St. Mary’s PG College Vidisha (MP)

CCE-2020-21

B.Sc-III year

Sub-Mathematics

Paper II-Real and Complex Analysis

**Note:** Solve any five questions :-

dksbZ ikap iz’u gy dhft;sA

**Ques-1** State and prove fundamental theorem of integral calculus.

lekdyu ij ewyHkwr izes; ds dFku dks fyf[k;s ,oa fl) dhft;sA

**Ques-2** Let f(x,y)= When (x,y) (0,0)

When (x,y) = (0,0)

Show that the function f(x,y) is continuous but not differentiable at (0,0).

ekuk f(x,y)= tc (x,y) (0,0)

tc (x,y) = (0,0)

fl) dhft;s fd Qyu f(x,y) fcUnq ¼0]0½ ij larr gSA ijUrq vodyuh; ugha gSA

**Ques-3** (a) Test the convergence of the integral dx

lekdyu dx ds vfHklkfjrk dk ijh{k.k dhft;sA

(b) Test the convergence of the integral

lekdyu ds vfHklkfjrk dk ijh{k.k dhft;sA

**Ques-4** Find the Fourier series of the function f(x)=x sinx in the interval ()

Qyu f(x)=x sinx dh vUrjky () esa Qksfj;j Js.kh Kkr dhft;sA

**Ques-5** Let (X,d) be any bounded metric space and let M be a positive real number, then there exists a metric d\* such that metric space (X,d\*) is bounded.

ekuk (X,d) dksbZ ifjo) nwjhd lekf"V gS ,oa ekuk M dksbZ ?kukRed okLrfod la[;k gSA rc ,d nwjhd d\* bl izdkj mifLFkr gksxk fd nwjh lekf"V (X,d\*) Hkh ifjo) gksxkA

**Ques-6** In a metric space (X,d), prove that every open sphere is an open set.

fdlh nwjhd lekf"V ¼X,d½ eas fl) dhft;s fd izR;sd foo`Ùk xksyd ,d foo`Ùk leqPp; gksrk gSA