(4) **Code No. : B-273(B)**

Solve the following difference equation by using generating function method :

given that .

(y) ây÷ §ýlâk¥ â§ý ytÑ §ý¥§ý¡ wuw §ýl §ÿàâ¹þ£ý§ý

 ZÀâmvàµ §ýl §ÿàâ¹þ§ý rÊàrÊ Ñàµ nÑèñ

Prove that the order of an element a of group

is the same as the order of .

Unit-V

ZàÎÅà–5. (¡) rÀ̃u rÃk³âå½åm tÞ §ý̂âv¥ây÷ §ýlâk¥ â§ý
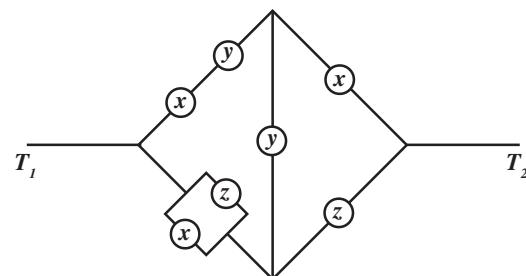
uâÀ ¡àÈ §ÿwv uâÀ .

In a Boolean algebra B, Prove that if and only if where .

(r) âÅàÈÅàâvàhm Åývlå §ÿàçâwuàÄkÅàâu ZàyàtàÅu Ûýq tÞ qáÈwâmên §ýlâk¥ß

Find the disjunctive normal form of the following function :

(y) âÅàÈÅà qáÈqn §ÿà yÈvâ§ýÈ½à §ýlâk¥ß

Simplify the following circuit :

---X---

Code No. : B-273(B)

Annual Examination - 2017

B.Sc.-III

MATHEMATICS

Paper-III

DISCRETE MATHEMATICS

Max.Marks : 50

Time : 3 Hrs.   **Min.Marks : 17**

¹àq ß Zà³u§ý ¢§ÿà¢êyçÀàçsâ³à ZàÎÅà Ñ́v §ýlâk¥ ñ ysâ ZàÎÅàâÞ§ý ¡ §ý ytâÅà Ñèñ

Note : Attempt two parts from each unit. All questions carry equal marks.

Unit-I

ZàÎÅà–1. (¡) ³àå½åmâu ¡ â³àtÅà yçâÀhà¢¥ â§ý $n! \geq 2^n$ kÑàÝ

Prove by mathematical induction that for

(r) sàxà §ý âv¥ Íuà§ýÊ½à §ýl yÊjÅàà §ýlâk¥ ñ

Construct grammar for the language .

(y) ¥§ý i ¹Ñàà §ý i ¹Ñàç§ýl Zààâu§ýmà ÀấÊã i ¹Ñàà §ý i ¹Ñàç§ýl Zààâu§ýmà §ýà wªàèÑèñ â§ÿmâäqÑvâ i ¹Ñàà §ý Zààm§ÿv y̧uâçàâÀâ½àm ÀấÊã i ¹Ñàà §ý Zààm§ÿv y̧uâçàâÀâ½àm §ýà i ¹Ñàà §ý Zààm§ÿv y̧uâçàâÀâ½àm §ýà i Àà Ñç Zà³u§ý §ýl Zààâu§ýmà Òàâm §ýlâk¥ ñ

The chance of one event happening is the square of the chance of a second event happening, but the odds against the first are the cube of the odds against the second. Find the chance of each event.

P.T.O.

Unit-II

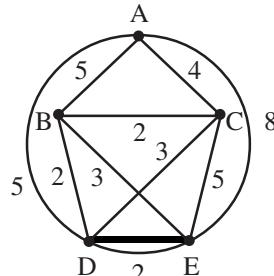प्रश्न–2. (¡) yÌrÅo §ÿä ¥§ý ¥y_à £AäÑÊ½ä Aäâk¥ kàçÐwmä]u ÑàçqÊÅmäytâtm ¡äÊ y§ÿt§ý Åà Ñàçñ

Give an example of a relation which is reflexive but neither symmetric nor transitive.
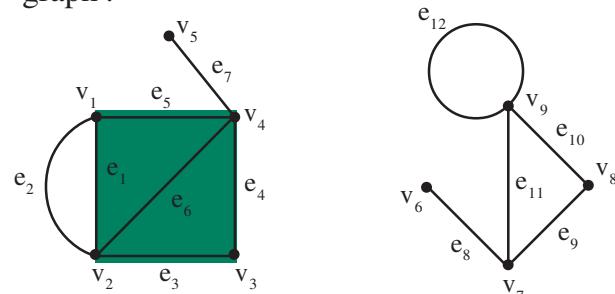
(र) âÅäÎAäâ§ým ¡àv(h §ý âv¥ ¥§ý Åu âÅämt Ñät Ì¹âàÅuÅà qá£qn Ôäàm §ÿÌâk¥ñ

Find a minimum Hamiltonian circuit for the following graph.

Unit-III

प्रश्न–3. (¡) âÅäÎAäâvâhm yÞuä¾t§ý ÄÿvÅà §ý âv¥ kÅà§ý ÄÿvÅà Ôäàm §ÿÌâk¥ :

Find the generating function of the following numeric function :

$$A(z) = \frac{1}{5 - 6z + z^2}$$

(य) âÅäÎAäâvâhm ¡ yÌr÷ ªäÄÿ §ÿÌ kâàm ¥wÎ Ìâ§åumà Ôäàm §ÿÌâk¥ ñ

Find the rank and nullity of the following disconnected graph :

(र) tâÅàvàç ¡ äÊ yÞuä¾t§ý ÄÿvÅà ¢y Zä§ÿâÊ Ñèâ§ý âÀuà ªàuà Ñèâ§ý :

Let a, b, c be numeric functions such that ,

Given that :

$$mnà \text{ (and)} \qquad c_r = \begin{cases} 1 & , \ r = 0 \\ 0 & , \ r \geq 1 \end{cases}$$

b §ÿä âÅäoâÊ½ä §ÿÌâk¥ ñ (Determine b.)

(य) uÞÞÅà §ÿàçÅuâàmtä§ÿm §ÿÌâk¥ âky§ÿÌ ¡ wÐnà yâÊ½ää tÞ ÅâäjçÀâ ªàçè Ñèñ

Minimize the machine whose state table is given below:

$$a_{r+2} = 4a_{r+1} - 4a_{r} = 2, r \geq 0$$

$$a_r = \begin{cases} 2 & , \ r = 1 \\ 0 & , \ r \geq 2 \end{cases}$$

¡ wÐnà (State)	âÅàwÞâ (Input)		âÅà²àt (Output)
	0	1	
S_0	S_3	S_6	1
S_1	S_4	S_2	0
S_2	S_4	S_1	0
S_3	S_2	S_0	1
S_4	S_5	S_0	1
S_5	S_3	S_5	0
S_6	S_4	S_2	1

Unit-IV

प्रश्न–4. (¡) ¡ hÊ ytä§ÿÊ½ä §ÿàçÑv §ÿÌâk¥ ñ

Solve the difference equation .

(र) kÅà§ÿ ÄÿvÅà âwâo yçâÅäÎAäâvâhm ¡ hÊ ytä§ÿÊ½ä §ÿä Ñv Ôäàm §ÿÌâk¥ âÀuà Ñè ß