ST.ANNE'S

COLLEGE OF ENGINEERING AND TECHNOLOGY

(An ISO 9001:2015 Certified Institution)

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QUESTION BANK

PERIOD: JULY - NOV 2018 **BATCH**: 2015 – 2019

BRANCH: ECE **YEAR/SEM:** IV/VIII

SUB CODE/NAME: EC6702 – OPTICAL COMMUNICATION &NETWORKS

UNIT I – INTRODUCTION TO OPTICAL FIBERS

PART – A

1. Why partial reflection does not suffice the propagation of light?**[Nov/Dec-17] [ID]**

2. A graded index fiber has a core with a parabolic refractive index profile which has a diameter of 50μ the fiber has a numerical aperture of 0.2.Estimate the total number of guided modes propagating in the fiber when it is operating at a wavelength of 1μm? **(Nov/Dec-17)[D]**

3. The refractive index difference(Δ) for an optical fiber is 1%. Determine the critical angle at the core cladding interface if the core refractive index is 1.46. **(May/June-12)[ID]**

4. A step index fiber has a normalized frequency(V) of 26.6 at 1300nm. If the core radius is 25μm, find the numerical aperture. **(May/June-12) [ID]**

5.What is the energy of a single photon of the light whose λ=1550nm, in eV? **(Nov/Dec2011)[D]**

6. Assume that there is a glass rod of refractive index 1.5,surrounded by air. Find the critical incident angle. **(Nov/Dec-2011)[ID]**

7. Calculate the cutoff wavelength of a single mode fibre with core radius of 4μm and Δ=0.003. **(Nov/Dec-2012) [ID]**

8. For a fiber with core refractive index of 1.54 and fractional refractive index difference of 0.01, calculate its numerical aperture. **(Nov/Dec-2012) [ID]**

9. For n1=1.55 and n2=1.52,calculate the critical angle and numerical aperture**(May/june-13)[ID]**

10. What is a linearly polarized mode? **(May/june-13)[D]**

11. The refractive indexes of the core and cladding of a silica fiber are 1.48 and 1.46 respectively. Find the acceptance angle for the fiber.**(Nov/Dec-13)[D]**

12 Determine the normalized frequency at 820nm for a step index fiber having a 25μm radius . The refractive indexes of the cladding and the core are 1.45 and 1.47 respectively. How many modes propagate in this fiber at 820nm? **(Nov/Dec-13)[D]**

13.A multimode fiber has core diameter of 50μm and cladding refractive index of 1.45.If its modal dispersion is 10ns/km, find its numerical aperture.**(May/June-14)[D]**

14. Distinguish meridional rays from skew rays. **(May/June-14)[D]**

15. Define acceptance angle and NA of a fiber.**(Nov/Dec-14)[D]**

16. List any two advantages of single mode (or) mono-mode fibers. **(Nov/Dec-14)[ID]**

17. Calculate the critical angle of incidence between two substances with different refractive indices, where n_1 =1.5 and n_2=1.46**(April/may-15)[D]**

18. State snell's law. **(April/may-15)[D]**

19. what is total internal reflection in a fiber? **(Nov/dec-15)[D]**

20. Define phase and group velocity. **(Nov/dec-15) (May/june-16)[ID]**

21. what are the conduction for the single mode propagation?**(May/june-16)[D]**

22. Write down the wavelength regions corresponding to first ,second and third windows.[ID]

23. What are the limitations of optical fiber communication systems?[D]

24. What is critical angle?[D]

25. What is meant by linearly polarized mode?[D]

26. What is step index fiber?[D]

27. What are the advantages of graded index fiber?[D]

28. What types of fibers are used commonly?[ID]

29. What are leaky modes in optical fibers?[D]

30. What are meridional rays?[D]

31. What are skew rays?[D]

32. What are the advantages of optical network?[D]

33. What are the advantages of optical communication?[D

PART – B
[First Half]

1. Draw and explain the acceptance angle and numerical aperture of an optical fiber and derive expressions for both**. (8) (may/june-12) [D]**

2. What is numerical aperture of an optical fiber? Deduce an expression for the same**. (12) [Nov/Dec-11] [D][D]**

3. Calculate NA of silica fiber with its core refractive index (n1) of 1.48 and cladding refractive index of 1.46. What should be the new value of'n1' in order to change the NA to 0.23 **(4) [Nov/Dec-11 [D]**

4. Explain the phenomenon of total internal reflection using snell's law with figures and calculations**. (12) [Nov/Dec-11] (OR)** Describe the ray theory behind the optical fiber communication by total internal reflection**.** State the application of snell's law in it**. (OR)** Expalin the ray theory of fiber with a special mention about TIR, acceptance angle and NA**.**

[May/june-13] (OR) With diagram explain acceptance anle numerical aperture and total internal reflection**. (8) [May/june-14]** OR Explain phase shift with total internal reflection and evanescent field**. (16) [Nov/Dec-17] [ID]**

5. Calculate the Numerical Apertures of a fiber having n_1=1.6 and n_2=1.49 and another fiber having n_1=1.458 and n_2=1.405. which fiber has grater acceptance angle? **(8)[May/june-13][D]**

6. With the help of a block diagram explain the different components of a optical fiber link. **(12)[Nov/Dec-13] (OR)** Draw and explain ray theory transmission in an optical communication. **(8) [May/june-14]OR** With neat block diagram explain the fundamental blocks of optical fiber communication**.(8) [April/May-18]**

7. A silica optical fiber with core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and cladding refractive index of 1.47. determine. **(8) [april/May-18] [D]**
   a) The critical angle at the core-cladding interface
   b) The numerical aperture for the fiber
   c) The acceptance angle in air for the fiber

8. Describe single mode fibers and their mode field diameter. What are the propagation modes in them? **(8) [May/june-13][D]**

9. Explain the difference between meridional and skew rays. **(4) [Nov/Dec-13][D]**

[Second Half]

[Topic Name as per syllabus]

10. Derive expression for the linearly polarized modes in optical fibers and obtain the equation for V number. **(8)[Nov/Dec-12][ID]**

11. Describe single mode fibers and their mode field diameter. What are the propagation modes in them? **(8)[May/june-13][D]**

12. Explain the features of multimode and single mode step index fiber and compose them. **(8) [Nov/Dec-14][D]**
13. Discuss on the transmission of light through graded index fiber **(8) [Nov/Dec-14][ID]**

14. Explain step index and graded index fiber cable. (6**)[April/may-15]** (OR) Classify fibers and explain them. **(8) [D]**

15. Discuss briefly about the structure of graded index fiber**.(8) [april/May-18][D]**

16. Distinguish step index from graded index fibers**. (4) Nov/Dec-11**

17. A SI fiber with silica –core refractive index of 1.458, V=75 and NA=0.3 is to be operated at 820nm. What should be its core size and cladding refractive index?
    Calculate the total number of modes entering this fiber. **(8) Nov/Dec-12[D]**

18. Describe single mode fibers and their mode field diameter. What are the propagation modes in them? **(8) [May/june-13][D]**

19. A step index fiber has a core diameter or 7μm and core refractive index of 1.49. Estimate the shortest wavelength of light which allows single mode operation when the relative refractive index difference for the fiber is 1% **(8) (may/june-12)[D]**

20. A fiber has a core radius of 25nm core refractive index of 1.48 and relative refractive index difference (Δ) is 0.01. If the operating wavelength is 0.84nm, find the value of normalized frequency and the number of guided modes. Detamine the number of guided if Δ is reduced to 0.003**. (8) (may/june-12)[D]**

UNIT-2 SIGNAL DEGRADATION IN OPTICAL FIBERS
PART – A

1. Define attenuation **(Nov/Dec-17)[D]**
2. What is polarization mode dispersion (PMD)? **(A/ M 2007) 2018 [D]**
3. What is elastic and inelastic scattering? **(A/ M 2018)** [**ID]**
4. A 30 km long optical fiber has an attenuation of 0.8db/km. If -7 dbm of optical power is launched into the fiber, determine the output optical power in dBm. **(May/June-12)[D]**
5. What factors cause Rayleigh scattering in optical fibers? **(May/June-12)[D]**
6. Define the attenuation coefficient of a fiber. **(Nov/Dec-11)[D]**
7. Calculate the cut-off wavelength of an optical signal through a fiber with its core refaractive index of 1.50 and that of cladding =1.46. The radius of 25 . The normalized frequency is 2.405**. (Nov/Dec-11)[D]**
8. what are the two reasons for chromatic dispersion? **(Nov/Dec-12)[ID]**
9. What are the most important non-linear effects of optical fiber communication? **(Nov/Dec-12)[D]**
10. What is Rayleigh scattering? **(May/June 2013)[D]**
11. What is meant by mechanical splice? **(May/June 2013)[D]**
12. Define dispersion in multimode fibers. **(Nov/Dec-13)[D]**
13. Identify the causes of scattering loss. **(May/June 2014)[D]**
14. A fiber has an attenuation of 1.5dB/km at 1300nm. If 0.5mw of optical power is initially launched into the fiber What is the power level in microwatts after 9km? **(May/June 2014)[D]**
15. What are the types of fiber losses which are given per unit distance? **(Nov/Dec-14)[ID]**
16. List the factors that cause intrinsic joint losses in a fiber. **(Nov/Dec-14)[D]**
17. Define signal attenuation. **(Apr/May-15)[D]**
18. What are bending losses ? Name any two types. **(Apr/May-15)[D]**
19. What do you meant by polarization dispersion in a fiber ? **(Nov/Dec-15)[ID]**
20. A fiber has an attenuation of 0.5 dB/km at 1500mW of optical power is initially launched into the fiber, what is the power level in after 25km? **(Nov/Dec-15) [ID]**
21. What is chromatic dispersion?(**May/June-16)[D]**
22. Differentiate linear scattering from non-linear scattering.[D]
23. What are the types of material absorption losses in silica glass fibers?[D]

24. What is intrinsic absorption in optical fibers?[D]
25. What is intra Modal dispersion?[D]
26. Compare splices and connectors.[D]
27. Write a note on scattering losses.[D]
28. Mention the losses responsible for attenuation in optical fibers.[D]
29. What are the requirements of good couplers?[D]
30. Define - Microscopic Bending[D]

PART-B
[First Half]

1. Explain in detail about the scattering and the bending losses that occur in an optical fiber with relevant diagrams and expressions. **(8) (Apr/may-18) OR** explain the following with necessary diagram and expression
   (i) Non linear scattering loss fiber bend loss[D]
2. Write short notes on stimulated Raman scattering and Stimulated Brillouin scattering **(6) (Apr/may-18)[ID]**
3. In detail explain linear scattering losses. **(16) OR** Describe linear and Non linear scattering losses in optical fibers**. (Nov/Dec-17) (Nov/Dec-12)[D]**
4. Explain the following with necessary diagram and expression **(10) (May/June-12)[D]**
   (i) Non linear scattering loss fiber bend loss
   (ii) Material dispersion in optical fiber
5. Discuss the attenuation encountered in optical fiber communication due to **(Nov/Dec-13)[D]**
   (1) Bending (2) Scattering (3) Absorption (12) OR What are the lossor signal attenuation mechanisms in a fiber?.Explain **(16) (Apr/May-15)**
6. Explain detail about core and cladding losses.[8]
7. With aid of diagrams discuss the various losses occurring in optical fibers. [ID][13]
8. Explain the attenuation and losses in fiber [D][8]
9. Explain the effects of signal distortion in optical waveguide [D][6]
10. The optical power launched into on 8Km length of fiber is 120µw, the optical power at the fiber output is 3µw then calculate.
    (a) The overall signal attenuation or loss in decibels through the fiber.
    (b) The signal attenuation per kilometer.
    (c) The overall signal attenuation for a 10Km optical link using the same fiber with splices at 1Km intervals, each giving an attenuation of 1 dB.
    (d) The numerical input/output power ratio.

[Second Half]

11. Discuss material and wave guide dispersion mechanisms with necessary mathematical expressions.(**8) (Apr/may-18) (May/June-12)[ID]**
12. Clearly bring out the differences between intra and inter modal dispersion.(**12) (Nov/Dec-13)[ID]**

13. Calculate the maximum transmission distance for a fiber link with an attenuation of 0.2dB/Km if the power launched in 1mw and the receiver sensitivity is 50µm.Calculate the attenuation for an other link with same parameters and the distance of 28kms. **(4)(Nov/Dec-13)[D]**
14. With diagram, explain intra and inter model dispersion **(16) (May/June-14) (Nov/Dec-15)[ID]**
15. Explain detail about polarization mode dispersion **[8]**
16. Design optimization of SM fibers. [8]
17. Bring out the differences between intermodal and intramodal dispersion?[D][13]
18. How wave guide dispersion affects the performance of the transmission in an optical fiber?[ID][13]
19. What do you mean by pulse broadening? Explain in effects on information carrying capacity of afiber?[ID] [8]

20. Discuss the attenuation encountered in optical fiber communication due to Bending, Scattering and Absorption.[D] [13]
21. Discuss material and waveguide dispersion mechanisms with necessary mathematical expressions[D] [13]
22. Silica has an estimated fictive temperature of 1400K with an isothermal compressibility of $7x10^{-11}$ m^2N^{-1}. The refractive index and the photo elastic coefficient for silica are 1.40 and 0.286 respectively.

    Determine the theoretical attenuation in decibels per kilometer due to the fundamental Rayleigh scattering in silica at optical wavelength of 0.63µm. Boltzmann constant is $1.381x10^{-23}$ JK^{-1}

UNIT-3
FIBER OPTICAL SOURCES AND COUPLING
PART-A

1. Give some possible lensing schemes to improve optical source to fiber coupling efficiency.(**Nov/Dec-17)[ID]**
2. Illustrate the factors that determine the response time of the photodiode. OR Define detector response time **(Apr/May-18) .(Apr/May 18) (May/June-13)[D]**
3. An LED has radiative and non-radiative recombination times of 30ns and 100ns respectively. Determine the internal quantum efficiency**. (Apr/May-18)[ID]**
4. What are the advantages of pin photodiodes.(**Apr/May 18)[D]**
5. what are the advantage of LED?(**May/June-12)[D]**
6. Photons of energy $1053x10^{-19}$ J are incident on a photodiode which has a responsivity of 0.65.A/W. If the optical power level is 10mW,find the photocurrent generated. **(May/June-12)[ID]**
7. Why silicon is not used to fabricate LED or Lase diode?(**Nov/Dec-11)[D]**
8. Comapre and contrast between surface and edge emitting LEDs **(Nov/Dec-12)[D]**
9. What is the significance of intrinsic layer in PIN diodes? **(Nov/Dec-12)[ID]**
10. calculate the band gap energy for an LED to emit 850nm**. (May/June-13)[D]**
11. Write two differences between a Laser diode and a LED **[Nov/Dec-13][May/June-16][D]**
12. For a photodiode define quantum efficiency-η and responsitivity-R**.[May/June-14][ID]**
13. Define the internal quantum efficiency of LED .[**May/June-14] [Nov/Dec-14] [Nov/Dec-**

15][ID]

14. what are the drawbacks of avalanche photo diode? **[Nov/Dec-14][D]**

15. Contrast the advantages of PIN diode with APD diode.[**Apr/May-15][D]**

16. What is hetro junction structure? **[Nov/Dec-15][D]**

17. What are the two types of LED configurations?[D]
18. What are the three requirements of Laser action?[ID]
19. Define-External Quantum Efficiency[D]
20. In a 100ns pulse, 6 $*10^6$ photons at wavelength of 1300nm fall on an InGaAs photo-detector on the average, 5.4 $*10^6$ electron-hole pairs are generated. Find the quantum efficiency**.(N / D 2010)[ID]**
21. What do you mean by Avalanche Photo Diode?[D]
22. What is the principle of operation of LASER? **(N / D 2008)[D]**

23. What is a DFB LASER? Differentiate DFB LASER from other types of LASERs? **(N / D 2009)[D]**

24. When an LED has 2V applied to its terminals, it draws 100mA and produce 2mW of optical power. Determine conversion efficiency of the LED from electrical to optical power. **(N / D 2008)[D]**
25. What are the necessary features of a photo detector? **(N / D 2007)[D]**
26. Define – Photocurrent[D]
27. What are the advantages of Quantum Well LASERs?[D]
28. What are the two types of confinement used in LEDs?[D]
29. Differentiate LEDs and Laser diodes.[D]
30. What do you mean by direct band gap Materials?[D]

PART-B

[First Half]

1. Compare LED with a laser diode.[**4] [Nov/Dec-11] [Nov/Dec-14]**

2. With help of neat diagram explain the construction and working of a surface emitting LED **[12] [Nov/Dec-11] OR** Draw the structures of SLED and ELED and explain their principle of operation**. [May/June-13] OR** Expalin the working of n hetero structure LED**. [Nov/Dec-13] [May/June-14]**

3. Expalin the structure and working of a silicon APD.[13] [Nov/Dec-11]

4. Draw the injection laser diode structure and explain lasing in it.**[8] [May/June-13][Nov/Dec-14**

5. Draw the structures of PIN andf APD photo detectors and explain their operatios.[8] **[May/June-13]**

6. List the benefits and drawbacks of avalanche photo diodes.[D][8]

7. Compare LED with a LASER diode.[D] [8]

8. Draw the injection laser diode structure and explain lasing in it.[ID] [8]

9. Derive the expressions for the SNS of both PIN and APD by incorporating all noise sources.[ID] [8]

[Second Half]

10. Define S/N ratio of a photodector. What conductios should be met to achieve a high SNR?[**4] [Nov/Dec-11]**

11. What are the three factors that decides the response time of photodiodes? Expalin them in detail with necessary sketches.[**8] [Nov/Dec-12]**

12. Briefly explain the different noise sources of a photo dector. [6] **[Nov/Dec-13]**

13. Discuss about optical detection noise.[13] [Nov/Dec-15]
14. Explain mechanical splices with neat diagrams. **(8) (May/June-12)[ID]**
15. Write a brief note on fiber alignment and joint loss. **(8) (May/June-12) (Nov/Dec-12) (May/June-13) OR** Describe the three types of fiber misalignment that contribute to insertion loss at an optical fiber joint**. (8) (Nov/Dec-14) [D]**
16. What is meant by fiber splicing? Explain fusion splicing of optical fibers. (8) OR Discuss in detail about fiber splicing**.(10)(Nov/Dec-11) (Apr/May-15)[D]**
17. Explain expanded beam fiber connector with a neat schematic.(**8) (Nov/Dec-11)[D]**
18. Write notes on fiber splices and connectors**. 8) (Nov/Dec-12)[D]**
19. Describe various fiber splicing techniques with their diagram**. (10) (May/June-13)[D]**
20. Describe the various types of fiber connectors and couplers**. (8) (May/June-13)[D]**

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UNIT-4
FIBER OPTIC RECEIVER AND MEASUREMENTS

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PART-A

1. Define quantum limit.[May/june-12][D]
2. What are the methods used to measure fiber refractive index profile? [May/june-12][D]
3. Mention the error sources in fiber optical receiver. [May/june-12][ID]
4. What is dark current? [Nov/Dec-12][D]
5. List out the various error sources. [Nov/Dec-12][D]
6. what are the error sources of receiver?[May/june-13][ID]
7. What is known as quantum limit? [May/june-13][D]
8. A digital fiber optic link operating at 1310 nm, requires a maximum BER of 10^{-8}. Calculate the required average photons per pulse. (N / D 2013)[ID]
9. List out the benefits of SONET over PDH networks. [May/june-14][ID]
10. Mention the advantages of using transimpedance front and receiver configuration. [Nov/Dec-14][ID]
11. state the significance of maintaining the fiber outer diameter constant. [Nov/Dec-14][ID]
12. Define bit-error rate.[Apr/May-15][D]
13. list any two advantages of trans-impedance amplifiers. .[Apr/May-15][ID]
14. Draw and describe the operation of fiber optic receiver. [Nov/Dec-15][D]
15. Mention few filter diameter measurement techniques. [Nov/Dec-15][D]
16. Why silicon is preferred to make fiber optical receivers? (N / D 2010), (A / M 2011)[ID]
17. Define – Modal Noise and Mode Partition Noise. (A / M 2011), (M / J 2013)[ID]

18. What do you mean thermal noise?[D]
19. What are the methods used to measure fiber refractive index profile? (M / J 2012)[D]
20. What are the methods used to measure fiber dispersion?[D]
21. Define – Radiance[D]
22. What is bit rate?[D]
23. What is Inter Symbol Interference (ISI)?[D]
24. List the advantages of preamplifiers.[D]
25. What are the types of preamplifiers?[ID]
26. What are the methods used to measure fiber dispersion?[D]
27. What are the system requirements?[D]
28. Give the range of system margin in link power budget?[D]
29. What is reflection noise?[D]
30. What are the effects of reflection noise in high speed systems?[D]

PART-B

[FIRST HALF]

1. Discuss the noise and disturbances affecting the optical detection system.[8][May/June-12][ID]
2. Draw the front end optical amplifiers and explain[13].[Nov/Dec-12][ID]
3. What are the various types of Pre-amplifiers available for optical networks? Explain any three of them with their circuit diagrams[13][May/June-13] OR Expalin any two two types of pre-amplifier used in receiver.[Nov/Dec-13][D]
4. With suitable diagram explain optical receiver operation and its performance.[13][May/June-13] OR Draw the block diagramof fundamental optical receiver. Explain each block.[13]][Nov/Dec-14][D]
5. Write short notes on Quantum limit.[8][D]

[SECOND HALH]

6 . Explain the following measurements[D]
(i) attenuation measurement using cut back technique
(ii) Frequency domain measurement of fiber dispersion.

7 .Write notes on the following[13] [Nov/Dec-12][D]
(i) Fiber cut –off Wvelength
(ii) fiber refractive index profile measurment.

8. Explain the Insertion –loss method used for attenuation measurement.[8][Nov/Dec-13][D]
9. Explain the technique used in Frequency-Domain Intermodal . Dispersi measurement.[8]] [Nov/Dec-13][D]

10. Describe the dispersion and numerical aperture measurements of fiber.[13] [May/June-13][D]
11. Explain the dispersion measurements methods in optical fiber.[13]][Nov/Dec-17][D]

12. Discuss on the numerical aperture measurements of optical fiber.[13]][Nov/Dec-17][D]

13. Explain the attenuation and dispersion measurements in details.[13][Apr/May-15[D]
14. Analyze the following: (i)Fibre refractive index profile measurement. (8) [D] [8]
15.Analyze the following: (i)Fibre cut-off wavelength measurement [D] [8].
16. Explain the measurement technique used in the case of (13) [D]
(i) Numerical aperture (ii) Refractive index profile (iii) Fiber cut-off wave length (iv) Fiber diameter.
17. Write a note on Fiber numerical aperture measurements.[8] [D]
18. Draw the front end optical amplifiers and explain. (8) Considering the probability distributions f the received logic 0 and 1 signal pulses, derive the expressions for BER and error function.[D] [`13]
19. Explain the operation of a pre-amplifier built using a FET.[D] [8]
20. Explain the measurement technique used in the case of [8] [D]
Fiber cut-off wave length (iv) Fiber diameter.

UNIT -5
OPTICAL NETWORKS AND SYSTEM TRANSMISSION

PART-A

1. What are the drawbacks of broadcast and select networks for wide area networks applications?[May/June-12][ID]
2. Mention any 2 nonlinear effects present in optical fiber.[Nov/Dec-17][ID]
3.Draw the basic structure of STS -1 SONET frame. [Nov/Dec-17][D]
4. Write a short note on solution.[Apr/may-18] [May/June-13] [May/June-14][D]
5. What are the drawbacks of broadcast and select networks for wide area network applications?[.[Apr/may-18][May/June-12][ID]
6. Define wavelength-routed WDM network.[Apr/May-18][D]
7. List out the benefits of SONET over PDH networks. [Apr/May-18][D]
8. What were the problems associated with PDH networks?[Nov/Dec-12][ID]
9. Enumerate the various SONET/SDH layers. [Nov/Dec-12][D]
10. What is a broadcast and select network?[May/June-13][D]
11. Obtain the transmission bit rate of the basic SONET frame in Mbps.[Nov/Dec-13][D]
12. Illusrate interchannel cross talk that occurs in a WDM system. [Nov/Dec-13][D]
13. Give significance of solutions. [May/june-14] [Nov/Dec-14][D]
14. State the concept of WDM. [Nov/Dec-14][D]
15. What is SONET?[Apr/May-15][D]
16. What is optical CDMA?[Nov/Dec-15] [May/June-16] OR What is optical code division multiple access mechanism?[D]
17. Distinguish SONET and SDH. [Nov/Dec-15] [D]
18. What are the pumping mechanisms used in Erbium Doped Amplifiers.[May/June-16][D]
19. What are the three topologies used for fiber optical network? (N / D2011)[D]
20. What are the advantages of WDM? (N / D 2007)[D]
21. What is EDFA? (A / M 2008), (M /J 2012)[ID]

22. What is meant by topology?[D]
23. Calculate the number of independent signals that can be sent on a single fiber in the 1525 – 1565 nm bands. Assume the spectral spacing as per ITU – T recommendation G.692.(A / M 2011).[D]
24. What do you mean by bidirectional WDM?[D]
25. What are the basic performances of the WDM?[D]
26. What is DWDM?[D]
27. Define – Network[D]
28. What is switched communication network?[D]
29. Write few advantages of the optical network[D]
30. Write the functions of transport and path overhead[D]

PART-B

[FIRST HALF]

1. Explain SONET/SDH network [Nov/Dec-17] [May/June-14] [13]
2. Briefly explain the layers of the SONET.[Apr/May-18] [6]
3. Describe in detail the non linear effects on the performance of the network. [Apr/May-18] [10]
4. Explain the architecture of SONET and discuss non-linear effects on network performance.[13] [Nov/Dec-11] [May/June-13] [May/June-14] [Nov/Dec-15] [13]
5. Explain SONET layers and frame structure with diagram. [Nov/Dec-15] [May/june-16] [13]
6. Discuss the concepts of media access control protocols in broadcast and select network.[13] [Nov/Dec-12] [Nov/Dec-13] [May/june-15] [May/june-16]
7. Describe the non-linear effects on network performance in detail. [Nov/Dec-12] [May/June-13][8]

[SECOND HALF]

8. Explain the basics of optical CDMA systems. [Nov/Dec-12] [8]
9. Write a note on solitons. [8] [Nov/Dec-13]
10. Discuss the following: [13] [Nov/Dec-14]
    (i) WDM networks
    (ii) Ultra high capacity networks
11. Write a note on optical switching methods. [Nov/Dec-17] [13
12. Explain the principle of solutions and discuss the solitons and discuss the soliton parameters with necessary expression and diagrams.[13] [May/June-12]
13. Write short notes with necessary diagrams on: [13] [May/June-12] [Nov/Dec-11] [Nov/Dec-15] [Nov/Dec-13]Optical CDMA (ii) WDM and EDFA performance
14. Write short notes on (i) Wavelength routed networks. (8)
15. Write short notes on (i) Optical CDMA [8]
16. Discuss various parameters of solitons.

17. What is broadcast and select multihop network? Explain.
18. Write short notes on SONET frame and SONET layer structure.
19. Explain the following requirementsfor the design of an optically amplified WDM Link: (a) Link Bandwidth (8)
20. Explain the following requirementsfor the design of an optically amplified WDM Link: (b) Optical power requirements for a specific BER