RESOURCES FOR

"HSC-I BUSINESS

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:

1. **Extended Response Questions (ERQs)**

HOW TO ATTEMPT ERQs:

- 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.

SECTION C (LONG ANSWER QUESTIONS)

1. **WritesomeapplicationsofROBOT?**

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S.NO	ERQ	ANSWER	CL	DL
1	(a) Solve the following equations, using Cramer's Rules:3x + 2y = 54. 2x + 3y = 10 B) Solve the following equations: $\frac{3x+2}{2} + \frac{4x+5}{4} - \frac{3x-8}{8} = 16$	SIMILAR TO Q.7	K/A	M
2	Define partnership business. Also discuss merits and demerits of this type ofbusiness	PARTNERSHIP BUSINESS: A partnership is an arrangement between two or more people to oversee business operations and share its profits and liabilities. 1 Less formal with fewer legal obligations. ... 2 Easy to get started. ... 3 Sharing the burden. ... 4 Access to knowledge, skills, experience and contacts. ... 5 Better decision-making. ... 6 Privacy. ... 7 Ownership and control are combined. ... 8 More partners, more capital.	K/R	E
3	(a) Find the sum of annuity, if an amount of Rs. 500 is invested at the endof each half year for 5 years at 6% per annum compounded half yearly. (b) Distribute an amount of Rs. 6800 among three persons in the ratio of1:5:4. What is the share of each person?	SIMILAR TO Q4.	K/A	E

#	Question	Solution	K/A	M/E
4	**For the quadratic equations y = -5x² + 2x + 3 Determine: a) Which way does the parabola open? b) The vertex c) The roots of the equation.**	**(b)** *the vertex* $$y = -5x^2 + 2x + 3 \qquad a = -5, b = 2, c = 3$$ $$x = -\frac{b}{2a} \qquad y = \frac{-(b^2 - 4ac)}{4a}$$ $$= \frac{-2}{2(-5)} \qquad = \frac{-[(2)^2 - 4(-5)(3)]}{4(-5)}$$ $$= \frac{-2}{-10} \qquad y = \frac{-(4 + 60)}{-20}$$ $$x = \frac{1}{5} \qquad = \frac{64}{20}$$ $$y = \frac{16}{5}$$ **(c)** *the roots of the equation* $$y = -5x^2 + 2x + 3$$ $$a = -5, b = 2, c = 3$$ $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ $$= \frac{-2 \pm \sqrt{(2)^2 - 4(-5)(3)}}{2(-5)}$$ $$x = \frac{-2 \pm \sqrt{4 + 60}}{-10}$$ $$= \frac{-2 \pm \sqrt{64}}{-10}$$ $$x = \frac{-2 \pm 8}{-10}$$ $$x = \frac{-2 + 8}{-10} \qquad x = \frac{-2 - 8}{-10}$$ $$= \frac{6}{-10} \qquad = \frac{-10}{-10}$$ $$x = -\frac{3}{5} \qquad x = 1$$	**K/A**	**M**
4	**Find the sum and the present value of annuity, if an amount of Rs 500 is invested at the end of each half year for 5 years at 6% per annum compounded half yearly.**	Principal Amount $= R = $ Rs. 500 Rate of Interest $= r = 6\% = \frac{6}{100} = 0.06 = \frac{0.06}{2} = 0.03$ The Duration $= n = 5$ years $= 5 \times 2 = 10$ years Sum of Annuity $= A = ?$ Present value $= P = ?$ $$A = R\left[\frac{(1+r)^n - 1}{r}\right]$$ $$= 500\left[\frac{(1+0.03)^{10} - 1}{0.03}\right]$$ $$A = 500\left[\frac{(1.03)^{10} - 1}{0.03}\right]$$ $$= 500\left[\frac{1.343916 - 1}{0.03}\right]$$ $$A = 500\left[\frac{0.343916}{0.03}\right]$$ $$= 500 \times 11.46386667$$ $$A = 5731.933$$ $$P = R\left[\frac{(1+r)^n - 1}{r(1+r)^n}\right]$$ $$= 500\left[\frac{(1+0.03)^{10} - 1}{0.03(1+0.03)^{10}}\right]$$ $$P = 500\left[\frac{(1.03)^{10} - 1}{0.03(1.03)^{10}}\right]$$ $$= 500\left[\frac{1.34916 - 1}{0.03(1.34916)}\right]$$ $$P = 500\left[\frac{0.343916}{0.0404748}\right]$$ $$= \frac{500 \times 0.343916}{0.0404748}$$ $$P = \frac{171.958}{0.0404748} = 4248.52$$	**K/A**	**E**

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5	$A=\begin{bmatrix}0&1\\2&3\end{bmatrix}, B=\begin{bmatrix}2&4\\5&6\end{bmatrix}$ and $C=\begin{bmatrix}6&7\\5&8\end{bmatrix}$ Prove that $A \times (B+C) = A \times B + A \times C$	$B + C = \begin{bmatrix}2&4\\5&6\end{bmatrix} + \begin{bmatrix}6&7\\5&8\end{bmatrix}$ $= \begin{bmatrix}2+6&4+7\\5+5&6+8\end{bmatrix}$ $B + C = \begin{bmatrix}8&11\\10&14\end{bmatrix}$ $A \times (B+C) = \begin{bmatrix}0&1\\2&3\end{bmatrix}\begin{bmatrix}8&11\\10&14\end{bmatrix}$ $= \begin{bmatrix}(0\times8)+(1\times10)&(0\times11)+(1\times14)\\(2\times8)+(3\times10)&(2\times11)+(3\times14)\end{bmatrix}$ $A \times (B+C) = \begin{bmatrix}0+10&0+14\\16+30&22+42\end{bmatrix}$ $= \begin{bmatrix}10&14\\46&64\end{bmatrix}$ ....(1) **A × B + A × C** $A \times B = \begin{bmatrix}0&1\\2&3\end{bmatrix}\begin{bmatrix}2&4\\5&6\end{bmatrix}$ $= \begin{bmatrix}(0\times2)+(1\times5)&(0\times4)+(1\times6)\\(2\times2)+(3\times5)&(2\times4)+(3\times6)\end{bmatrix}$ $A \times B = \begin{bmatrix}0+5&0+6\\4+15&8+18\end{bmatrix}$ $= \begin{bmatrix}5&6\\19&26\end{bmatrix}$ $A \times C = \begin{bmatrix}0&1\\2&3\end{bmatrix}\begin{bmatrix}6&7\\5&8\end{bmatrix}$ $= \begin{bmatrix}(0\times6)+(1\times5)&(0\times7)+(1\times8)\\(2\times6)+(3\times5)&(2\times7)+(3\times8)\end{bmatrix}$ $A \times C = \begin{bmatrix}0+5&0+8\\12+15&14+24\end{bmatrix}$ $= \begin{bmatrix}5&8\\27&38\end{bmatrix}$ $(A\times B)+(A\times C) = \begin{bmatrix}5&6\\19&26\end{bmatrix} + \begin{bmatrix}5&8\\27&38\end{bmatrix}$ $= \begin{bmatrix}5+5&6+8\\19+27&26+38\end{bmatrix}$ $(A\times B)+(A\times C) = \begin{bmatrix}10&14\\46&64\end{bmatrix}$ ....(1) Hence proved: $A*(B+C) = A*B+A*C$	K/A	D
6	**If an amount of Rs 6000 is invested at the end of each quarter for 5 year at 6% per annum compounded quarterly, find the sum of annuity and its present value**	SIMILAR TO Q.4	K/A	E
7	Solve the following equations using Cramer's Rule $2x - 3y = 5$ $4x - 5y = 11$	Let $D = \begin{bmatrix}2&-3\\4&-5\end{bmatrix}$, $D_x = \begin{bmatrix}5&-3\\11&-5\end{bmatrix}$ and $D_y = \begin{bmatrix}2&5\\4&11\end{bmatrix}$ $\because \quad |D| = \begin{vmatrix}2&-3\\4&-5\end{vmatrix}$ $= [(2\times-5)-(-3\times4)]$ $= -10+12$ $\Rightarrow \quad |D| = 2$ $\because \quad |D_x| = \begin{vmatrix}5&-3\\11&-5\end{vmatrix}$ $= [(5\times-5)-(-3\times11)]$ $= -25+33$ $\Rightarrow x=|D_x| = 8/2 = 4$ $\because \quad |D_y| = \begin{vmatrix}2&5\\4&11\end{vmatrix}$ $= [(2\times11)-(5\times4)]$ $= 22-20$ $\Rightarrow y=|D_y| = 2/2=1$	K/A	D