Suez Canal University
Faculty of Computers & Informatics
First Semester; First Level
Date: 12 -1-2023; Time: 2- Hours

Final Examination 2022-2023

Module (B) **Discrete Mathematics BSD- 103** Module (B)

قبل الشروع في الحل تأكد أن الإمتحان يقع في ثلاث ورقات مرقمة من 1 الى 6

Choose the correct answer for the following statements:

[1] If a matrix of a relation is $M_R = \begin{bmatrix}1&0&1\\0&1&1\\0&0&1\end{bmatrix}$, then $\overline{M_R}$ is..

(a) $\begin{bmatrix}0&1&0\\1&0&0\\1&1&0\end{bmatrix}$; (b) $\begin{bmatrix}0&1&0\\1&0&0\\1&1&0\end{bmatrix}$; (c) $\begin{bmatrix}1&0&0\\0&1&0\\1&1&1\end{bmatrix}$; (d) $\begin{bmatrix}1&0&1\\0&1&1\\0&0&1\end{bmatrix}$

[2] The set of solution of the equation:
$\left\lceil\frac{1}{2}\right\rceil x^2 + \left\lfloor -\frac{1}{2}\right\rfloor x - (-26 \; mod \; 7) = 0$ is... $\left\{\begin{matrix}(a)\ \{-1,2\}; & (b)\ \{1,-2\} \\ (c)\ \{1,2\}; & (d)\ \{-1,-2\}\end{matrix}\right\}$

[3] $P \to Q \equiv \cdots$ $\{(a)\ Q \to P;\ (b)\ \bar{Q} \to P;\ (c)\ P \to \bar{Q};\ (d)\ \bar{Q} \to \bar{P}\}$

[4] The relation R is called *reflexive* closure if $R_1 =$ $\{(a)\ R\cup\Delta\ \ (b)\ R^{\infty};\ (c)\ R\cup R^{-1}\}$

[5] For any two non-empty sets A and B, if $B \subset A$, then $B \equiv \cdots$ $\left\{\begin{matrix}(a)\ \bar{A}; & (b)\ A \\ (c)\ A\cap B; & (d)\ A\cup B\end{matrix}\right\}$

[6] $(P \vee Q) \wedge \bar{P} \equiv \cdots$ $\{(a)\ \bar{P} \wedge Q;\ (b)\ \bar{Q} \wedge \bar{P};\ (c)\ P \vee \bar{Q};\ (d)\ \bar{Q} \vee \bar{P}\}$

[7] If n is odd, then we have $\left\lceil\frac{n^2}{4}\right\rceil = \cdots$ $\{$(a) $\frac{n^2+3}{2}$; (b) $\frac{n^2-3}{4}$; (c) $\frac{n^2+4}{3}$; (d) $\frac{n^2+3}{4}$ $\}$

[8] $\neg[\forall x, \bar{P}(x)] \equiv \cdots$. $\{(a)\ \exists x, \bar{P}(x);$ (b) $\exists x, P(x);$ (c) $\forall x, P(x)\}$

[9] $(p \vee q) \wedge \bar{p} \equiv \cdots$ $\{(a)\ p \vee \bar{q};\ (b)\ \bar{p} \wedge q;\ (c) F;\ (d) T\}$

[10] If $R_1 = \{(1,x),(2,x),(1,y),(2,y),(3,x)\}$, $R_2 = \{(x,a),(x,b),(y,a),(y,c)\}$, then $R_2{}^\circ R_1 =$

(a) $\begin{bmatrix}1&1&1\\1&1&1\\1&1&1\end{bmatrix}$; (b) $\begin{bmatrix}0&1&0\\1&0&0\\1&1&0\end{bmatrix}$; (c) $\begin{bmatrix}1&1&1\\1&1&1\\1&1&0\end{bmatrix}$; (d) $\begin{bmatrix}1&1&1\\1&0&1\\1&0&1\end{bmatrix}$

[11] If P is false and Q is true propositions, then $P \to Q \equiv$ $\{(a) T;\ (b)\ F;\ (c)\ P;\ (d)\ Q\}$

[12] $\lceil x\rceil - \lfloor x\rfloor = 0$ if $x \in$ $\{(a)\ \mathbb{C};\ (b) \mathcal{R};\ (c)\ \mathbb{Q};\ (d)\ z\}$

[13] $(T \wedge q) \vee (T \wedge r) \equiv$ $\{(a)\ T\ \ (b) F\ \ (c)\ q \vee r\ \ (d)\ q \wedge r\}$

[14] For $X = \{2,3,4\}$, $Y = \{3,4,5,6\}$, the relation $R: X \to Y$ defined by $x + y \le 2$ is $\{(a)\{(4,5)\};\ (b) Y;\ (c) X;\ (d)\ \emptyset\}$

[15] If $(x,y) \in R$, then $(y,x) \in \cdots$ $\{(a) R;\ (b)\ \bar{R};\ (c)\ D_R;\ (d) R^{-1}\}$

[16] The length of the path: a-b-a-c equals: $\{(a) 4;\ (b) 6;\ (c)\ 3;\ (d) 5\}$

[17] $(p \wedge q) \vee (p \wedge \bar{q}) \vee (\bar{p} \wedge \bar{q}) \equiv$ $\{(a)\ \bar{p} \vee q;\ (b) P;\ (c)\ p \vee \bar{q};\ (d)\ q\}$

[18]	$\sum_{k=1}^{n} k = \cdots$	$\{(a)\ \frac{n}{2}\ ; (b)\ \frac{n^2}{2}\ ; (c)\ n^2+n\ ; (d)\ \frac{n^2+n}{2}\}$
[19]	A binary tree with 9 −vertices has exactly … edges	$\{(a)\ 7;\ (b)\ 8;\ (c)\ 5;\ (d)\ 6\}$
[20]	The series $(0.3 + 0.03 + 0.003 + 0.0003 + \cdots)$ is	{(a) Convergent; (b)divergent}
[21]	$\sum_{k=1}^{2n}\left(\frac{1}{2}\right) = \cdots$	$\{(a) 2n;\ (b)\ 4n;\ (c)\ \frac{n}{2};\ (d)\ n\}$
[22]	A relation R is *transitive* if	$\{(a) \forall\ xRy, yRz \rightarrow xRz;\ (b)\ xRx;\ \ (c) \forall\ xRy \rightarrow yRx\}$
[23]	If p is true proposition, and q is false, then $p \oplus q$ is ...	$\{(a)\ F\ (b) T\ (c)\ q\}$
[24]	A number being divisible by 2, then it should be even. This represents ….. condition.	{(a) sufficient; (b)necessary}}
[25]	$(p \wedge \bar{p}) \rightarrow T \equiv \cdots$	$\{(a)\bar{p};\ (b)\ p; (c) F;\ (d) T\}$
[26]	If x mod $y = r$, then y divides….	$\{(a) r;\ \ (b)\ y - r\ \ (c) - r + x;\ (d)\ x\}$
[27]	The relation which is defined by: " *is divisible by*" is … on z^*. 8 3 -1	{(a) Reflexive (b) transititve (c) Symmetric; (d)Reflexive and transitive}
[28]	The quantity $h(137) + (-12\ mod\ 5) - \lceil -1 \rceil$ equals	{ (a) 8 ; (b) 6 ; (c) 7 (d) 9 }
[29]	In case of 4 input of a given gate, then the number of possible input combination.	$\{(a)\ 16;\ (b)\ 4;\ (c)\ 64;\ (d)\ 8\}$
[30]	The relation is said to be equivalence if it is ….	{(a) Reflexive (b) transititve (c) Symmetric; (d)Alll of them}
[31]	If a, b, c are lengths of a triangle such that $p: a^2 + b^2 = c^2$ and q: *the* triangle is right, then….	$\{(a)$ only $p \rightarrow q;$ (b) only $q \rightarrow p;$ $(c)\ p \leftrightarrow q\}$
[32]	A relation R is *symmetric* if $\forall(x, y) \in R$, then	$\{(a) \forall\ xRy, yRz \rightarrow xRz;\ (b)\ xRx;\ \ (c) \forall\ xRy \rightarrow yRx\}$
[33]	$A \cup B = \cdots$	{(a) $\{x: (x \in A) \vee (x \in B)\}$; (b) $\{x: (x \in A) \wedge (x \in B)\}$; (c) $\{x: (x \notin A) \vee (x \notin B)\}$}
[34]	If $S_n = \{5k \mid k = 1, 2\}$, then $\bigcup_{n=2}^{10} S_n = \cdots$	{(a) $\{5, 20\}$; (b) $\{5, 10, 25\}$; (c) $\{5, 10\}$}
[35]	The general term of the sequence: 5, 0.5, 0.05, … is …., $n \geq 0$	{ (a) $\left(\frac{0.5}{10^n}\right)$; (b) $\left(\frac{5}{10^{n-1}}\right)$; (c) $\left(\frac{5}{10^n}\right)$; (d) $\left(\frac{5}{10^{n+1}}\right)$ }
[36]	If $f(x) = x + 1$, then $\lim_{n\rightarrow 1} \sum_{k=1}^{n} f(n)$ equals ……	{ (a) 1/2 ; (b) 3/2 ; (c) 2 }
[37]	$j! = \cdots,\quad j \in z^+$	$\left\{(a) \prod_{k=1}^{j} k\ ;\ (b) \sum_{k=1}^{j} k\ ; (c) \sum_{k=0}^{j} k\ ; (d) \prod_{k=0}^{j} k\right\}$
[38]	The relation "less than" on a set $\{1, 2, 3, 4\}$	{(a) Reflexive; (b) transititve (c) Symmetric; (d) All of them}

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[39]	If $f(x) = 2\lceil x\rceil$, then $7\ mod\ 5 - 0.5\, f(-0.5)$ equals	$\{(a)2;\ (b)1.5;\ (c)3;(d)\ 2.5\}$
[40]	If the inverse of the function $f(x) = 2^x$ form a relation R on the set $\{1, 2, 4, 8\}$, then R equals..	{(a) $\{(1,2),(2,4),(4,16),(8,256)\}$; (b) $\{(1,0),(2,1),(4,2),(8,3)\}$; (c) $\{(1,1),(2,2),(4,4),(8,8)\}$ }
[41]	The standard form of the odd integer is	$\{(a)\ n;(b)\ n^2;\ (c)\ 2n+1;(d)\ n+1\}$
[42]	$\forall x,y,z \in z^+$, if $P(x,y,z): x + zy + 2yz$, then $p(x^2, x, x) \equiv$	$\{(a)\ x^3;\ (b)\ 4x^2;\ (c)x;\ (d)\ 3x^2\}$
[43]	If $\lceil 1 + x\rceil = \lfloor 2.5x\rfloor$, then $x = \cdots$	$\{(a)\ 1;\ (b)\ 0;\ (c)3/4\ \ (d)1/2\}$
[44]	If $a_n = 2^n$, then $\sum_{n=2}^{4} a_n = \cdots$	{(a) 28 ; (b) 6 ; (c) 60 ; (d) 12}
[45]	$\sum_{k=1}^{k=n} a_k\, a_{k+n-1} = \cdots$	{(a) $\sum_{k=0}^{n-1} a_{k-1}\, a_{n+k}$; (b) $\sum_{k=0}^{n-1} a_{k-1}\, a_{n-k}$ (c) $\sum_{k=0}^{n-1} a_{k+1}\, a_{k+n}$}
[46]	$\bigcap_{n=1}^{N} A_n = \cdots$	$\left\{\begin{array}{l}(a)\ \{x \mid \exists n, x \notin A_n\}\\(b)\ \{x \mid \exists n, x \in A_n\}\\(c)\ \{x \mid \forall n, x \in A_n\}\\(d)\ \{x \mid \forall n, x \notin A_n\}\end{array}\right\}$
[47]	If $f(x) = \lceil x + 1\rceil$, then 12 mod 4 $- 0.5\, f(-1.5) =$	$\{(a)-1;(b)-1/2;(c)3;(d)0\}$
[48]	The sequence $\left\{\frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \ldots\right\}$ is....	$\{(a)$increasing (b) decreasing $\}$
[49]	$(12\ mod\ 5) + h(15) - 3\lfloor -4.7\rfloor + 2\lceil 0.3\rceil = \cdots$	$\{(a)\ 20\ \ (b)\ 21\ \ (c)\ 23\ \ (d)\ 32$
[50]	If $f(x) = x^2$, then $\mathrm{Lim}_{n\to k} \sum_{k=1}^{n} f\left(\frac{k}{n}\right) = \cdots$.	{(a) 1; (b) 2 ; (c) k ; (d) n}

[51] ✷ In terms of unit step function, $f(t) = \left\{\begin{array}{ll} t^2+7 & 0 \le t < 1\\ t^2 & 1 \le t < 3\\ 7 & t \ge 3\end{array}\right\}$ is equivalent to

(a) $f(t) = t^3u(t) + 7\,u(t) - 7\,u(t-1) - t^2\,u(t-3) + 7u(t-3)$

(b) $f(t) = -t^2u(t) - 7\,u(t) - 7\,u(t-1) - t^2\,u(t-3) - 7u(t-3)$

(c) $f(t) = t^2u(t) + 7\,u(t) - 7\,u(t-1) - t^2\,u(t-3) + 7u(t-3)$

[52] ✷ In terms of unit step function, $f(t) = \left\{\begin{array}{ll} 3 & 0 < t \le 2\\ t & 2 < t \le 3\\ -t & 3 < t \le 5\end{array}\right.$ is equivalent to

(a) $f(t) = (3 + t)u(t-2) + 2tu(t-3) + u(t-5) + 3$

(b) $f(t) = (-3 + t)u(t-2) - 2tu(t-3) + u(t-5) + 3$

(c) $f(t) = (-3 + t)u(t-2) - 2tu(t-3) - u(t-5) + 3$

[53]	$\lceil -1.5\rceil = 4 + \cdots$	{ $(a)\ \lfloor -1.5\rfloor$, $(b)\ \lceil -3.2\rceil$, $(c)\ \lfloor -5.2\rfloor$; (d) $\lceil -5.2\rceil$ }

[54] Taylor series expansion for the function $\sin x$ is...

(a) $1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$ (b) $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots$

(c) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots$ (d) $x^2 - \frac{x^4}{4!} + \frac{x^6}{6!} - \cdots$

[55] If n is an even positive integer, then $n^2 + 2(3n + 1)$ is .... {(a) odd ; (b) not even not odd ; (c) even }

[56] If $a_n = n^2$, then $\prod_{n=3}^{5} a_n$ {(a) 50 ; (b) 3600 ; (c) 3600 ; (d) 60}

[57] The solution of the recurrence relation $a_n = a_{n-1} + 1$ with the initial condition $a_0 = 2$ is.... {(a) $n-2$;(b) n; (c) $n+2$; (d) $2n$ }

[58] The quantity $h(137) + 12 \; mod \; 5 - \lceil -1 \rceil + \lceil -0.5 \rceil$equals {(a) 6 ; (b) 8 ; (c) 7 (d) 4}

[59] $\sum_{k=2}^{n} a_{n+k} =$.... {(a) $\sum_{k=0}^{n-2} a_{n+k+2}$; (b) $\sum_{k=0}^{n} a_{n+k+2}$;; (c) $\sum_{k=0}^{n-1} a_{n+k+2}$ }

[60] A tree with3 −edges has exactly .... vertices. {(a) 3 ; (b) 1 ; (c) 3; (d) 4}

[61] If the matrix of a relation R is : $\begin{array}{c} \\ 1 \\ 2 \end{array}\begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix} \end{array}$ then R^{-1} is....

(a) $\begin{array}{c} \\ 1 \\ 2 \end{array}\begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix} \end{array}$ (b) $\begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array}\begin{array}{c} \begin{array}{cc} 1 & 2 \end{array} \\ \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \\ 0 & 1 \end{bmatrix} \end{array}$

[62] $2 \times \lceil 1.2 \rceil = \cdots$ {(a) $\lceil 2 \rceil$; (b) $\lceil 4 \rceil$; (c) $\lfloor 2.4 \rfloor$; (d) $\lfloor 1 \rfloor$ }

[63] If $\lceil 2x + 1 \rceil = \lfloor 2x + 1 \rfloor$, then $2x + 1$ should be ... {(a)rational (b) integer (c) irrational }

[64] If $R_1 = R \cup R^{-1}$, then R_1 .... closure. {(a) symmetric; (b) transitive; (c) reflexive}

[65] The digit number of the following bar code is..... {(a) 4 ; (b) 5 ; (c) 7; (d) 6 }

[66] The symmetric closure of $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$ is

(a) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$; (b) $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$; (c) $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 1 & 0 \\ 0 & 1 & 0 \end{bmatrix}$; (d) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$

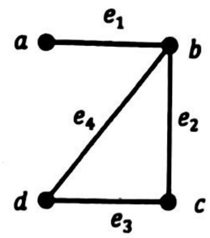
[67] The reflexive closure of $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$ is

(a) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$; (b) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$; (c) $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 1 & 0 \\ 0 & 1 & 0 \end{bmatrix}$; (d) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$

[68] If a matrix of a relation is $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$, then $\overline{M_R}$ is..

(a) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$; (b) $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 0 \end{bmatrix}$; (c) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$; (d) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

* For the diagraph



[69] The adjacency matrix is:

(a)
$$\begin{array}{cc} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

(b)
$$\begin{array}{cc} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

(c)
$$\begin{array}{cc} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

[70] The incident matrix is:

(a)
$$\begin{array}{cc} & \begin{matrix} e_1 & e_2 & e_3 & e_4 \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \end{array}$$

(b)
$$\begin{array}{cc} & \begin{matrix} e_1 & e_2 & e_3 & e_4 \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix} \end{array}$$

(c)
$$\begin{array}{cc} & \begin{matrix} e_1 & e_2 & e_3 & e_4 \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix} \end{array}$$

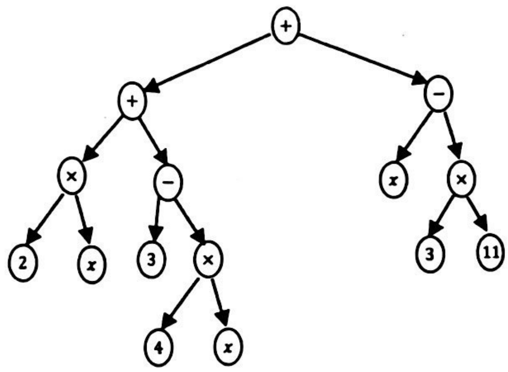
[71] The Laplacian matrix is:

(a)
$$\begin{array}{cc} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 1 & -1 & -1 & 0 \\ -1 & 3 & -1 & -1 \\ -1 & -1 & 2 & -1 \\ 0 & -1 & -1 & 3 \end{bmatrix} \end{array}$$

(b)
$$\begin{array}{cc} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 1 & -1 & 0 & 0 \\ -1 & 3 & -1 & -1 \\ -1 & -1 & 2 & -1 \\ 0 & -1 & -1 & 2 \end{bmatrix} \end{array}$$

(c)
$$\begin{array}{cc} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 1 & -1 & 0 & 0 \\ -1 & 3 & -1 & -1 \\ 0 & -1 & 2 & -1 \\ 0 & -1 & -1 & 2 \end{bmatrix} \end{array}$$

* The mathematical expression representing the following tree is



[72]

(a) $\big((2 \times x) + (3 - (4 \times x))\big) + (x - (3 \times 11))$

(b) $\big((2 \times x) + (3 - (4 \times x))\big) - (x - (3 \times 11))$

(c) $\big((2 \times x) \times (3 - (4 \times x))\big) + (x - (3 \times 11))$

[73] The height of the previous tree equals … {(a) 2; (b) 5; (c) 3; (d) 4 }

[74] The number of edges in the previous tree equals… {(a) 12; (b)15; (c) 13; (d) 14 }

	✸ If $A = \{a,b,c,d\}$, $R: A \to A$ and $R = \{(a,b),(b,c),(a,c),(c,d)\}$,	
[75]	The reflexive closure of R is ….	(a) $\{(a,b),(b,a),(b,c),(c,b),(a,c),(c,a),(c,d),(d,c)\}$ (b) R^∞ (c) $\{(a,b),(a,a),(b,c),(b,b),(a,c),(c,c),(c,d),(d,d)\}$ (d) $A \times A$
[76]	The symmetric closure of R is ….	(a) $\{(a,b),(b,a),(b,c),(c,b),(a,c),(c,a),(c,d),(d,c)\}$ (b) R^∞ (c) $\{(a,b),(a,a),(b,c),(b,b),(a,c),(c,c),(c,d),(d,d)\}$ (d) $A \times A$
[77]	The transitive closure of R is ….	(a) $\{(a,b),(b,a),(b,c),(c,b),(a,c),(c,a),(c,d),(d,c)\}$ (b) R^∞ (c) $\{(a,b),(a,a),(b,c),(b,b),(a,c),(c,c),(c,d),(d,d)\}$ (d) $A \times A$
[78]	$\overline{A \cap B} = \cdots$	{(a) $\{x \mid x \in \bar{A} \cap \bar{B}\}$; (b) $\{x \mid x \in \bar{A} \cup \bar{B}\}$; (c) $\{x \mid x \in A \cap B\}$}
[79]	If $d = \max(d_1, d_2)$, then	{(a) $(d_1 < d) \wedge (d_2 < d)$; (b) $(d_1 < d) \vee (d_2 < d)$; (c) $(d_1 > d) \wedge (d_2 > d)$;
[80]	$3\lceil 1.8 \rceil + 2\lfloor -1.1 \rfloor = \cdots$	{ (a) 2 ; (b) 10 ; (c) 1/2 ; (d) 1}

With our best wishes

Ass. Prof. Y.M.Hamada

Dr/ M.G. Brika