

Q. 5 (a) Given the vehicular speed  $v = 72$  km/hr,  $f_c = 895$  MHz. Determine the coherence time and minimum symbol rate require to avoid frequency dispersion. **3 marks**

- (b) Assume a receiver is located a 10 km from a 50 W transmitter. The carrier frequency is 6 GHz and free space propagation is assumed,  $G_r=1$ ,  $G_t=1$ . Find the power at the receiver.

**3 marks**

- (c) Show that the PDF given in eq (1) can be generated by Normal random variable.

$$P_R(r) = \frac{r}{\sigma^2} \exp\left(-\frac{r^2}{2\sigma^2}\right) \quad (1)$$

also find the percentage of time that a signal is 20 dB or more below the rms value for a Rayleigh fading signal.

**4 marks**