

(a) 10 cm (b) 20 cm (c) 11¼ cm (d) 22½ cm

Q.7 If tanx = $-\frac{1}{\sqrt{5}}$ and x lies in the IV quadrant, then the value of cos x is

(a) $\frac{\sqrt{5}}{\sqrt{6}}$ (b) $\frac{2}{\sqrt{6}}$ (c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{6}}$

Q.8 Which of the following is incorrect?

(a) sin x = $-\frac{1}{5}$ (b) cosx =1 (c) secx = $\frac{1}{2}$ (d) tanx = 20

Q.9 $\frac{1+2i+3i^2}{1-2i+3i^2}$ equals to -

(a) i (b) -1 (c) $-i$ (d) 4

Q.10 if x + iy = $\frac{1+5i}{1-6i}$, then y

(a) 9/85 (b) -9/85 (c) 53/85 (d) None

Q.11 If x is a real number and |x| < -5, then

(a) x ≥ 5 (b) -5 < x < 5 (c) x ≤ -5 (d) -5 ≤ x ≤ 5

Q.12 If x < 7, then

(a) – x < -7 (b) –x ≤ -7 (c) –x < -7 (d) –x ≥ -7

Q.13 If ${}^{m}C_1 = {}^{n}C_2$, then

(a) 2m = n (b) 2m = n(n+1) (c) 2m = n(n-1) (d) 2n = m(m-1)

Q.14 The number of word from the letter of the word 'BHARAT' in which B and H will never come together is

(a) 360 (b) 240 (c) 120 (d) None

Q.15 If a, b, c are in G.P. and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, then xyz are in

(a) AP (b) GP (c) Both AP & GP (d) None

Q.16 The nth term of a GP is 128 and the sum of its n terms is 255. If its common ratio is 2, then its first term

(a) 1 (b) 3 (c) 8 (d) None

Q.17 The number of irrational terms in the expansion of $\left(4^{\frac{1}{5}} + 7^{\frac{1}{10}}\right)^{45}$ is

(a) 40 (b) 5 (c) 41 (d) None

Q.18 The value of tan 1° tan 2° tab 3° … tan 89° is

(a) 0 (b) 1 (c) ½ (d) Not defined

ASSERTION - REASON BASED QUESTIONS

In the following questions, a statement of assertion(A) is followed by a student of reason(R). choose the correct answer out of the following choices…

(a) Both (A) and (R) are true and (R) is correct explanatory of (A).

(b) Both (A) and (R) are true and (R) is not the correct explanatory of (A)

(c) (A) is True but (R) is false

(d) (A) is false but (R) is true.

Q.19 Assertion (A) : Value of sin(-270)° is 1.
Reason(R) : sin(180° + θ) = -sinθ

Q.20 Assertion (A) : The expansion of $(1 + x)^n = {}^nC_0 + {}^nC_1x + {}^nC_2x^2 + \cdots {}^nC_nx^n$

Reason(R) : If x = -1, then the above expansion is zero.

Section – B – Each carries 02 marks

Q.21 For all sets A and B, A – (A – B) = A∩B

OR

If R = {(x , y) : x , y ϵ W , $x^2 + y^2 = 25$}, then find the domain and range of R.

Q.22 If sinθ + cosecθ = 2, then find $\sin^2\theta + \text{cosec}^2\theta$

Q.23 $If \left(\frac{1-i}{1+i}\right)^{100}$ = a + ib, then find out a and b.

Q.24 If $\frac{x}{5} < \frac{3x-2}{4}$ $\frac{5x-3}{5}$, then solve for x ϵ R .

Q.25 If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, then find x.

Section – C –each carries 03 marks.

Q.26 Find domain and range of $\frac{1}{\sqrt{9-x^2}}$

Q.27 Find tan $\frac{\pi}{12}$

Q.28 Find the values of x for which the functions

f(x) = $3x^2$ –1 and g(x) = 3+x are equal.

OR

Redefine the function f(x) = |x-2 | + |2 + x| , -3 ≤ x ≤ 3.

Q.29 If α and β are different complex numbers with | β | = 1, then find $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$.

Q.30 If the letters of the word 'LATE' be permuted and the words so formed be arranged as in a dictionary, find the rank of the word LATE.

Q.31 Find three numbers in GP, whose sum is 13 and the sum of whose squares is 91.

OR

The sum of first three terms of a GP is $\frac{39}{10}$ and their product is 1. Find the common ratio and the terms.

Section – D – each carries 05 marks

Q.32 Prove that cos2x cos $\frac{x}{2}$ – cos3x cos$\frac{9x}{2}$ = sin5x sin$\frac{5x}{2}$

OR

Prove that cos10 ˚ cos30 ˚ cos50 ˚ cos70 ˚ = 3/16

Q.33 A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of

(i) Exactly 3 girls?

(ii) At least 3 girls?

(iii) At most 3 girls?

Q.34 Find the sum of the following series upto nterms

.6 + .66 +.666 + ….

Q.35 (a) Find sets A,B and C such that A∩B, B∩C and A∩C are non-empty sets and A∩B∩C = ϕ

(b) Draw the Venn diagram of following: -

(i) A ' ∩ B '

(ii) (A ∩ B) '

(iii) (A U B) – (A ∩ B)

<u>Section – E – Each carries 04 marks</u>

Q.36 Four friends decide to play a game of cards. They picked a normal deck of cards of 52 playing cards.
The deck has 4 suits (Hearts, Diamonds, Spade and Clubs). Hearts and diamonds are Red in colour while spades and clubs are black in colour. Each suite has 13 cards each with one ace (A), 9 numbered cards (2 to 10) and 3 face cards (Jack(J), King(K) and Queen(Q)) based on the above information, answer the following questions:

(i) In how many different ways can four card can be drawn from the deck?

(ii) Find the no. of ways of selecting 4 cards belonging to four different suits.

(iii) What are the numbers of ways of selecting cards of the sane colour?

OR

In how many ways 4 cards of same suit can be selected?

Q.37 To demonstrate the compound angle formulae in trigonometry, Mahesh and Siraj selected two angles 'A' and 'B' such that A,B ϵ $(0, \frac{\pi}{2})$ and sinA = 3/5, cosB = 9/41. Answer the following question based on the above information.

(i) Find the value of cosA + SinB.

(ii) Find the value of cos(A+B)

(iii) Find the value of cosec(A-B)

OR

Find the value of tan(A-B)

Q.38 During covid – 19, a pharmaceutical company decides to make antiviral pills at the rate of 1.5 times the pills made every last week. Based on the above information, answer the following questions -

(i) If they have prepared 6750 pills in fourth week, then how many they have made in the first week?

(ii) How many pills will be prepared in nth week?

OR

In which week they might have prepared 10125 pills