ZàÎÀà-2. ¡àÍuÑ âwâo y¡ Ñv §ýLâk¥ (Solve by matrix method) ß

$$x-2y+z-t+1=0$$
$$3x-2z-3t+4=0$$
$$5x-4y+t+3=0$$

OR

Ñv §ýLâk¥ (Solve) ß

ZàÎÀà-3. yÑyt°ju §ýà qáÊsàâxm §ýLâk¥ mnà ây÷ §ýLâk¥ â§ý Àà Àà¥ (rà¥) yÑyt°ju uà mà âwyiãu Ñàm Ñ uà ywyt ñ

Define coset and prove that two right (left) cosets are either disjoint or identical.

OR

¨uà âÀ¥ Ñ¥ âõjÊ yâ§ýuà §ý yàqÕà ¥§ý ytÑ Ñ?

Is $G=\{a, b, c, d\}$ a group with respect to defined binary operation $*$ -

	a	b	c	d
a	b	d	a	c
b	d	c	b	a
c	a	b	c	d
d	c	a	d	b

ZàÎÀà-4. ây÷ §ýLâk¥ â§ý â§ýyã ytÑà §ý yt°ju t¡ mÌu§ýàÊmà §ýà yrro mÌumà yrro Ñàmà Ñ ñ

Show that the relation of isomorphism in the set of groups is an equivalent relation.

OR

¨uà ¥§ý wvu Ñ uâÀ

Is $(I,*,0)$ a ring if - $a*b=a+b-1$

$a\,o\,b=a+b-ab, \quad a,b\in I$

ZàÎÀà-5. §ýà âwÐmàÊ §ýLâk¥ ñ (Expand .)

OR

§ýà Ñv §ýLâk¥ ñ (Solve .)

----x----

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Annual Examination - 2017

B.Sc.-I

MATHEMATICS

Paper - I

ALGEBRA AND TRIGONOMETRY

Max.Marks : 50

Time : 3 Hrs. Min Marks : 17

¹ãq ß h½»¡'¡' t¡ Ày ¡âmvi¡ÙàÊã ZàÎÀà Ñ¡, âkÁÑ¡ Ñv §ýÊÁàà ¡âÁàwàu¡ Ñ¡ ñ h½»¡'r' t¡ vi¡ÙàÊã ZàÎÀà mnà h½»¡'y' t¡ Àãi¡ £ÙàÊãu ZàÎÀà Ñ¡ ñ h½»¡'¡' §ýà yry¡ qÑv¡ Ñv §ýÊ¡ ñ

Note : Section 'A' is objective type, containing 10 questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

h½»¡-'¡'(Section-'A')

âÁàÈÁàà¡â§ým ¡âm vi¡£ÙàÊãu ZàÎÀàà¡ §ýý £ÙàÊ ÀãâÁk¥ ñ (Answer the following very short-answer-type questions.) (1x10=10)

ZàÎÀà-1. ây÷ §ýLâk¥ â§ý â§ýyã ytÑà §ý yt°ju t¡ mÌu§ýàÊmà §ýà yrro mÌumà yrro Ñàmà Ñ ñ

Show that the relation of isomorphism in the set of groups is an equivalent relation.

OR

¨uà ¥§ý wvu Ñ uâÀ

Is $(I,*,0)$ a ring if - $a*b=a+b-1$

$a\,o\,b=a+b-ab, \quad a,b\in I$

ZàÎÀà-2. À§ýàm¡ âwâo y¡ âÁàÈÁàâvâhm ytâ§ýÊ½à §ý tvà¡ §ýà ZàÁàÊ rmà¢¥ ñ

By Descarte's method, find the types of roots of given equation.

$$x^9-x^5+x^4+x^2+1=0$$

ZàÎÀà-3. Ñv §ýLâk¥ (Solve) ß

ZàÎÀà-4. â§ýyã ¡àÍuÑ §ý ¥ÎàvàÁà Úq §ýL qÑjàÁà rmà¢¥ ñ

What is the identification of Echelon form of any matrix.

ZàÎÀà-5. â§ýyã j§ýLu ytÑ §ý §ýt y¡ §ýt â§ýmÁà¡ kÁà§ý Ñàm¡ Ñ?

How many minimum generators are there in any cyclic group?

ZàÎÀà-6. â§ýyã ytÑ §ýý ¡wuw §ýL §ýàà¹¡ §ýà qáÊsàâxm §ýLâk¥ ñ

Define order of an element of a group.

ZàÎÀà-7. Íu¼§ýt âÁà§ýàâv¥ (Find inverse of) ß

(5 3 2 4)

ZàÎÀà-8. ytà§ýàÊmà §ý Zànt Zàtu §ýà §ýnÁà âvâh¥ ñ

Write the statement of first theorem of homomorphism.

ZàÎÂà-9. tàÂà rmà¢¥ (Evaluate)ß

ZàÎÂà-10. tàÂà rmà¢¥ (Evaluate) ß

h½»¦-'r'(Section-'B')

âÂàÈÂààâ§ým vi¦ £ÙàÊãu ZàÎÂàà¡ §ý £ÙàÊ ÀãâK¥ ñ (Answer the following short-answer type questions) (3x5=15)

ZàÎÂà-1. §ýL Êâh§ý Ðwm¦Øàmà §ýL kà¡j §ýLâK¥ ñ

Test the linear dependency of vectors

$(2, -1, 3, 2)$, $(1, 3, 4, 2)$, $(3, -5, 2, 2)$.

OR

âÀhà¢¥ â§ý A^{-1} §ý ¡à¢ªàÂà tàÂà §ý ¡à¢ªàÂà tàÂàà¡ §ý Íu¾§ýt Ñàm¡ Ñ¦ ñ

Show that eigen values of are inverse of eigen values of .

ZàÎÂà-2. wÑ Îàm¦ Öààm §ýLâK¥ âkyy¡ âÀ¥ ªà¥ ytã§ýÊ½à §ý t¦v ÑÊà¾t§ý ó½àã t¡ Ñã Ñà¡ :

Find the condition that the roots of the given equation are in harmonic progression :

OR

wÑ ytã§ýÊ½à rmà¢¥ âky§ý t¦v âÀ¥ Ñ¥ ytã§ýÊ½à §ý t¦và¡ y¡ 2 §ýt Ñ¦ ß

Find the equation whose roots are 2 less than that of the given equation :

ZàÎÂà-3. uâÀ ¡àÊ â§ýyã ytÑ §ý Àà¡ £qytÑ Ñà¡ mà¡ â÷ §ýLâK¥ â§ý sã £y ytÑ §ýà £qytÑ Ñà¡ªàà ñ

If H_1 and are two subgroups of any group then show that is also subgroup of that group.

OR

uâÀ $a * b = a + b + 2, \forall\ a, b \in I$ mà¡ m¾ytâ§ý ¡wuw ¡àÊ §ýà Íu¾§ýt Öààm §ýLâK¥ ñ

If , then find identity element and inverse of a.

ZàÎÂà-4. âÀhà¢¥ â§ý §ýà m¾ytâ§ý ¡wuw Ñà¡ªàà ¡àÊ uâÀ ytà§ýàáÊmà mnà §ýà m¾ytâ§ý ¡wuw Ñ¦ ñ

Show that is identity element of and if is homomorphism and e is the identity of G.

OR

â÷ §ýLâK¥ â§ý Zà¾u¡§ý Öà¡Øà q½àà§ýLu Zààm Ñàmà Ñ¦ ñ

Prove that every field is an integral domain.

ZàÎÂà-5. uâÀ mà¡ â÷ §ýLâK¥ .

If , then show that .

OR

§ýà tàÂà Öààm §ýLâK¥ ñ (Evaluate .)

$(3, -5, 2, 2)$

h½»¦-'y'(Section-'C')

âÂàÈÂààâ§ým Àã¦ £ÙàÊãu ZàÎÂàà¡ §ý £ÙàÊ ÀãâK¥ ñ (Answer the following long-answer type questions) (5x5=25)

ZàÎÂà-1. âÂàÈÂààvâhm ¡àÍuÑ §ýà ZàytàÂu Úq t¡ rÀv§ýÊ kàâm Öààm §ýLâK¥ :

Change the following matrix into normal form and find its rank :

OR

âÂàÈÂààvâhm ¡àÍuÑ §ýà Íu¾§ýt §ýv¡-ÑâtÌ¹¦Àà ZàtÌu §ýL yÑàumà y¡ Öààm §ýLâK¥ ß

Find inverse of following matrix by Caley-Hamilton theorem.