Duration: 3hrs **[Max Marks: 80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		**Attempt any FOUR**	**[20]**
	a	Describe 3-axis stabilization.	**[5]**
	b	What do you mean by earth eclipse of satellite?	**[5]**
	c	What are losses involved in satellite communication and how they are minimized?	**[5]**
	d	Explain Telecommand format for nanosatellite.	**[5]**
	e	Compare LEO, MEO and GEO.	**[5]**
2	**a**	What do you understand by orbital perturbations? Give main causes of orbital perturbation.	**[10]**
	b	Derive an expression for overall uplink and downlink C/N ratio. For a satellite circuit the carrier-to-noise ratios are uplink 23dB, downlink 20dB, and intermodulation 24 dB. Calculate the overall carrier- to-noise ratio in decibels.	**[10]**
3	**a**	Why do you require deployment mechanisms in nanosatellite and which are the critical elements in deployment mechanisms?	**[10]**
	b	Discuss Limits of Visibility with its derivation.	**[10]**
4	**a**	Derive general link equation and also explain system noise temperature.	**[10]**
	b	List and describe the materials used for nanosatellite structure.	**[10]**
5	**a**	What do you mean by active thermal control and what are the different techniques used for it w.r.t. nanosatellite?	**[10]**
	b	Describe receive only earth station in detail.	**[10]**
6	**a**	Write short note on: i) input and output backoff ii) Orbit Control System	**[10]**
	b	What are the different types of nano satellite structure design?	**[10]**

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[Time: 3 **Hours]** **[Marks:80]**

N.B: 1. **Questions No. 1 is Compulsory.**
2. **Attempt any three out of remaining Questions.**
3. **Figures to the right Indicate full marks.**

Q.1 Attempt any Four write short notes on **20**

a) Significance of Environment

b) Global Warming

c) Scope of Environment Management

d) EMS certification

e) Forest Act

f) Eco-system and its types

Q.2 a) Discuss on environmental issues related to Indian context. **10**

b) Discuss on Air [P & CP] Act **10**

Q.3 a) Explain limiting factor and food chain as related to ecosystem. **10**

b) Write a note on each. Ozone layer depletion & Acid rain. **10**

Q.4 a) Discuss on corporate environment responsibity. **10**

b) What is sustainable development? What are the parameter effecting it? **10**

Q.5 a) What is ISO-14000? How does adoption of ISO-14000 practices benefits industries as well Environment. **10**

b) Discuss the functions of government as planning and regulatory agency. **10**

Q.6 a) Discuss the Atomic and Biomedical hazards as related to Global environmental concern. **10**

b) Discuss on Total Quality environmental management. **10**

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Duration: 3hrs **[Max Marks: 80]**

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(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any Four	**[20]**
	a	A 45^0-45^0-90^0 Prism is immersed in alcohol (n_1=1.45), what is the minimum refractive index of the prism must have if a ray incident normally on one of the short faces is to be totally reflected at the long phase of the prism	**05**
	b	An optical fiber is made up of glass with a refractive index of 1.55 and its cladding with a refractive index of 1.51.Launching takes place from air.What numerical aperture does the fiber have? What is the acceptance angle? And what is the value of Δ ?	**05**
	c	With a neat sketch explain the optical bands and windows? Which band is known as extended "C" band?	**05**
	d	With a neat sketch explain Photonic crystal fiber and state its applications	**05**
	e	Compare SONET and SDH networks with PDH	**05**
	f	Compare optical Packet switching and Optical burst switching networks.	**05**
2	**a**	How do you classify Optical fiber based on the number of modes guided and refractive index profile. Elaborate it with proper dimension ,neat sketch and the colour codes for the optical fiber	**[10]**
	b	With a neat sketch explain micro bending and macro bending losses in optical fiber? How it can be minimized? An optical signal at a specific wavelength has lost 55% of its power after traversing 3.5Km of fiber.What is the attenuation in dB/Km of this fiber	**[10]**
3	**a**	Compare LED and LASER in detail. A p-n junction LED has an injection efficiency of 60% ,light extraction efficiency of 50% and $\tau_{nr}=10^{-8}$Second.Calculate τ_r	**[10]**
	b	Differentiate between PIN and APD. Define quantum efficiency, Responsivity and long wavelength cut off for photo detector	**[10]**
4	**a**	With a neat sketch explain FSO network,its applications and challenges	**[10]**
	b	Write a short note on Elastic optical Network **OR** Data center network	**[10]**
5	**a**	Briefly Explain Optical Transport Network.Also explain the OTN layers hierarchy model with a diagram	**[10]**
	b	What are the elements of WDM network.With a neat sketch explain the WDM access Network	**[10]**
6	**a**	Write a short note on FTTH network	**[10]**
	b	With a neat sketch explain the working of EDFA and its applications	**[10]**

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Duration: 3hrs **[Max Marks: 80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
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(4) Assume suitable data, if required and state it clearly.

1		Attempt **any FOUR**	**[20]**
	a	Classify various wireless networks. Illustrate it with a systematic diagram.	
	b	Compare link types in Bluetooth.	
	c	List the advantages of deploying WLAN.	
	d	Discuss characteristics of VANETs.	
	e	State the characteristics of WBAN.	
2	**a**	Construct WiMAX network architecture. Review the features of WiMAX.	**[10]**
	b	Compare SPIN and LEACH routing Protocol	**[10]**
3	**a**	Illustrate network establishment in Bluetooth. Explain each mode of operation.	**[10]**
	b	Determine Hidden and Exposed Node Problem in WLAN with suitable diagrams.	**[10]**
4	**a**	Classify categories of applications of NFC and List out Applications of 6LoWPAN	**[10]**
	b	Calculate the uplink throughput for data service only for a WCDMA cell using the following information: Required Eb/Nt= 1dB Required interference margin = 3 dB (cell loading =0.5) Interfernce factor due to other cells =0.5 Channel activity factor = 1.0 Chip rate (*Rc): 3.84 Mcps*	**[10]**
5	**a**	Explain the working principle of UWB in the time and frequency domain. Draw the UWB frequency spectrum.	**[10]**
	b	Describe Wireless Sensor Network Architecture. Differentiate wireless sensor networks and wireless ad hoc networks.	**[10]**
6	**a**	Illustrate architecture components of RFID and explain them in brief. Discuss any one practical application of RFID.	**[10]**
	b	Discuss architecture of IoT with any one example. Explain M2M communication	**[10]**

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