PAPER NO. 09

RAWALPINDI BOARD FIRST GROUP

ANNUAL 2018

Roll No. _____ (To be filled in by the candidate)

Maximum Marks: 20 **(OBJECTIVE TYPE)** Time Allowed : 30 Minutes

NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

Q1. 20

1. **The geometric mean between $-2i$ and $8i$ is:**

(A) ± 1 (B) ± 2

(C) ± 3 (D) ± 4

2. **If A and B are mutually exclusive events, then $P(A \cup B)$ is equal to:**

(A) $P(A) + P(B)$ (B) $P(A) - P(B)$

(C) $P(AB)$ (D) $P(A) \cap P(B)$

3. **If ${}^{n}C_{8} = {}^{n}C_{12}$, then n is equal to:**

(A) 8 (B) 12

(C) 20 (D) 0

4. **In the expansion of $(x + y)^n$, middle term is:**

(A) T_4 (B) T_6

(C) T_5 (D) T_3

5. **If n is a positive even integer, then $\binom{n}{1}+\binom{n}{3}+\binom{n}{5}+\ldots\ldots+\binom{n}{n-1}$ is equal to:**

(A) 2^n (B) 2^{n+1}

(C) 2^{n-1} (D) 3^n

6. **An angle in the standard position whose terminal side falls on x – axis or y – axis is:**

(A) General angle (B) Coterminal angle

(C) Quadrantal angle (D) Acute angle

7. **$\cos(\pi + \theta)$ is equal to:**

(A) $\sec\theta$ (B) $-\cos\theta$

(C) $\cos\theta$ (D) $-\sec\theta$

8. Range of Cosine function is:

(A) $(-1,1)$ (B) $[-1,1]$

(C) $[-1,1)$ (D) $(-1,1]$

9. In any ΔABC $rr_1r_2r_3 =$ ____________

(A) Δ^4 (B) Δ^3

(C) Δ^2 (D) Δ

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10. **With usual notation $\sqrt{\frac{(s-b)(s-c)}{bc}}$ is equal to:**

(A) $\cos\frac{\alpha}{2}$ (B) $\sin\frac{\alpha}{2}$

(C) $\sin\frac{\beta}{2}$ (D) $\sin\frac{\gamma}{2}$

11. **$\cos^{-1}(-x)$ is equal to:**

(A) $\frac{\pi}{2}-\sin^{-1}x$ (B) $\frac{\pi}{2}+\sin^{-1}x$

(C) $\pi+\cos^{-1}x$ (D) $\pi-\cos^{-1}x$

12. **Solution of the equation $\tan x + 1 = 0$ is:**

(A) $\left\{\frac{3\pi}{4}+n\pi\right\}$ (B) $\left\{\frac{\pi}{4}+n\pi\right\}$

(C) $\{\pi+n\pi\}$ (D) $\{2\pi+n\pi\}$, when $n \in z$

13. **If $z = a + ib$, what is the value of $\cos\theta$?**

(A) $\frac{a}{|z|}$ (B) $\frac{b}{|z|}$

(C) $\frac{a}{b}$ (D) $\frac{b}{a}$

14. **A function $f : A \rightarrow B$ is surjective if:**

(A) Range $f = A$ (B) Range $f = B$

(C) Range $f \neq B$ (D) Range $f \neq A$

15. **Determinant of any unit matrix has value:**

(A) Greater than 1 (B) less than 1

(C) 1 (D) zero

16. **A square matrix A is skew-symmetric if A^t is equal to:**

(A) A (B) $-A$

(C) A^t (D) A^2

17. **The discriminant of $ax^2 + bx + c = 0$, $a \neq 0$ is:**

(A) $b^2 + 4ac$ (B) $4ac - b^2$

(C) $b^2 - 4ac$ (D) $a^2 - 4ac$

18. The degree to the equation $x^3 + 3x^2 + 4x + 5 = 0$ is:

(A) 4 (B) 3

(C) 2 (D) 1

19. $\frac{x^2+1}{Q(x)}$ will be improper fraction if

(A) Degree of Q (x) = 2 (B) Degree of Q(x) = 3

(C) Degree of Q(x) = 4 (D) Degree of Q (x) = 5

20. $\sum_{1}^{n} K$ is equal to:

(A) $\frac{n-1}{2}$ (B) $\frac{n}{2}$

(C) $\frac{n(n+1)}{2}$ (D) $\frac{n(n-1)}{2}$

(x) Prove the formula $1 + 3 + 5 + \ldots + (2n-1) = n^2$ for $n = 1, 2$

(xi) Find the term involving x^4 in the expansion of $(3 - 2x)^7$.

(xii) Use binomial theorem, find the value to three decimal places $(1.03)^5$.

Q4 Attempt any nine parts. (18)

(i) Verify $2\sin 45° \cdot \frac{1}{2}\operatorname{cosec} 45° = \frac{3}{\sqrt{2}}$.

(ii) Prove that $\frac{2\tan\theta}{1+\tan^2\theta} = 2\sin\theta\cos\theta$.

(iii) Prove that $\tan(45° + A)\tan(45° - A) = 1$

(iv) Prove that: $\frac{\sin 2\alpha}{1+\cos 2\alpha} = \tan\alpha$

(v) Define period of a trigonometric function.

(vi) Prove that $r = (s-a)\tan\frac{\alpha}{2}$.

(vii) Prove that $\tan^{-1}\frac{1}{4} + \tan^{-1}\frac{1}{5} = \tan^{-1}\frac{9}{19}$.

(viii) Solve $\sin x + \cos x = 0$.

(ix) Solve the trigonometric equation $\sec^2\theta = \frac{4}{3}$.

(x) Find the radius of the circle in which the arm of the central angle of measure 1 radian cut off an arc of length 35cm.

(xi) If α, β be the angle of a triangle ABC then prove that $\cos\left(\frac{\alpha+\beta}{2}\right) = \sin\frac{\gamma}{2}$

(xii) Find the smallest angle of $\triangle ABC$, when $a = 37.34$, $b = 3.24$, $c = 35.06$.

(xiii) Find area of triangle ABC given three sides $a = 18$, $b = 24$, $c = 35.06$.

PART - II

Note: Attempt any THREE questions.

Q5. (a) Convert into logical form and prove by truth table of $(A \cap B)' = A' \cup B'$. 5

(b) Find the value of λ if given system has non-trivial solution. 5

$x_1 + 4x_2 + \lambda x_3 = 0,\ 2x_1 + x_2 - 3x_3 = 0,\ 3x_1 + \lambda x_2 - 4x_3 = 0$

Q6. (a) If a,b are the roots of $x^2 - px - p - c = 0$, then prove that: $(1+\alpha)(1+\beta) = 1 - c$. 5

(b) Resolve into partial fraction $\frac{x^2+a^2}{(x^2+b^2)(x^2+c^2)(x^2+d^2)}$ 5

Q7. (a) The sum of 9 terms of a A.P is 171 and its eighth term is 31. Find the series. 5

(b) If x is very nearly equal 1 then prove that: $px^p - qx^q = (p-q)x^{p+q}$. 5

Q8. (a) Find the value of remaining trigonometric function of sine $\frac{1}{\ldots}$ and the terminal ... of ...

08. (a) Find the value of remaining trigonometric function of $\sin\theta = -\frac{1}{\sqrt{2}}$ and the terminal arm of the angle is not in quad III. 5

(b) Prove that: $\frac{\sin 3\theta}{\cos\theta} + \frac{\cos 3\theta}{\sin\theta} = 2\cot 2\theta$ 5

09. (a) Prove that $r_1 + r_2 + r_3 - r = 4R$. 5

(b) Prove that: $\sin^{-1}\frac{3}{5} + \sin^{-1}\frac{8}{17} = \sin^{-1}\frac{77}{85}$. 5

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