**ANNUAL EXAMINATION 2020**

**(Only for Regular Students)**

***Centre No. 135 Centre Name- Disha College, Raipur (C.G.)***

**Class-B.Sc.-I Subject- Mathematics**

**Paper No- I Paper Name- Algebra & Trignometry**

**Time- 3 hrs. M.M.-50**

**Note:-Attempt any one part from each unit.**

UNIT-I

Q1(a) Show that the matrix

satisfies cayley Hamilton theorem and hence find A-1.

n’kkZb;s fd vkO;wg dSys gSfeYVu çes; dks larq”V djrk gS rFkk A-1 Kkr dhft,A

(b) Prove that Eigen values of a unitary matrix are of unit modulus.

fl) dhft, fd fdlh ,sfdd vkO;wg ds vkbxsu eku bdkbZ ekikad ds gksrs gSaA

Q2(a) Reduce the following matrix in the normal form and find its rank.

fuEu vkO;wg dks çlkekU; #i esa cnfy, vkSj mldh tkfr Kkr dhft,A

(b) Define Linearly Dependence and Independence of vectors and show that the vector R1, R2 and R3 are linearly independence.

jSf[kdr% Lora= dks le>kb,A crkb, fd D;k fuEufyf[kr vkO;w gds iafDr vkO;wg R1, R2 vkSj R3

jSf[kdr% Lora= gSA

UNIT-II

Q3(a) Show that the following equations are inconsistent (using matrix method).

fn[kkb, fd fuEufyf[kr lehdj.k vlaxr gS&

x + y + z = -3

3x + y - 2z = -2

2x + 4y + 7z = 7

(b) If r1, r2, r3 are the roots of the equation 2x3 - 3x2 + kx – 1 = 0 find constant K if sum of two roots is 1 and then find the roots of the equation thus obtained.

;fn r1, r2, r3 cgqin 2x3 - 3x2 + kx – 1 = 0 ds ‘kwU;d gSA vpj K dk fu/kkZj.k dhft,] ;fn nks ‘kwU;kadksa dk ;ksx 1 gSA ifj.kkeh cgqin ds ‘kwU;dksa dks Kkr dhft,A

Q4(a) If are the roots of the cubic x3 - px2 + qx-r = 0 Find the equation whose roots are

;fn f=?kkr lehdj.k x3 - px2 + qx-r = 0 ds ewy gS] rks og lehdj.k Kkr dhft, ftlds

ewy gSaA

(b) Solve by Cardon’s Method 9x3 + 6x2 -1 = 0

dkMZu fof/k ls gy dhft, 9x3 + 6x2 -1 = 0

UNIT-III

Q5(a) Define Equivalence relation and if I is the set of non zero integers and a relation R is defined

by xRy if xy = yx where then. Is the relation R on equivalence relation?

;fn I ‘kwU; jfgr iw.kkZadks dk leqPp; gS vkSj laca/k R bl çdkj ifjHkkf”kr gS fd xRy xy = yx rks fl) dhft, fd R, I esa rqY;rk laca/k gSA

(b) Show that the set of fourth roots of unity forms an obelian group with respect to multiplication.

fl) dhft, dh bdkbZ ds prqFkZ ewyksa dk leqPp; xq.ku lafØ;k ds vUrxZr ,d ifjfer vkcsyh lewg gSA

Q6(a) State and prove Lagranges theorem.

ysxzkat çes; dk dFku fyf[k, rFkk fl) dhft,A

(b) If G is a group and H be a non empty subset of G, then H is a subgroup of G if and only

if , where b-1 is the inverse of b in G.

,d lewg G ds ,d vfjDr mileqPp; H ds milewg gksus ds fy, vko’;d ,oa i;kZIr çfrca/k ;g gS

fd , tgk¡ b-1 dk çfrykse gSA

UNIT-IV

Q7(a) If is any group homomorphism then f is one-one if and only if where

is the kernel of f.

,d lekdkfjrk] rqY;dkfjrk gS] ;fn vkSj dsoy ;fn mldh vf”V rqPN gSA

(b) The relation of isomorphism in the set of all groups is an equivalence relation.

lHkh lewgksa ds leqPp; esa rqY;dkfjrk dk laca/k ,d rqY;rk laca/k gksrk gSA

Q8(a) If f is a homomorphism from a ring (R,**+**,.) onto a ring (R1,**+**1,.1) then prove that

;fn f oy; (R, **+**,.) ls vkPNkpd onto oy; (R1, **+**1,.1) ij ,d lekdkfjrk gS rks fl) dhft,A

(b) Every finite Integral domain is a field.

fl) dhft, fd çR;sd ifjfer iw.kkZadh; Mksesu ,d QhYM gksrk gSA

UNIT-V

Q9(a) State and prove Demoivres theorem.

Mh&ekW;oj çes; fyf[k, rFkk fl) dhft,A

(b) Prove that

fl) dhft, fd

Q10(a) If n is any positive integer, then prove that

;fn n dksbZ /ku iw.kkZad gS rks fl) dhft, fd

(b) Prove that

fl) dhft, fd

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