RESOURCES FOR

"SSC-II MATHEMATICS"

ZUEB EXAMINATIONS 2021

PREFACE:

The ZUEB examination board acknowledges the serious problems encountered by the schools and colleges in smooth execution of the teaching and learning processes due to sudden and prolonged school closures during the covid-19 spread. The board also recognizes the health, psychological and financial issues encountered by students due to the spread of covid-19.

Considering all these problems and issues the ZUEB Board has developed these resources based on the condensed syllabus 2021 to facilitate students in learning the content through quality resource materials.
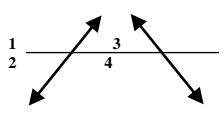
The schools and students could download these materials from www.zueb.pk to prepare their students for the high quality and standardized ZUEB examinations 2021.

The materials consist of examination syllabus with specific students learning outcomes per topic, Multiple Choice Questions (MCQs) to assess different thinking levels, Constructed Response Questions (CRQs) with possible answers, Extended Response Questions (ERQs) with possible answers and learning materials.

ACADEMIC UNIT ZUEB:

2. Constructed Response Questions (CRQs)

HOW TO ATTEMPT CRQs:

- Write the answer to each Constructed Response Question/ERQs in the space given below it.
- Use black pen/pencil to write the responses. Do not use glue or pin on the paper.

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SECTION B (SHORT ANSWER QUESTIONS)

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1. If U= {x | x∈N∧1≤x≤12} A={1,2,5,9} and B={2,3,8,9,10} prove that A′∪B′=(A∩B)′?

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S.NO	*CRQ*	ANSWER	CL	DL
1.	Find all the subsets of A= {a,b,c,d}. hence or otherwise, find |P(A)|	{a}, {b},{c}, {a,b}, {ac}, {a,d}, {b,c},{b,d},{c,d},{a,b,c},{a,b,d}, {a,c,d},{b,c,d},{a,b,c,d}; |P(A)|=16	K/A	E
2.	Which of the following are equivalent sets? a. A={a,b,c}, B={1,2,3} b. A={1,2,3,4}, B ={a,b,c} c. A=|x| x is a positive integer less than 6}, B=(a,e,i,o,u}	a. $A \sim' B$ b. $A \sim B$ c. $A \sim B$	K/A	M
3.	Verify the commutative property of union and intersection for the following sets. A={1,2,3,4,5}, B= {3,5,7,9} A={x|x∈ Z^+ and $x \leq 5$ B= {x|x∈ Z and $1 \leq x \leq 4$}	Proof	K/A	M

4.	If A={1,2,3} then find: i. A function f from A to A which is one-one. ii. A function g from A to A which is onto. iii. A function h from A to A which is one-one and onto. iv. A function k from A to A which is neither one-one nor onto.	i. {(1,1),(2,2),(3,3)} ii. {(1,2),(2,1)(3,3)} iii. {(1,2),(2,2),(3,1)} iv. {(1,1),(2,3)(3,3)}	K/A	M
5.	Let A={1,2,3,4}, B={2,4,5,6} and C={2,3,6,8}. Find: i. $(A-B)\times(B-C)$ ii. $(A\cap B)\times(B\cap C)$ iii. $(A\times B)\cap(B\times C)$ iv. $(A\times B)-(B\times C)$	i. {(1,4), (1,5), (3,4) (3,5)} ii. {(2,2), (2,6), (4,2), (4,6)} iii. {(2,2), (2,6), (4,2), (4,6)} iv. {(1,2), (1,4), (1,5), (1,6), (2,4), (2,5), (3,2), (3,4), (3,5), (3,6), (4,4), (4,5)	K/A	M
6.	Taking proper units, show the following points on a graph paper. i. (4,6), (6,2), $\left(\frac{1}{2},\frac{1}{2}\right)$, (1,3) ii. (-3,4), (-5,2), (-4,1), $\left(-\frac{4}{5},\frac{1}{2}\right)$, $\left(-\frac{2}{5},\frac{2}{5}\right)$, $\left(-\frac{1}{2},\frac{1}{2}\right)$	Graph	K/A	M
7.	Which of the following sets possess the closure property with respect to addition and multiplication? i. {0,-1} ii. {0} iii. {1}	i. {0,-1} does not possess the closure property w.r.t addition and multiplication ii. {0} possess the closure property w.r.t addition and multiplication. iii.{1} possess the closure property w.r.t multiplication but it does not process the closure property w.r.t addition.	K/A	M
8.	Simplify the following (letters a,b,c etc. represent the real numbers) i. $(-91)^4$ ii. $a^4\times a^3\times a^8$ iii. $(a\times b)^{13}$	i. 91^4 ii. a^{15} iii. $a^{13}b^{13}$	K/A	M
9.	Simplify: $$\frac{a^9}{a^2}$$	a^7	K/A	E
10.	Simplify: $$\left(\frac{8a^2b}{3cd}\right)^{-2}$$	$$\frac{9c^2d^2}{64a^4b^2}$$	K/A	E
11.	Simplify: $5\sqrt{8}+8\sqrt{5}$	$3\sqrt{8}$	K/A	E
12.	Simplify the following: (indices are natural numbers) 1. $\frac{\sqrt[n]{q}}{\sqrt[m]{q}}$	$mn\sqrt{q^{m-n}}$	K/A	M
13.	Simplify:	$1\frac{1}{5}$	K/A	M

			K/A	
	i. $\sqrt{\dfrac{(216)^{\frac{2}{3}}(25)^{\frac{1}{2}}}{\left(\frac{1}{25}\right)^{\frac{-3}{2}}}}$			
14.	Rationalize the denominators of the following: i. If $\frac{1}{x} = 7 + 4\sqrt{3}$, find the value of $x^2 + \frac{1}{x^2}$ and $x^2 - \frac{1}{x^2}$	$194; -112\sqrt{3}$	K/A	E
15.	Find the logarithms of: i. 125 to base $5\sqrt{5}$	2	K/A	E
16.	Find the logarithms of the following numbers: i. 0.857	$\bar{1}.9330$	K/A	M
17.	Find the value of x if: Log x = $\bar{2}.7777$	0.05994	K/A	M
18.	Find the numbers of digits in: i. 4^{75}	46	K/A	M
19.	Separate polynomials and non-polynomial. In case of polynomial write the number of variable. i. $5xy^3$	Polynomial; 2	K/A	E
20.	Write the following algebraic expression in descending order w.r.t the given variables: i. $x^2 + x^3 - 2x - 1$ ii. $y^4 + \frac{4}{y^2} + \frac{9}{y^4} + 4y - \frac{12}{y^3} + 6$	i. x^3+x^2-2x-1 ii. $y^4+4y+6+\frac{4}{y^2} - \frac{12}{y^3} + \frac{9}{y^4}$	K/A	D
21.	Find the value of 3X-4Y-2Z when: X=$3x^3 - 7x^2 - 9x + 7$, Y=$12x^3 + 3x^2 - 13x + 1$, and Z= $6x^3 - 5x^2 - 6x + 4$	$51x^3-23x^2+37x+9$	K/A	D
22.	Find the product of the following: $(2 - x^3)(2 + x^3)(4 - x^6)(16 - x^{12})$	$256-x^{24}$	K/A	M
23.	Find the value of the following: i. $x^2 + \frac{1}{x^2}$ when $x + \frac{1}{x} = 3 + \sqrt{2}$	$9+6\sqrt{2}$	K/A	E
24.	Expand the following: i. $\left(\frac{1}{2}a - \frac{2}{3}b + \frac{3}{4}\right)^2$	$\frac{1}{4}a^2 + \frac{4}{9}b^2 + \frac{9}{16} - \frac{2}{3}ab - b$ $+\frac{3}{4}a$	K/A	E
25.	If a+b=4, prove that $a^3 + b^3 + 12ab = 64$	proof	K/A	E
26.	Prove the using formulae: $(a+2)(a-2)(a^2-2a+4)(a^2+2a+4)=a^6-64$	proof	K/A	E
27.	Factorize the following: i. $4a^4+625b^4$	$(2a^2 - 10ab + 25b^2)$ $(2a^2 + 10ab + 25b^2)$	K/A	M

28.	Factorize: i. ax^{12}+ay^{12}	$a(x^4 + y^4)(x^8 - x^4y^4 + y^8)$	K/A	M
29.	Find the H.C.F of the following polynomials by factor method: i. 2x^3-54, 2x^4+18x^2+162 ii. 9x^2+63x+108, 9x^2-45x-216 and 18x^2+ 45x-27	i. $2(x^2 + 3x + 9)$ ii. 9x+27	K/A	M
30.	First polynomial is x^2-5x+6, H.C.F and L.C.M are (x-3) and x^3-9x^2+26x-24, respectively.	x^2-7x+12	K/A	M
31.	What should be added to x^4+4x^3+10x^2+14x+7 to make it a perfect square?	-2x+2	K/A	M
32.	Find the additive inverse of each of the following matrices: i. $\begin{bmatrix} -6 & 8 \\ -7 & 12 \end{bmatrix}$ if X=$\begin{bmatrix} -6 & 8 \\ -7 & 12 \end{bmatrix}$, $Y = \begin{bmatrix} 12 & 13 \\ 14 & 15 \end{bmatrix}$, $Z = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $O = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ Then show that.	$\begin{bmatrix} 6 & -8 \\ 7 & -12 \end{bmatrix}$	K/A	D
33.	(X+Y)+Z=X+(Y+Z)=X+(Z+Y)	Proof	K/A	D
34.	Compute the product, if possible: i. $\begin{bmatrix} 6 & -5 \\ 7 & -4 \end{bmatrix}\begin{bmatrix} 5 & 2 \\ 0 & 1 \end{bmatrix}$	$\begin{bmatrix} 30 & 7 \\ 35 & 10 \end{bmatrix}$	K/A	E
35.	Find the value of x, if: i. A is a singular matrix where A =$\begin{bmatrix} 2 & 3 \\ x & 5 \end{bmatrix}$ ii. A=$\begin{bmatrix} 4 & 3 \\ 2 & x \end{bmatrix}$ and B=$\frac{1}{2}\begin{bmatrix} 2 & -3 \\ -2 & 4 \end{bmatrix}$ are multiplicative inverses of each other. iii. $\begin{bmatrix} x \\ x+5 \end{bmatrix} = \begin{bmatrix} 9 \\ 14 \end{bmatrix}$ iv. $[x \quad 5]\begin{bmatrix} 6 \\ x \end{bmatrix} = [132]$	i. 10/3 ii. 2 iii. 9 iv. 12	K/A	E
36.	If a point C lies between the points A and B, prove that: i. $m\overline{AB} > m\overline{AC}$ $m\overline{BC} > m\overline{AB}$	Proof	K/A	E
37.	In this figure, $\angle 1 \cong \angle 3$, $prove$ $that$: $\angle 2 \cong \angle 4$	Proof	K/A	M
38.	Is PQ ∥ CD? If i. $m\angle 3 = 70°$ and $m\angle 6 = 70°$ ii. $m\angle 4 = 100°$ and $m\angle 5 = 100°$ iii. $m\angle 1 = 110°$ and $m\angle 5 = 110°$ iv. $m\angle 4 = 120°$ and $m\angle 6 = 60°$	Proof	K/A	M

39.	Prove the opposite angles of a parallelogram are congruent. [hint: use cor.2]	Proof	K/A	M