Pakistan school, Kingdom of Bahrain

HSSC Pre Board Examination, June 2021

Subject :Mathematics **Total Marks: 20**

Grade : 11th Sec:---------- **Time** : 20 MIN

Name: ---------- Version Number: 2 7 1 0

N**ote: section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the center superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.**

SECTION- A (Marks)

Q.1 Circle the correct option I.e A/B/C/D. Each part carries one mark.

(i) If a =b, b = c => a=c is called---------- property

(a) Trichotomy (b) reflexive (c) symmetric (d) Transitive

(ii) If A is a subset of B then A∩ B = ----------

(a) A (b) B(c) B^C (d) A^C

(iii) The determinant of an identity matrix is equal to--------

(a) 1 (b)-1 (c) 2 (d) none of these

(iv) For non-trivial solution $|A|$ is----------

(a) zero (b) -1 (c) 1 (d) Not defined

(V) Number of basic techniques for solving a quadratic equation are ---------

(a)Three (b) Two (c) 1 (d) None of these

(vi) Quadratic equation when roots are given -2 and -3 is----------

(a) $x^2 + 5x - 6 = 0$ (b) $x^2 - 5x - 6 = 0$ (c) $x^2 + 5x + 6 = 0$ (d) None of these

(vii) An equation which holds good for all values of variable is called:

(a) Identity (b) conditional equation (c) equation (d) Both a, and b

(viii) The sum of cube of first n natural numbers…….

(a) $\frac{n^2(n+1)^2}{4}$ (b) $\frac{n(n+1)}{4}$ (c) $\frac{n(n+1)(2n+1)}{6}$ (d) $\frac{n(n+1)}{2}$

(P.T.O)

(ix) If a,A,b are in A.P then 2A=----------

(a) $a+b$ (b) $\pm \frac{a+b}{2}$ (c) $\frac{2ab}{a+b}$ (d) $\frac{a-b}{2}$

(x) The number of ways of 5 person can be seated on a round table are

(a) 24 (b) 20 (c) 5 (d) 120

(Xi) The sum of odd and even coefficients of a binomial expansion are…….

(a) Equal (b) Not equal (c) Double of the other (d) None of these

(Xii) The sum of coefficient in binomial expansion of $(1+x)^n$ are

(a) 2^n (b) 2^{n-1} (c) n + 1 (d) $\frac{n(n+1)}{2}$

(xiii) How many radians equal to 150°

(a) $\frac{5\pi}{6}$ (b) $\frac{5\pi}{3}$ (c) $\frac{5\pi}{4}$ (d) $\frac{3\pi}{4}$

(xiv) What is co- ratio of sin θ

(a) cos θ (b) tan θ (c) cot θ (d) cosec θ

(xv) Tan (45° + A) tan (45° - A)

(a) 1 (b) 0 (c) -1 (d) 2

(xvi) Period of 3Cos$x$ is

(a) 2 π (b) 2 π + 3 (c) 3 (2 π) (d) $\frac{2\pi}{3}$

(xvii) A triangle which is not right is called ----------

(a) Oblique (b) Quadrilateral (c) Equilateral (d) Isosceles

(xviii) s tan $\frac{\alpha}{2}$ = ----------

(a) r_1 (b) r_2 (c) r_3 (d) 1

(xix) tan ($tan^{-1}(1)$)----------

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{4}$ (c) 1 (d) 0

(xx) An equation containing at least one trigonometric function is called

(a) trigonometric equation (b) algebraic equation (c) Linear equation (d) None

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Subject : Mathematics **Total Marks Section B and C: 80**

Grade: 11 sec: ---------- **Time: 2:40 HRS**

Note : Attempt any Ten parts from section B and any five questions from section C on the separately provided answer book, Use supplementary answer sheet i.e. Sheet –B if required. Write your answers neatly and legibly. LogboopPk and graph paper will be provided on demand.

SECTION-B (Marks: 40) (10X4=40)

Q2. Attempt any Ten (10) parts. All parts carry equal marks.

(i) Prove that the sum as well as the product of any two conjugate complex numbers is a real number.

(ii) Verify De Morgan's laws for the following sets:
U = {1,2,3…20} , A = {2,4,6….20} , B = { 1,3,5….19}

(iii) If A = $\begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$, Find A^3

(iv) When $x^4 + 2x^3 + kx^2 + 3$ is divided by $x - 2$, the remainder is 1.Find the value of k.

(v) $\frac{x^2-2x+3}{x^4+x^2+1}$ solve into Partial Fraction.

(vi) The enrollment of a famous school doubled after every eight years from 1970 to 1994. If the enrollment was 6000 in 1994, what was its enrollment in 1970?

(vii) Prove that $n_{c_r} + n_{c_{r-1}} = n + 1_{c_r}$

(viii) Find the coefficient of, x^5 in the expansion of $\left(x^2 - \frac{3}{2x}\right)^{10}$

(ix) If $\cot\theta = \frac{15}{8}$ and the terminal arm of the angle is not is quad.1, find the value of $\cos\theta$ and $\operatorname{cosec}\theta$.

(x) Reduce $sin^4\theta$ to an expression involving only function of multiples of θ,raised to the first powe

(xi) Solve using first law of tangents and the law of sines: a = 319 , b = 168 and $\gamma = 110^{\circ}22$.

(xii) Find periods of the following functions: $\cot\frac{x}{2}$ and $\sec 9x$.

(xiii) Prove the following : $tan^{-1}\frac{1}{11} + tan^{-1}\frac{5}{6} = tan^{-1}\frac{1}{3} + tan^{-1}\frac{1}{2}$

(xiv) Find the solution set of $\sin 7x - \sin x = \sin 3x$

(P.T.O)

SECTION-C (Marks 24) (5x8=40)

Note: Attempt any Five questions. All questions carry equal marks.

Q3. (i) $2x + 2y + z = 3, 3x - 2y - 2z = 1, 5x + y - 3z = 2$, (solve by using Cramer's rule)

(ii) Solve the following systems of homogeneous linear equations.

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

Q4. Solve the equation. $2x^4 + 3x^3 - 4x^2 - 3x + 2 = 0$

Q5. (i) For what value of n, $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the positive geometric mean between a and b.

(ii) If $y = \frac{2}{3}x + \frac{4}{9}x^2 + \frac{8}{27}x^3 +$-------- and if $0 < x < \frac{3}{2}$, then show that $x = \frac{3y}{2(1+y)}$

Q6. If $2y = \frac{1}{2^2} + \frac{1.3}{2!}.\frac{1}{2^4} + \frac{1.3.5}{3!}\frac{1}{2^6} +$---------, then prove that $4y^2 + 4y - 1 = 0$

Q7. Prove the identity. (I) $\frac{1}{cosec\theta - cot\theta} - \frac{1}{sin\theta} = \frac{1}{sin\theta} - \frac{1}{cosec\theta + cot\theta}$

(II) Find sin ($\alpha + \beta$) and cos ($\alpha + \beta$) ,given that $\tan\alpha = \frac{3}{4}$, $\cos\beta = \frac{5}{13}$ and neither the terminal side of the angle of measure α nor that β is in 1 quadrant.

(8) Find area of a triangle ABC, given three sides:

a = 524 , b = 276 , c = 315

(9) Find the solution set of : $\cos\theta + \cos 3\theta + \cos 5\theta + \cos 7\theta = 0$