

लोक सेवा आयोग
नेपाल टेलिकम, प्राविधिक, टेलिकम, सातौँ, टेलिकम इन्जिनियर (इलेक्ट्रोनिक्स एण्ड कम्युनिकेशन)
पदको आन्तरिक तथा खुला प्रतियोगितात्मक लिखित परीक्षा
२०८१/०५/०७

पत्र : द्वितीय
समय : ३ घण्टा

पूर्णाङ्क : १००

विषय : **Technical Subject**

प्रत्येक **Section** को उत्तर छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ । अन्यथा उत्तरपुस्तिका रद्द हुनेछ ।

Subjective

Time : 2 hr 30 min

Marks : 70

Section "A"

35 Marks

1. Describe the working principle of thyristor controlled rectifiers with circuit diagram. 5
2. Differentiate between scalar and vector magnetic potential. Derive the expression for magnetic boundary conditions. 5+5=10
3. The open loop transfer function of a control system is given by:

$$G(S) H(S) = \frac{K}{S(S + \sigma)(S^2 + 4S + 13)}$$

Sketch the root locus for $0 \leq K \leq \infty$ and find the breakaway point as well as angle of departure from complex poles. 6+4=10

4. Describe the function of Phase-Locked Loop (PLL) in communications systems. Discuss the principles and applications of Frequency Shift Keying (FSK) modulation in digital communications. Explain the concept of Pulse Code Modulation (PCM) and its advantages in digital communications. 3+4+3=10

Section "B"

35 Marks

5. What are the factors that affect the uplink and downlink design in geostationary satellite system? Explain. 5
6. Explain the architecture and key components of the Next Generation Network (NGN). Discuss its advantages over traditional telecommunication networks and provide examples of services enabled by NGN. Describe the role of the physical layer in the OSI model and give examples of technologies or protocols that operate at this layer. 4+3+3=10
7. Discuss the principle of total internal reflection and how it enables signal transmission in optical fibers. What are the main differences between optical transmitters and optical receivers in fiber optic communications? Explain the principles of satellite communication, including satellite stabilization, tracking and wave propagation. Discuss the role of earth stations in this context and how they interact with satellites. 3+2+2+3=10
8. Write down the importance of earthing and shielding in communication network. Describe the use of lightning protection for the telecom equipments. 4+6=10

