

## Sample Paper 03: Public Service Commission

Available at: <http://www.mathcity.org/ppsc>

This is a sample paper for the post of Lecturer or Subject Specialist or any other equivalent position.



### General Knowledge

1. The largest country of the world (area wise) is?  
(A) U.S.A. (B) Russia (C) China (D) Canada
2. Who is Author of "Alice in Wonderland"?  
(A) Woodward (B) Lewis Carroll (C) J.K. Ali (D) None
3. Oldest Barrage of the Pakistan is:  
(A) Trimmu Barrage (B) Kotri Barrage (C) Sukkar Barrage (D) Taunsa Barrage
4. "Asia watch" is a:  
(A) Human Rights Organization (B) News agency (C) Building  
(D) None
5. A bul Qasim Al-Zahrawi was great muslim.  
(A) Artist (B) Buenos Scientist (C) Poet (D) Surgeon
6. Vitamin E is present in:  
(A) Milk (B) Egg (C) Orange (D) Apple
7. Jaundice is the disease of  
(A) Mouth (B) Lungs (C) Liver (D) Kidney
8. Ghauri-I is a  
(A) Long range missile (B) short range missile (C) anti-tank missile  
(D) Medium range missile
9. What part of Pakistan is famous for dates production  
(A) Lahore (B) Multan (C) Karachi (D) Nawab shah
10. The largest oil field of the world is in:  
(A) England (B) Germany (C) Saudi Arabia (D) Japan
11. Emirates is an airline of  
(A) Tripoli (B) Los Angeles (C) Doha (D) UAE

12. World War I begin in  
(A) 1900 (B) 1910 (C) 1914 (D) 1912
13. Quid-e-Azam's mother tongue was  
(A) Gujrati (B) Urdu (C) English (D) Hindi
14. The National flag of Pakistan was prepared by  
(A) Chaudhary Rehmat Ali (B) Molana Azaad (C) Ameer-ud-din Qadwai (D) Liaqat Ali
15. Which one of these is a River of Sindh  
(A) Indus (B) Nari (C) Mula (D) Hub
16. A fulmar is  
(A) An insect (B) A bird (C) A fish (D) A DOG
17. Anemia is a  
(A) Blood pressure (B) Bloodlessness (C) cough (D) Brain disease
18. London is situated on the bank of river  
(A) Thames (B) Nile River (C) Delaware (D) None
19. Pakistan purchased Gwadar from;  
(A) Oman (B) Iran (C) Kuwait (D) none
20. Eiffel tower is located in  
(A) New York (B) Paris (C) Rome (D) London

## Mathematics

21. The function  $f(x) = |x| + |x - 1|$  is  
(A) continuous and differentiable for  $x = 0, x = 1$  (B) continuous but not differentiable for  $x = 0, x = 1$  (C) discontinuous but differentiable for  $x = 0, x = 1$  (D) None of these
22. If a particle in equilibrium is subjected to four forces,  $F_1 = 2\hat{i} - 5\hat{j} + 6\hat{k}$ ,  $F_2 = \hat{i} + 3\hat{j} - 7\hat{k}$ ,  $F_3 = 2\hat{i} - 2\hat{j} - 3\hat{k}$  and  $F_4$ ,  $F_4$  is equal to  
(A)  $-5\hat{i} + 4\hat{j} + 4\hat{k}$  (B)  $5\hat{i} - 4\hat{j} - 4\hat{k}$  (C)  $3\hat{i} - 2\hat{j} - \hat{k}$  (D)  $3\hat{i} + \hat{j} - 10\hat{k}$
23. Evaluate  $\lim_{x \rightarrow 0} \left( \frac{\tan x}{x} \right)^{\frac{3}{x^2}}$   
(A) 0 (B)  $e^{\frac{1}{3}}$  (C)  $\frac{3}{x^3}$  (D)  $e^3$
24. Evaluate if  $z = x^2$   
(A) 0 (B)  $e^{\frac{1}{3}}$  (C)  $\frac{3}{x^3}$  (D)  $e^3$

25.  $\int_{-4}^0 \frac{t}{\sqrt{16-t^2}} dt =$   
 (A) 0 (B) Divergent (C) -4 (D) 4
26. The period of the function  $A\cos\omega t + B\sin\omega t$  is  
 (A)  $2\pi\omega$  (B)  $\frac{\omega}{2\pi}$  (C)  $\frac{2\pi}{\omega}$  (D) None
27.  $A = (-4x - 3y + az)\underline{i} + (bx + 3y + 5z)\underline{j} + (4x + cy + 3z)\underline{k}$  is irrotational when  $a, b, c$  are  
 (A) 4, -3, 5 (B) 4, 5, -3 (C) -3, 4, 5 (D) 2, 3, 5
28.  $V = (-4x - 6y + 3z)\underline{i} + (-2x + y - 5z)\underline{j} + (5x + 6y + az)\underline{k}$  is solenoidal for  $a =$   
 (A) 1 (B) 2 (C) 3 (D) 4
29.  $\int_{(0,0)}^{(2,1)} (10x^4 - 2xy^3)dx - 3x^2y^2dy$  along the path  $x^4 - 6xy^3 = 4y^2$  is  
 (A) 56 (B) 60 (C) 62 (D) 64
30. If  $S$  is the closed surface and  $V$  is the volume enclosed by  $S$  then  $\iint_S \underline{r} \cdot \underline{s} ds =$   
 (A)  $v$  (B)  $2v$  (C)  $3v$  (D)  $4v$
31. Centrifugal acceleration is  
 (A)  $-\omega \times (\omega \times r)$  (B)  $\omega \times (\omega \times r)$  (C)  $\omega \cdot (\omega \times r)$  (D)  $r \times (\omega \times r)$
32. Number of degrees of freedom of two particles connected by a rigid rod moving freely in a plane is .....  
 (A) 2 (B) 3 (C) 4 (D) 5
33. The centroid of a uniform semicircular wire of radius  $a$  is .....  
 (A)  $\frac{2a}{\pi}$  (B)  $\frac{4a}{\pi}$  (C)  $\frac{a}{\pi}$  (D)  $\frac{a}{2\pi}$
34. Moment of inertia of a rectangular plate with sides  $a, b$  about an axis  $\perp$  to plate and passing through vertex is .....  
 (A)  $\frac{1}{3}Ma^2$  (B)  $\frac{1}{3}Mb^2$  (C)  $\frac{1}{3}M(a^2 - b^2)$  (D)  $\frac{1}{3}M(a^2 + b^2)$
35. Every bounded infinite set has at least one limit point, is the statement of .....  
 (A) Heine-Borel Theorem (B) Weierstrass-Bolzano Theorem (C) Cantor's Intersection Theorem (D) None
36.  $\lim_{x \rightarrow 0} \frac{\bar{x}}{x} =$   
 (A)  $\frac{1+i}{1-i}$  (B) 1 (C) -1 (D) None
37. Evaluate  $\int_C \frac{z^2 - z + 1}{z-1} dz$ , Where  $C$  is the circle  $|z| = \frac{1}{2}$  :  
 (A) 1 (B) 2 (C)  $\frac{1}{2}$  (D) 0

38. The principal value of  $(-i)^i$  is  
 (A)  $e^{-\frac{\pi}{2}}$  (B) 1 (C)  $e^{\frac{\pi}{2}}$  (D)  $e^{\pi}$
39. The Residue of  $f(z) = \frac{z^2 - 2z}{(z+1)^2(z^2+4)}$  at  $z = 2i$  is .....  
 (A)  $e^{\frac{14}{25}}$  (B)  $e^{\frac{7+i}{25}}$  (C)  $e^{\frac{7-i}{25}}$  (D)  $e^{-\frac{7-i}{25}}$
40.  $\lim_{n \rightarrow \infty} (1 + \frac{x}{n})^n$  is .....  
 (A)  $e^x$  (B) 1 (C) 0 (D)  $e^n$
41.  $U(x, y) = e^x \cos y$  is .....  
 (A) Harmonic (B) Analytic (C) Not Harmonic (D) None
42.  $\int_0^{\infty} \frac{\sin x}{x} dx = \dots\dots\dots$   
 (A) 0 (B)  $-\frac{\pi}{2}$  (C)  $\frac{\pi}{2}$  (D)  $-\pi$
43.  $\text{Log}(1+i) = \dots\dots\dots$   
 (A)  $\frac{1}{2} \ln 2 - \frac{\pi i}{4}$  (B)  $\frac{1}{2} \ln 2 + \frac{\pi i}{4}$  (C)  $\frac{1}{2} \ln 2 - \frac{3\pi i}{4}$  (D)  $\frac{1}{2} \ln 2 + \frac{3\pi i}{4}$
44. Which of the following space is complete.  
 (A)  $\mathbb{Q}$  (B)  $]0, 1]$  (C)  $\mathbb{Z}$  (D)  $\mathbb{R}$
45. Least upperbound of  $\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \dots\}$  is  
 (A) 1 (B) 0 (C)  $\infty$  (D)  $\frac{n}{n+1}$
46. Error! Bookmark not defined.  $\lim_{x \rightarrow 1} \frac{x^x - x}{1 - x + \ln x}$  is  
 (A) 1 (B) -1 (C) 2 (D) -2
47.  $\lim_{x \rightarrow 0} x^{\sin x}$  is .....  
 (A) 0 (B)  $e$  (C)  $\frac{1}{2}$  (D)  $\infty$
48. Minimum and Maximum values of  $f(x) = x^{\frac{2}{3}(x^2-8)}$  in interval  $[-1, \frac{1}{2}]$  are  
 (A) -7, 0 (B) 0, 6 (C) 1, 2 (D) -2, 3
49.  $\int_0^1 \frac{4}{1+x^2} dx = \dots\dots\dots$   
 (A) 0 (B)  $\pi$  (C)  $\frac{4\pi}{3}$  (D)  $-\pi$
50.  $\int_0^{\pi} \text{cosec}^2 x dx = \dots\dots\dots$   
 (A) 0 (B) 1 (C) -1 (D)  $\infty$
51.  $\lim_{x \rightarrow 0} \sin \frac{1}{x} = \dots\dots\dots$   
 (A) does not exist (B) 1 (C) -1 (D) 0
52.  $\int_0^{\frac{3\pi}{4}} |\cos x| dx = \dots\dots\dots$   
 (A)  $\frac{1}{\sqrt{2}}$  (B)  $-\frac{1}{\sqrt{2}}$  (C)  $\infty$  (D)  $2 - \frac{1}{\sqrt{2}}$

53.  $\sec(\tan^{-1} \frac{2}{3}) = \dots\dots\dots$   
 (A)  $\frac{2}{\sqrt{13}}$  (B)  $\frac{3}{\sqrt{13}}$  (C)  $\frac{\sqrt{13}}{3}$  (D)  $\frac{\sqrt{13}}{2}$
54. Which of the following is convergent series?  
 (A)  $\sum \frac{1}{n^2}$  (B)  $\sum \frac{1}{\sqrt{n}}$  (C)  $\sum \frac{1}{n}$  (D)  $\sum \frac{1}{n^{\frac{1}{3}}}$
55.  $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$  is the Maclaurin's series of  
 (A)  $\cos x$  (B)  $\sin x$  (C)  $\sinh x$  (D)  $\cosh x$
56.  $\int_1^2 \int_0^{y^{\frac{3}{2}}} \frac{x}{y^2} dx dy = \dots\dots\dots$   
 (A)  $\frac{3}{4}$  (B)  $\frac{7}{8}$  (C)  $\frac{3}{2}$  (D)  $\frac{1}{2}$
57. Domain of  $f(x) = \sqrt{1-x^2}$  is  $\dots\dots\dots$   
 (A)  $x < 1$  (B)  $x > 1$  (C)  $|x| \leq 1$  (D)  $|x| \geq 1$
58. Domain of  $f(x) = \frac{1}{\sqrt{(1-x)(2-x)}}$  is  $\dots\dots\dots$   
 (A)  $\mathbb{R} \setminus [1, 2]$  (B)  $\mathbb{R} \setminus ]1, 2[$  (C)  $[1, 2]$  (D)  $]1, 2[$
59.  $f: \mathbb{R} \rightarrow (-1, 1)$  defined by  $f(x) = \dots\dots\dots$  is bijective.  
 (A)  $\frac{x}{1-|x|}$  (B)  $\frac{x}{1+|x|}$  (C)  $\frac{1}{1+|x|}$  (D)  $\frac{x}{-1+|x|}$
60. Interval of convergence of  $\sum_{k=1}^{\infty} x^k$  is  
 (A)  $] -1, 1[$  (B)  $[-1, 1]$  (C)  $(-\infty, +\infty)$  (D)  $x = 0$
61. Which of the following are open in the usual metric space  $(\mathbb{R}, d)$ ?  
 (A) Subsets of  $\mathbb{R}$  (B) Union of open intervals (C) Intervals (D) Singleton subsets
62. Let  $A = (0, 1] \cup (1, 3]$  and  $\mathbb{R}$  with usual metric space. Then  $\overset{\circ}{A} =$   
 (A)  $A \setminus \{0\}$  (B)  $A \setminus \{1\}$  (C)  $A \setminus \{3\}$  (D)  $(0, 1) \cup (1, 3)$
63. Let  $A$  be finite subset of a metric space  $X$ . Then  $A^d =$  \_\_\_\_\_  
 (A) singleton set (B)  $\phi$  (C)  $A$  (D)  $X \setminus A$
64. Let  $A$  be finite subset of  $(X, d)$ . Then  $A$  is \_\_\_\_\_  
 (A) open set (B) open as well as closed (C) closed set (D) none
65. If  $Y$  is subset of  $(X, d)$ . Then \_\_\_\_\_  
 (A) Every open set in  $Y$  is open in  $X$  (B) Every open set in  $X$  is open in  $Y$   
 (C)  $O$  is open in  $Y \iff O$  is open in  $X$  (D)  $O$  is open  $\iff O = Y \cap G$   
 where  $G$  is open in  $X$

66. Let  $f(x) = 1 + x^3$ . Then  $(0, 0)$  is the point of \_\_\_\_\_  
 (A) maximum value (B) minimum value (C) point of inflection  
 (D) none
67. Number of elements in a co-finite topological space  $(X, \tau)$  where  $X = \{s, t, u\}$  is \_\_\_\_\_  
 (A) 2 (B) 3 (C) 4 (D) 8
68. The boundary of subset  $B = \{\frac{1}{n} : n \in \mathbb{N}\}$  of  $(\mathbb{R}, d)$  is \_\_\_\_\_  
 (A)  $B$  (B)  $\{0\}$  (C)  $B \cup \{0\}$  (D)  $\phi$
69. The real line  $\mathbb{R}$  is homeomorphic to \_\_\_\_\_  
 (A)  $(0, 4)$  (B)  $[-1, 1]$  (C)  $\mathbb{Q}$  (D)  $\mathbb{Z}$
70.  $\mathbb{R}$  with co-finite topology is \_\_\_\_\_  
 (A)  $\tau_0$  - space (B)  $\tau_1$  - space (C)  $\tau_1$  - space but not  $\tau_2$  - space  
 (D)  $\tau_2$  - space
71. Let  $X = \{a, b, c\}$ ,  $\tau = \{\phi, \{a\}, \{b\}, \{a, b\}, X\}$ , Then  $X$  is \_\_\_\_\_  
 (A)  $\tau_1$  - space (B) Regular space (C)  $\tau_2$  - space (D) normal space
72. Which of the following is connected in  $\mathbb{R}$  with usual topology  
 (A)  $\mathbb{N}$  (B)  $\mathbb{Q}$  (C)  $(0, 1]$  (D)  $\mathbb{Z}$
73. Which of the following nowhere dense in  $\mathbb{R}$   
 (A)  $\mathbb{R} \setminus \mathbb{Z}$  (B)  $\mathbb{Z}$  (C)  $U(n, n + 1)$ ,  $n \in \mathbb{Z}$  with usual topology (D)  $\mathbb{Q}$
74. Which of the following topology is not totally disconnected?  
 (A) 1 (B) Discrete space (C)  $\mathbb{R}$  with usual topology (D)  $\mathbb{Q}$
75. Which of the following is dense in  $\mathbb{R}$  \_\_\_\_\_  
 (A)  $\mathbb{N}$  (B)  $\mathbb{Z}$  (C)  $\mathbb{R} \setminus \mathbb{Z}$  (D)  $\mathbb{Q}$
76.  $xy'' + y' = 0$  has a solution  $y = \ln x$  on interval \_\_\_\_\_  
 (A)  $(0, \infty)$  (B)  $(-\infty, 0)$  (C)  $(-\infty, \infty)$  (D)  $[0, \infty[$
77. Which of the following is not linear?  
 (A)  $y' = (\sin x)y$  (B)  $y' = (\sin y)x + e^x$  (C)  $y' + xy = e^{xy}$   
 (D)  $y' = 5$
78. Solution of  $y' = \frac{x+y}{x}$  is \_\_\_\_\_  
 (A)  $y = \ln |kx|$  (B)  $y = \ln |x|$  (C)  $y = x \ln |kx|$  (D)  $y = \ln |x| + k$
79. Which of the following differential equation is not exist?  
 (A)  $2xydx + (1 + x^2)dy = 0$  (B)  $ydx - xdy = 0$  (C)  $y' = \frac{2 + ye^{xy}}{2y - xe^{xy}}$   
 (D)  $(x + \sin y)dx + (x \cos y - 2y)dy$

80. Integrating factor for  $y' + \frac{4}{x}y = x^4$  is \_\_\_\_\_  
 (A)  $x^4$  (B)  $\ln x^4$  (C)  $4 \ln |x|$  (D)  $\ln |x|$
81. The area bounded by  $y = 4 - x^4$  and  $X - axis$  is \_\_\_\_\_  
 (A)  $\frac{4}{3}$  (B)  $\frac{8}{3}$  (C)  $\frac{16}{3}$  (D)  $\frac{32}{3}$
82. Which of the following is scalar?  
 (A)  $(\underline{a} \cdot \underline{b})\underline{c}$  (B)  $\underline{a} \cdot (\underline{b} \times \underline{c})$  (C)  $\underline{a} \times (\underline{b} \times \underline{c})$  (D)  $(\underline{a} \cdot \underline{b})(\underline{a} - \underline{a})$
83. Projection of  $\underline{a}$  on  $\underline{b}$  is \_\_\_\_\_  
 (A)  $\underline{a} \cdot \underline{b}$  (B)  $\frac{\underline{a}}{|\underline{a}|} \cdot \underline{b}$  (C)  $\underline{a} \cdot \frac{\underline{b}}{|\underline{b}|}$  (D)  $\underline{a} \times \underline{b}$
84. Which of the following is scalar quantity?  
 (A) Momentum (B) Magnetic field intensity (C) Specific heat  
 (D) Moment of force
85. A vector lying in the plane of  $\underline{a}$  and  $\underline{b}$  is \_\_\_\_\_  
 (A)  $(\underline{a} \times \underline{b}) \times \underline{c}$  (B)  $\underline{a} \times (\underline{b} \times \underline{c})$  (C)  $(\underline{c} \times \underline{a}) \times \underline{b}$  (D)  $(\underline{c} \times \underline{b}) \times \underline{a}$
86. Let  $\underline{t}$ ,  $\underline{n}$  and  $\underline{b}$  denote respectively the tangent, principal normal and bi-normal vectors to the curve. The osculating plane to the curve at  $P$  contains \_\_\_\_\_  
 (A)  $\underline{t}, \underline{b}$  (B)  $\underline{n}, \underline{b}$  (C)  $\underline{t}, \underline{n}$  (D)  $\underline{t}, \underline{n}, \underline{b}$
87. Let  $\underline{t}$ ,  $\underline{n}$  and  $\underline{b}$  be as in the above equation. Then  $\tau \underline{b} - k \underline{t} =$  \_\_\_\_\_  
 (A)  $\frac{d\underline{t}}{ds}$  (B)  $\frac{d\underline{n}}{ds}$  (C)  $\frac{d\underline{b}}{ds}$  (D)  $\frac{d(\underline{t} \times \underline{n})}{ds}$
88. Normal plane is equal to \_\_\_\_\_  
 (A)  $\underline{t}$  (B)  $\underline{n}$  (C)  $\underline{b}$  (D)  $\underline{t} \times \underline{n}$
89.  $\underline{t} \times \underline{b} =$  \_\_\_\_\_  
 (A)  $\underline{n}$  (B)  $-\underline{n}$  (C)  $\underline{n} \times \underline{b}$  (D) None
90.  $\{x | x \in C : x^4 = 1\}$  is a \_\_\_\_\_  
 (A) Subgroup of  $(C \setminus \{0\}, \cdot)$  (B) Subgroup of  $(C, +)$  (C) None cyclic group  
 (D) Subgroup of  $(Q \setminus \{0\}, \cdot)$
91.  $R^3$  under vector product forms a \_\_\_\_\_  
 (A) group (B) monoid (C) semi-group (D) groupoid
92. An element  $x$  of group  $G$  satisfying  $x^2 = x$  is called \_\_\_\_\_  
 (A) Involution (B) Idempotent (C) Transposition (D) cycle
93.  $\frac{Z}{n}$  is isomorphic to \_\_\_\_\_  
 (A)  $nZ$  (B)  $n$  (C)  $Z_n$  (D)  $\{0, \pm 2n, \pm 4n, \dots\}$
94. Let  $G = \langle a : a^{12} = e \rangle$ . Then  $G =$  \_\_\_\_\_  
 (A)  $\langle a^5 \rangle$  (B)  $\langle a^6 \rangle$  (C)  $\langle a^2 \rangle$  (D)  $\langle a^8 \rangle$

95. Let  $G = \langle a : a^{17} = e \rangle$ . Then  $G$  can be generated by \_\_\_\_\_  
(A) Any element of  $G$  (B) Any non identity element of  $G$  (C)  $b, b^{-1}$   
are the only generators of  $G$  (D) identity
96. If  $G = \langle \alpha, \beta : \alpha^3 = \beta^2 = (\alpha\beta)^2 = e \rangle$  Then  $N_G(\{e, \beta\}) =$   
(A)  $\{\phi\}$  (B)  $\{\phi, \beta, \alpha\beta\}$  (C)  $G$  (D)  $\{e, \phi\}$
97. If  $G = \langle \alpha, \beta : \alpha^4 = \beta^2 = (\alpha\beta)^2 = e \rangle$  Then  $G(z) =$   
(A)  $\{\phi\}$  (B)  $\{\phi, \alpha^2\}$  (C)  $\{\phi, \alpha, \alpha^2, \alpha^3\}$  (D)  $G$
98. Which of the following is not true for an abelian group  $G$ ?  
(A)  $[a, b] = \phi \forall a, b \in G$  (B)  $G$  is simple group of order 60 (C)  $G' = \{\phi\}$   
(D)  $Z(G) = G$
99. Inner automorphism of  $Q = \{\pm 1, \pm i, \pm j, \pm k\}$  is \_\_\_\_\_  
(A)  $\{\phi\}$  (B)  $C + 2 \times C_2$  (C)  $Q$  (D)  $C_4$
100. Number of conjugacy classes of a cyclic group of order 6 is \_\_\_\_\_  
(A) 1 (B) 2 (C) 3 (D) 6

**Disclaimer:** MathCity.org does not represent any official or government/semi-government/private educational institute or board or university. The resources given on MathCity.org holds no official position in government (or in government educational institute or board or university). The sample paper is made to help the students and the actual paper may be totally different from this sample. Some of the questions are taken from past papers.