

Q.P. 24574

Q3 b) $E_c=20\text{v}$, $f_c=200\text{ Khz}$, $E_m=6\text{v}$, $f_m=1\text{ Khz}$ $R_L=80\ \Omega$

$$M=6/20=.3\text{v}$$

2 marks

$$S(t)=E_c(1+m\cos W_{mt}).\text{COS}W_{ct}$$

$$20(1+.3\text{COS}(2\pi*10^3t).\text{COS}(4\pi*10^5t))$$

3 marks

Average power $P_t=(1+m^2/2).P_c$

$$= (1+m^2/2)E_c^2/2R_L$$

$$= (1+.9/2)*400/2*80$$

$$=2.615\text{w}$$

2 marks

Proper spectrum

3 marks

Q4 b) image frequency $f_{si}=f_s+2IF=1910\text{ Khz}$

4 marks

Image frequency rejection (α)= $\text{under root}(1+Q^2P^2)$

$$P=f_{si}/f_s-f_s/f_{si}=1910/1000-1000/1910$$

$P=1.3864$ $Q=100$ hence $\alpha=138.64$

4 marks

Total marks =8