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21EC51

Fifth Semester B.E. Degree Examination, June/July 2024
Digital Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a.   With a neat block diagram, explain the generation and detection of coherent QPSK signal. **(10 Marks)**

b.   Binary data is transmitted over a microwave link at a rate of 10^6 bits/sec and the PSD of noise at the receiver input is 10^{-10} watt/Hz. Find the average carrier power required to maintain an average probability of error $P_C \leq 10^{-4}$ for coherent binary FSK. What is the required channel bandwidth? Assume $erf(2.8) = 0.9998$. **(10 Marks)**

OR

2   a.   With a neat block diagram, explain the generation and detection of non-coherent DPSK signal. **(10 Marks)**

b.   Derive an expression for error probability of binary PSK using coherent detection. **(10 Marks)**

Module-2

3   a.   Explain error-Schmidt orthogonalization procedure. **(10 Marks)**

b.   Explain matched filter receiver. List the properties of matched filter receiver. **(10 Marks)**

OR

4   a.   Three signals $S_1(f)$, $S_2(f)$ and $S_3(f)$ are shown in Fig. Q4 (a) below. Apply Gram-Schmidt procedure to obtain an orthonormal basis for signals. Express $S_1(f)$, $S_2(f)$ and $S_3(f)$ in terms of orthonormal basis functions. **(10 Marks)**
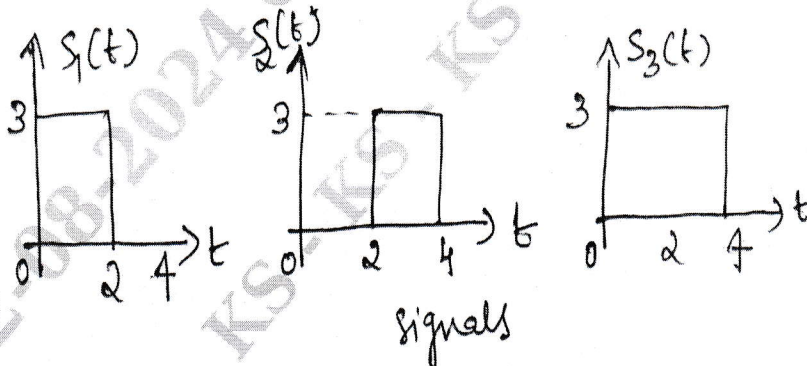

Fig. Q4 (a)

b.   Explain the design of bandlimited signals, with controlled ISI-partial response. **(10 Marks)**

Module-3

5   a.   Explain the model of spread spectrum digital communication. **(10 Marks)**

b.   Explain direct sequence spread-spectrum system. **(10 Marks)**

OR

6 a. For a linear feedback shift register with three stage (M = 3), evaluate the maximum length PN sequence for feedback taps = (3, 1). Draw the schematic arrangement and verify all the properties of PN sequence is generated output. Sketch the sequence, its autocorrelation function. If the chip rate happens to be 10 MHz.
   Test all the three properties of ML sequence after generating PN sequence for a 3-stage feedback shift register. Assume 100 as initial state. **(10 Marks)**

   b. Explain the application of DS-spread spectrum signals. **(10 Marks)**

Module-4

7 a. State the properties of entropy. Derive an expression for average information content of symbols in long independent sequences. **(10 Marks)**

   b. A source emits an independent sequence of symbols from an alphabet consisting of five symbols. A, B, C, D and E with probabilities of $\frac{1}{4}, \frac{1}{8}, \frac{1}{8}, \frac{3}{16}$ and $\frac{5}{16}$ respectively. Find the Shannon binary code for each symbol and efficiency of the coding scheme. **(10 Marks)**

OR

8 a. Consider the zero memory source with probabilities $P = \{0.4, 0.2, 0.1, 0.1, 0.05, 0.05\}$
   (i) Construct a binary Huffman code by placing the composite symbol as low as possible.
   (ii) Construct binary Huffman code by placing composite symbol as high as possible. In each case compute the variances of the word length and comment on the result. **(10 Marks)**

   b. Explain the types of codes. **(10 Marks)**

Module-5

9 a. Define Hamming weight, Hamming distance and Minimum distance. **(06 Marks)**
   b. Explain single error correcting Hamming codes. **(06 Marks)**
   c. What do you understand by Trelli's diagram? Explain clearly. **(08 Marks)**

OR

10 a. Explain Matrix description of Linear block codes. **(10 Marks)**

   b. For a systematic (7, 4) LBC, the parity matrix P is given by $P = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$.

   (i) Find all possible valid code-vectors.
   (ii) Draw the corresponding encoding circuit.
   (iii) A single error has occurred within the given received vectors. Detect and correct those errors, $R_A = 0111110$ and $R_B = 1011100$
   (iv) Draw the syndrome calculation circuit. **(10 Marks)**

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **21EC52**

Fifth Semester B.E. Degree Examination, June/July 2024
Computer Organization and ARM Microcontroller

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. With a neat diagram, explain basic operational concepts of computer.   (10 Marks)
    b. Explain in brief, the different types of key parameters that affect the processor performance.   (06 Marks)
    c. Explain Single-BUS structure in computer.   (04 Marks)

OR

2   a. Define Interrupt. Explain Interrupt hardware with neat diagram.   (05 Marks)
    b. What is DMA? Explain the use of DMA controllers in a computer system with neat diagram.   (05 Marks)
    c. What is Bus arbitration? Explain two approaches of bus arbitration with neat diagram.   (10 Marks)

Module-2

3   a. Draw and explain the Internal organization of $2M \times 8$ Asynchronous DRAM chip.   (10 Marks)
    b. With a neat diagram, explain virtual memory organization.   (10 Marks)

OR

4   a. Discuss with neat diagram, the single bus organization of data path inside a processor.   (10 Marks)
    b. Give the control sequences for execution of an instruction ADD (R_3), R_1 and explain each step in detail.   (05 Marks)
    c. Write short note on Basic concepts of instruction pipelining.   (05 Marks)

Module-3

5   a. With neat diagram, explain ARM embedded system hardware.   (10 Marks)
    b. Distinguish between RISC and CISC.   (04 Marks)
    c. Discuss how the embedded system software components used to control an embedded device.   (06 Marks)

OR

6   a. Describe the ARM core dataflow model with neat diagram.   (08 Marks)
    b. Write basic layout of a generic program status register.   (04 Marks)
    c. With table, describe the various Interrupts and Exception along with the vector addresses.   (08 Marks)

Module-4

7   a. Explain the following ARM instruction with an example for each :
       MVN, LSL, ROR, ADC, ORR.   (10 Marks)
    b. Mention the Instuctions/Syntax which are used for call a routine.   (04 Marks)
    c. Explain how LOAD-STORE instructions transfer data between memory and process registers.   (06 Marks)

OR

8   a.   Explain the following ARM Instruction with an example for each : LDR, SWI, SBC, SMULL and CLZ.   **(10 Marks)**

      b.   Mention the instruction used for accessing program status register, explain the same using suitable example.   **(05 Marks)**

      c.   Explain the saturation instructions used in ARM $\vee$ 5E processor.   **(05 Marks)**

Module-5

9   a.   Discuss with an example code, the steps involved in ARM-Thumb interworking.   **(08 Marks)**

      b.   Explain the stack operations using PUSH and POP instructions in Thumb with suitable example.   **(06 Marks)**

      c.   Write an ALP to add the first 10 integer numbers.   **(06 Marks)**

OR

10   a.   Describe the Basic C Data types are available in ARM processor.   **(10 Marks)**

      b.   In C looping structure, explain loops with a first number of iterations with suitable example.   **(10 Marks)**

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Fifth Semester B.E. Degree Examination, June/July 2024
Computer Communication Networks

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Mention the layers of TCP/IP protocol suite and explain briefly about layers and protocols in each layer. **(08 Marks)**
   b. Explain the packet format of ARP and show the ARP request and ARP response transmissions with suitable example. **(08 Marks)**
   c. Discuss about link layer addressing. **(04 Marks)**

OR

2 a. Compare various physical topologies in a computer network. **(08 Marks)**
   b. Explain different services offered by data link layer in brief. Also explain three types of addresses used in link layer protocols. **(08 Marks)**
   c. Show the encapsulation and decapsulation representation in the TCP/IP model and explain. **(04 Marks)**

Module-2

3 a. Explain CSMA/CA protocol with a flow diagram. What are the three strategies used in CSMA/CA algorithm. **(08 Marks)**
   b. Explain the Ethernet frame format of standard Ethernet. What are the minimum and maximum length of the frame. **(08 Marks)**
   c. A networks using CSMA/CD has a bandwidth of 10Mbps. If the maximum propagation time (including the delays in the devices and ignoring the time needed to send a jamming signal) is 25.6μs, what is the minimum size of the frame? **(04 Marks)**

OR

4 a. Explain spanning tree algorithm to solve looping problem in a system of connected LANs. **(08 Marks)**
   b. Explain VLAN. How is it used in grouping the stations? Explain the characteristics used to group the stations in VLAN. **(08 Marks)**
   c. In a standard Ethernet with the transmission rate of 10Mbps, assume that the length of the medium is 2500m and the size of the frame is 512 bits. The propagation speed of a signal in a cable is normally 2×10^8m/s. Find the propagation delay transmission delay, number of frames that can fit in the medium, and efficiency of standard Ethernet. **(04 Marks)**

Module-3

5 a. Explain IPv4 datagram format with neat diagram. **(08 Marks)**
   b. Explain distance vector routing algorithm using Bellman ford equation with suitable example. **(08 Marks)**
   c. An organization is granted a block of addresses with the beginning address 14.24.74.4/24. The organization needs to have 3 subblocks to use in its three subnets : one subblock of 10 addresses, one subblock of 60 addresses and one subblock of and one subblock of 120 addresses. Design the subblocks. **(04 Marks)**

OR

6 a. With a neat diagram, explain the IPv6 packet format.   (08 Marks)
   b. Explain a simple implementation of Networks Address Translation (NAT) and address
       translation with a neat diagram.   (08 Marks)
   c. Illustrate Path Vector Routing With An Example.   (04 Marks)

Module-4

7 a. Describe the general services provided by UDP. Explain the different field in user datagram
       packet format with a neat diagram.   (08 Marks)
   b. Explain the working of Go-back-N protocol. Also explain the send window ; sliding send
       window and receive window.   (08 Marks)
   c. Following is the content of UDP header :
       CB84000D001C001C. Find the
       i)   Source port number
       ii)   Destination port number
       iii) Length of datagram
       iv)   Length of data.   (04 Marks)

OR

8 a. List the features of Transmission Control Protocol (TCP). Explain the TCP segment format
       with diagram. s   (08 Marks)
   b. Explain the selective repeat protocol for flow control. Outline the send window and receive
       window structure for selective repeat protocol.   (08 Marks)
   c. Suppose a TCP connection is transferring a file of 5000 bytes. The first byte is numbered
       10001. What are the sequence numbers for each segment if data are sent in five segments,
       each carrying 1000 bytes?   (04 Marks)

Module-5

9 a. Explain the following with respect to Hypertext Transfer Protocol :
       Persistent and non-persistent connection
       Message formats.   (08 Marks)
   b. Explain the architecture of E-mail and protocols used in E-mail.   (08 Marks)
   c. Write short notes on security attacks in the computer networks.   (04 Marks)

OR

10 a. Explain the basic idea of File Transfer Protocol (FTP) and also explain the two connections
        in FTP.   (08 Marks)
    b. Explain with a neat diagram, how leaky bucket algorithm can be implemented to control the
        traffic.   (08 Marks)
    c. Write short notes on the purpose of Domain Name System (DNS).   (04 Marks)

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21EC54

Fifth Semester B.E. Degree Examination, June/July 2024
Electromagnetic Waves

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. State and explain Coulomb's law of force between two point charges in vector form and mention the units of quantities in the force equation. **(06 Marks)**

b. Two point charge Q_1 and Q_2 are located at $(1, 2, 0)$m and $(2, 0, 0)$m respectively. Find the relation between the charges Q_1 and Q_2 such that the total force on a unit positive charge at $(-1, 1, 0)$ have : i) No x-component ii) No y-component. **(08 Marks)**

c. List the expressions of electrified intensity $\vec{E}$ due to various charge distributions. **(06 Marks)**

OR

2 a. Derive the expression for eclectic field intensity $(\vec{E})$ due to infinite line charge of uniform charge distribution and lies along the Z-axis. **(12 Marks)**

b. Evaluate $\vec{D}$ (Electric flux density) at a point $(6, 8, -10)$ due to :
i) A point charge of 40mC at the origin
ii) A uniform line charge of $\rho_L = 40\mu C / m^2$ on the z-axis
iii) A uniform surface charge density of $\rho_s = 57.2\mu C / m^2$ on the plane x = 12m. **(08 Marks)**

Module-2

3 a. State and prove Gauss's law for a point charge. **(06 Marks)**

b. The flux density within the cylindrical volume bounded by r = 5m, z = 0 to z = 2m is given by $\vec{D} = 30e^{-r}a_r - 2ZQ_z c / m^2$. Estimate the total outward flux crossing the surface of cylinder. **(08 Marks)**

c. Define and derive the mathematical expression for divergence of a vector $\vec{D}$. **(06 Marks)**

OR

4 a. Given $\vec{D} = 5ra_r c / m^2$, prove divergence theorem for a shell region enclosed by spherical surfaces @r = a and r = b (b > a) and centred @ the origin. **(08 Marks)**

b. Define electric potential. Obtain an expression for the potential difference between two points in an electric field. **(06 Marks)**

c. Drive current continuity equation. **(06 Marks)**

Module-3

5 a. Find V at P(2, 1, 3) for the field of two co-axial conducting cones with V = 50V @ $\theta = 30°$ and V = 20V @ @ $\theta = 50°$. **(06 Marks)**

b. Derive Laplace and Poisson's equation from Gauss's law. **(06 Marks)**

c. Use Laplace equation to find the capacitance per unit length of a co-axial cable of inner radius 'a'm and outer radius 'b'm. Assume $V = V_0$ @ r = a and V = 0 @ r = b. **(08 Marks)**

OR

6 a. State and explain Biot-Savart's law. (06 Marks)
   b. Give $H = 20r^2 a_\phi A/m$
       i) Determine the current density (J). (08 Marks)
       ii) Also determine the total current that crosses the surface $r = 1m$, $0 < \phi < 2\pi$ and $z = 0$,
   c. Explain the concept of magnetic flux and magnetic flux density. (06 Marks)

Module-4

7 a. A point charge of $Q = -1.2C$ has velocity $\vec{V} = [5a_x + 2ay - 3a_z]m/s$. Find the magnitude of the force exerted on the charge, if

   i) $\vec{E} = -18a_x + 5a_y - 10a_z v/m$

   ii) $\vec{B} = -4a_x + 4a_y + 3a_z T$

   iii) Both the field are present. (08 Marks)
   b. Derive an expression for the force on a differential current element placed in a magnetic field. (07 Marks)
   c. State and explain Faraday's law of electromagnetic induction. (05 Marks)

OR

8 a. Discuss the magnetic boundary conditions to apply to $\vec{B}$ and $\vec{H}$ at the interface between two different magnetic materials. (12 Marks)
   b. If $B = 0.05xa_y T$ in a material for which $x_m = 2.5$, find μr, μ, H, M, J, J_b. (08 Marks)

Module-5

9 a. Derive Maxwell's equation in integral and point form for time varying fields. (12 Marks)
   b. Verify the field $\vec{E} = E_m \sin x \sin t\, a_y$ and $\vec{H} = \dfrac{E_m}{\mu_0} \cos x \cos t\, a_z$ satisfy Maxwell's equations.

   (08 Marks)

OR

10 a. Determine the relation between $\vec{E}$ and $\vec{H}$ of an electromagnetic wave travelling in free space along z-direction. (10 Marks)
   b. Discuss uniform plane wave propagating in a good conducting media and also explain the term skin depth. (10 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2024
Research Methodology and Intellectual Property Rights

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Identify the meaning of Research and brief out the objectives and motivation in Engineering Research. **(10 Marks)**
   b. Identify the steps to find the "Solve a worthwhile problem". **(10 Marks)**

OR

2 a. Identify the types of Engineering Research and briefly explain them. **(10 Marks)**
   b. Identify the ethical issues related to authorship and brief out them. **(10 Marks)**

Module-2

3 a. Identify the essence of new and existing knowledge and explain briefly. **(10 Marks)**
   b. Identify how search operators are used to narrow down the search results. **(10 Marks)**

OR

4 a. Identify the impacts of title and keywords on citation. **(10 Marks)**
   b. Identify acknowledgement and attributions in research process and briefly explain. **(10 Marks)**

Module-3

5 a. Define Intellectual Property (IP). Explain the major types of IP. **(10 Marks)**
   b. Identify the process of patenting. Briefly explain. **(10 Marks)**

OR

6 a. Explain briefly the Commercialization of a patent. **(10 Marks)**
   b. What are the exclusions (product and processes) that cannot be patented? Explain. **(10 Marks)**

Module-4

7 a. Explain the classes or types of copyrights. **(10 Marks)**
   b. What is a Trademark? Explain the symbols in TM. **(10 Marks)**

OR

8 a. What are the advantages "the registration of a trademark provides to the proprietor"? **(10 Marks)**
   b. Identify process of Trademark registration and explain briefly the classification of TM. **(10 Marks)**

Module-5

9 a. Define Industrial design. Briefly explain acts and laws to govern Industrial design. **(10 Marks)**
   b. Identify procedure for registration of Industrial design by taking example of Aple Inc Vs Samsung Electronics Co. **(10 Marks)**

OR

10 a. Define Geographical Identification (GI) and briefly explain acts, laws and rules pertaining to GI. **(10 Marks)**
   b. Identify IP Organizations in INDIA. Explain schemes and programs for Intellectual Property Rights. **(10 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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Question Paper Version : A

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2024
Environmental Studies

Time: 1 hr.]

[Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.

2. Use only **Black ball point pen** for writing / darkening the circles.

3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**

4. Darkening two circles for the same question makes the answer invalid.

5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. In an ecosystem, the flow of energy is _____.
   a) Biodirectional   b) Cyclic   c) Unidirectional   d) Multidirectional

2. Which of the following is a biotic component of an ecosystem?
   a) Fungi   b) Solar light   c) Temperature   d) Humidity

3. Which pyramid is always upright?
   a) Energy   b) Biomass   c) Numbers   d) Food chain

4. The largest reservoir of nitrogen in our planet is,
   a) Oceans   b) Atmosphere   c) Biosphere   d) Fossil fuels

5. Abiotic components include,
   a) Soil   b) Temperature   c) Water   d) All of these

6. Primary consumer is,
   a) Herbivores   b) Carnivores   c) Macro consumers   d) Omnivores

7. The word "Environment" is derived from _____.
   a) Greek   b) French   c) Spanish   d) English

8. Mineral is,
   a) Organic matter   b) Naturally occurring inorganic substance
   c) Synthesis compound   d) None of these

Ver A – 1

9. The term ecosystem was first proposed by,
   a) Jacob Van Verkul   b) A.G.Transley   c) Costraza   d) Marrie Gibbs

10. Gold occur in,
    a) Sedimentary Deposits   b) Places deposits
    c) Hydrothermal deposits   d) None of these

11. Fluorosis is caused due to,
    a) No fluoride intake   b) Low fluoride intake
    c) Excessive fluoride intake   d) None of these

12. Decrease of oxygen level in water mainly causes,
    a) Fluorosis   b) Death of aquatic life
    c) Water pollution   d) Both (b) and (c)

13. Mineral resource are,
    a) Renewable   b) Non-Renewable   c) Equally distributed   d) None of these

14. Deforestation can,
    a) Increase the rainfall   b) Increase Soil fertility
    c) Introduce silt in rivers   d) None of these

15. Plants use _____ gas for photosynthesis.
    a) Oxygen   b) Methane   c) Nitrogen   d) Carbon dioxide

16. Forests prevent soil erosion by binding soil particles in their,
    a) Stems   b) Roots   c) Leaves   d) Buds

17. Nitrogen fixing bacteria exists in _____ of plants?
    a) Leaf   b) Roots   c) Steam   d) Flower

18. Which of the following is the source of ground water?
    a) Oceans   b) Springs   c) Rivers   d) All of these

19. The effluents from urban areas contain,
    a) Oil and greases   b) Detergents
    c) Nutrients   d) All of these

20. Maximum dissolved oxygen is required by,
    a) Fish   b) Bacteria   c) Vegetables   d) All of these

21. Which of the following is not a component of soil?
    a) Mineral matter   b) Organic matter   c) Ozone   d) Soil air

22. Definition of Noise is,
    a) Loud sound   b) Unwanted sound   c) Constant sound   d) Sound of high frequency

23. The Noise is measured in,
    a) Decibels   b) Joules   c) PPM   d) NTU

24. Noise pollution can be minimized by,
    a) Urbanization
    c) Reducing noise at source
    b) Maintaining silence
    d) None of these

25. Bursting crackers mainly causes,
    a)Noise pollution
    b) Plastic pollution
    c) Marine pollution
    d) None of these

26. Water pollution can be minimized by,
    a)Releasing sewage to ocean
    c) Treating waste water
    b) Releasing effluent to waste land
    d) None of these

27. Chlorine can be used to,
    a)To kill pathogenic microorganisms
    c) To clear the turbidity
    b) To increase the pH
    d) All of these

28. Carbon content is higher in,
    a)Soil
    b) Atmosphere
    c) Water
    d) Living matter

29. The depletion of trees is causing accumulation of _____.
    a)NO_3
    b) SO_2
    c) CO_2
    d) O_2

30. The adverse effect of modern agriculture is,
    a)Water pollution
    b) Soil degradation
    c) Water logging
    d) All of these

31. E.I.A is related to,
    a)Resource conservation
    c) Waste minimization
    b) Efficient Equipment process
    d) All of these

32. "Earth Day" is held every year on,
    a)June 5th
    b) November 23rd
    c) April 22nd
    d) January 26th

33. Which of the following is the most environmental friendly agriculture practice?
    a)Using chemical fertilizers
    c) Organic farming
    b) Using insecticides
    d) None of these

34. The diesel vehicles pollute the environmental largely through,
    a)NO_x
    b) CO
    c) Unburnt hydrocarbons
    d) All of these

35. Which among the following is clean fuel?
    a)Petrol
    b) Diesel
    c) Electricity
    d) CNG

36. Which among the following is not a greenhouse gas,?
    a)N_2O
    b) CFC's
    c) HFA's
    d) None of these

37. The protocol that reduces greenhouse gas emission's are,
    a)Kyoto protocol
    b) Cartagena protocol
    c) Montreal protocol
    d) Vienna protocol

38. Global Warming could affect,
    a) Climate
    c) Melting of glaciers
    b) Increase in Sea level
    d) All of these

39. Which of the following is a source of SO_2 in atmosphere?
    a) Volcanoes
    b) Thermal power plants
    c) H_2SO_4 manufacturing
    d) All of these

40. Atmospheric oxidation of SO_2 to SO_3 is influenced by,
    a) Sunlight
    b) Humidity
    c) Presence of hydrocarbons
    d) All of these

41. Acid Rain effects _____ .
    a) Materials
    b) Plants
    c) Soil
    d) All of these

42. Ozone layer is present in,
    a) Troposphere
    b) Stratosphere
    c) Mesosphere
    d) Thermosphere

43. Which of the following is the unit for measuring the thickness of ozone layer?
    a) Decibels
    b) Dobson unit
    c) Centimeter
    d) None of these

44. CFC's have been used as,
    a) Solvents
    b) Refrigerants
    c) Blowing agents for polymer foams
    d) All of these

45. Ozone hole was first discovered over,
    a) Arctic
    b) Antarctica
    c) Tropical region
    d) Africa

46. The term acid rain was coined in the year,
    a) 1952
    b) 1852
    c) 1652
    d) 1752

47. Which of the following is not a source of CO_2 in the atmosphere?
    a) Burning of fossil fuels
    b) Photosynthesis
    c) Volcanic Eruptions
    d) Animal and plant respiration and decay

48. Increase in Asthma attacks has been linked to high levels of,
    a) Oxygen
    b) Airborne dust particles
    c) Nitrogen
    d) All of these

49. Food chain is divided into _____ basic categories.
    a) Four
    b) Three
    c) Five
    d) Seven

50. About ¾ of the country's coal deposits are found in,
    a) Karnataka
    b) Tamil Nadu
    c) Kashmir
    d) Bihar and Orissa.

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