GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI
(An Autonomous Institute of Government of Maharashtra)

CT-I Engineering Mathematics-IV SHU401 [EXTC/ ELPO]

Date: 23/01/2017 **Time: 1hr** **Max. Marks 15**

Q.1 Show that when $|z+1|<1$, $z^{-2}=1+\sum_{n=1}^{\infty}(n+1)(z+1)^n$. **(03)**

Q.2 Attempt any three:- **(12)**

e) State Cauchy integral formula and hence evaluate $\oint_c \frac{3z^2+z}{z^2-1}dz$, where c is the circle $|z-1|=1$.

f) Evaluate: $\int_0^{1+i}(x-y+ix^2)\,dz$ along

i) the straight line from $z=0$ *to* $z=1+i$

iii)the real axis from $z=0$ *to* $z=1$ and then along a line parallel to imaginary axis from z =1 to z= 1+i

g) State Cauchy residue theorem and hence evaluate $\oint_c \frac{z-3}{z^2+2z+5}dz$, where c is the circle

ii) $|z|=1$ ii) $|z+1-i|=2$

h) Evaluate the following integrals by contour integration $\int_0^{2\pi}\frac{d\theta}{5-3\cos\theta}$.