1. The 5G wireless standard is NR
   Ans b
2. In a conventional wireline system, the channel is Static
   Ans c
3. The noise considered for the wireline channel is Additive white Gaussian
   Ans a
4. The Gaussian PDF with mean $\mu = 4$ and variance $\sigma^2 = 4$ is
$$\frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(n-\mu)^2}{2\sigma^2}} = \frac{1}{\sqrt{8\pi}}e^{-\frac{(n-4)^2}{8}}$$

   Ans d

5. The auto-correlation $R_{nn}(\tau)$ of white noise is
$$\frac{N_0}{2}\delta(\tau)$$
   The PSD $S_{nn}(f)$ of white noise is the Fourier transform of the auto-correlation given as
$$\frac{N_0}{2}$$
   Ans b
6. $SNR$ for BPSK modulation is $\frac{2P}{N_0}$
   Ans a
7. BER for BPSK modulation in the wireline system is given as $Q(\sqrt{SNR})$. Therefore, SNR for a given BER is
$$BER = Q(\sqrt{SNR}) \Rightarrow SNR = \left(Q^{-1}(BER)\right)^2$$
   Ans a
8. The $Q$ −function is defined as $\int_x^\infty \frac{1}{\sqrt{2\pi}}e^{-\frac{t^2}{2}}dt$. Hence $Q(1)$ equals
$$\int_1^\infty \frac{1}{\sqrt{2\pi}}e^{-\frac{t^2}{2}}dt$$

   Ans b
9. BER for BPSK at $SNR = 18$ dB for a wireline channel can be evaluated as follows
$$10\log_{10} SNR = 18 \Rightarrow SNR = 10^{1.8} = 63.0957$$
$$\Rightarrow BER = Q\left(\sqrt{10^{1.8}}\right) \approx 9.85 \times 10^{-16}$$
   Ans d
10. In QPSK constellation, the phase difference between symbols is $90^\circ$
    Ans c