33 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Distributed System *(CT703)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What is Distributed System? Discuss the challenges of Distribution System with example. [2+6]
2. Mention the role of IDL and middleware in Distributed System. Explain RMI approach in the distributed object based system. [4+6]
3. Define DFS. How does DFS encourage sharing a storage device? Explain with the help of suitable architecture. [8]
4. How threads differ from process? How does checkpoint help in recovery? What does distributed commit refer to? [4+2+2]
5. Define flat and nested transaction. Discuss the approach of optimistic concurrency control in distributed transactions. [4+6]
6. Why it is difficult to synchronize physical clock? Explain how clock synchronization can be solved using logical clock. [2+6]
7. What are the reasons for replicating the service provide? Discuss about fault tolerant services. [4+4]
8. How cascading aborts occurs and can be solved? Explain the needs and roles of atomic commit protocol in distributed system. [8]
9. Write short notes on: [4×3]
   a) Christian's Algorithm
   b) Recovery approach in Distributed System
   c) CORBA services
   d) Monolithic and Microkernel

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Examination Control Division
2071 Shawan

Exam	[illegible]		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: – Distributed System *(CT703)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
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[1] Discuss the properties of Distributed System (DS). How interaction model addresses the relevant issues in DS? [6+2]

[2] What is the importance of IDL in RMI? Write the operation of static RMI. [3+5]

[3] What are the characteristics of SUN-NFS? Discuss with its architecture. [3+5]

[4] What are the common problems of physical clock synchronization algorithms? Write Chandy-Lamport's algorithm for recording global states in Distributed System. [3+5]

[5] Measure the performance issue of non-token based Ricart-Agrawal Algorithm. Write alternate algorithm to address those performance issues. [2+6]

[6] How to come to consensus in DS? Discuss with an approach, how do you make the distributed system service highly available? [3+5]

[7] What are the relationships between parent and child transactions in DS? Write the problems of locking with the solutions to avoid it. [4+8]

[8] How do you avoid faults in DS? Compare independent checkpointing with coordinated checkpointing approach. [4+4]

[9] Write short notes on (Any Three) [4+4+4]

[a] Monolithic and Micro-Kernel

[b] Services provided by CORBA with the functions of Object Adapter

[c] Two Phase Distributed Commit

[d] Distributed Debugging

[e] RPC communication semantics

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Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Distributed System (CT703)

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt **All** questions.*
- *The figures in the margin indicate **Full Marks**.*
- *Assume suitable data if necessary.*

1. "Distributed system acts as a single coherent system to its end user." Justify the statement with its features and challenges. What is fundamental model? [6+2]
2. Define DFS. How RMI perform communication between distributed objects? Explain. [2+6]
3. Verify with proper explanations that DNS is a distributed hierarchical database system. [10]
4. Write the importance of election algorithm. Explain BULLY algorithm with suitable example. Compare it with Ring based algorithm. [8]
5. List the goals of JINI. What are CORBA services? How does operating system support for distributed system? [4+2+2]
6. Explain with algorithmic steps, how token ring algorithm works for mutual exclusion in distributed system. [10]
7. Explain Byzantine general problem to handle faulty process with example. Describe any one failure recovery technique. [8]
8. Define lock in concurrency control. How can concurrency be controlled in distributed transactions? What situation does lead to distributed deadlock? [1+4+3]
9. Write short notes on: [3×4]
   a) Heterogeneity in distributed system
   b) Rendezvous concept and implementation
   c) Flat versus nested locks
   d) Process Resilience

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Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Distributed System *(CT703)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define Distributed System, What are advantages and disadvantages of distributed system? [2+6]
2. Draw and explain distributed file service architecture. How does that architecture encourage the sharing of storage resources in distributed system? Explain. [6+2]
3. Differentiate between RPC and RMI. How does modern RPC maintain the transparency in distributed system? [2+6]
4. Compare process and threads. Why threads are important in distributed System. [2+2]
5. Give an example of heterogeneous model of distributed application. How is distributed operating system realized in practical distributed systems? Explain. [2+4]
6. What do you mean physical and logical clocks? Explain Network Time Protocol and Berkeley Algorithm for physical clock synchronization. [2+4+2]
7. How does mutual exclusion help in co-ordination in distributed system? Explain the way how Lamport algorithm ensures mutual exclusion? [2+6]
8. What are the major objectives for replication in distributed system? Explain primary backup model for fault tolerance. [3+5]
9. Differentiate between nested transaction and distributed transaction with examples. How is commitment ensured in distributed transactions? [2+6]
10. What do you mean by fault tolerant system? What do you mean by Byzantine Failure? Explain Byzantine Generals problem to illustrate how agreement can be reached in faulty system. [1+2+5]
11. Write short notes on: [3+3]
    a) Comparison of CORBA and Mach
    b) Timestamp ordering in concurrency control

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Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Distributed System *(CT703)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. How do you define Distributed System? Explain with the model, how hardware, data and controls are distributed in the distributed system environment. [2+6]
2. Explain the ways how distributed objects communicate with each other. Differentiate between RPC and RMI. [4+4]
3. Define distributed file system. Draw and explain distributed file service architecture in detail. [2+6]
4. Differentiate between homogeneous and heterogeneous distributed applications with example. [4]
5. Compare physical clocks and logical clocks with its implementation semantics. Describe Lamport's timestamp algorithm with its benefits and drawbacks. [2+6]
6. Explain any one election technique in Distributed System. Discuss with steps how consensus can be achieved in Distributed System. [5+3]
7. How do you say that replication is one of the scaling techniques in Distributed System? How to handle concurrent invocations with object replication in distributed object based system? [2+4]
8. What are the roles of atomic commitment protocol (ACP) in distributed transactions? Explain the different methods of concurrency control in distributed transactions. [2+6]
9. What are the dependability requirements of fault tolerant system? What do you mean by K-fault tolerant? How to come agreement in faulty system? Explain with the approach of byzantine generals problem. [2+2+4]
10. Write different services provided by CORBA. What are dynamic and static invocation approaches of CORBA. [2+4]
11. Write short notes on: [4+4]
    a) Process and threads in OS
    b) Distributed commit

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Examination Control Division
2069 Chaitra

Exam.	[redacted]
Level	BE
Programme	BCT
Year / Part	IV / I

Subject: - Distributed System *(CT703)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the major goals of distributed system? Explain the need of transparency in distributed system along with the challenges in achieving that. [4+4]
2. How do you convince that middleware plays the important role in Distributed System? Explain the operation of RPC in client server communication in Distributed System. [3+5]
3. What do you mean by file and directory service? Explain the operation of SUN NFS with its architecture. [3+5]
4. Why network operating system (NOS) is widely preferred over distributed operating system (DOS) in practical distributed systems? Explain DOS as a middleware. [4+4]
5. Define logical and physical clocks. Explain Lamport timestamp algorithm along with an example. [2+6]
6. Present a practical scenario where you need an election algorithm. Explain an election algorithm with example that is suitable to your scenario. [2+4]
7. Compare passive replication with active replication approach. Also discuss with a technique that make the distributed system service highly available. [2+4]
8. What do you mean by Distributed Deadlock? Explain the two-phase commit protocol of handling distributed transaction. [2+5]
9. What are the flat and nested transactions? Describe the methods for concurrency control in distributed system. [3+4]
10. What do you mean by faults, failures and errors? How do you handle faults in Distributed System? Explain process resilience approach in brief. [2+2+4]
11. What is IDL? Explain CORBA RMI with its services. [2+4]

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Examination Control Division
2068 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Distributed System *(Elective I)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe precisely what is meant by a scalable system. Explain distribution transparency in Distributed Systems. [4+4]
2. Explain how GFS handles client request? [8]
3. Why do we have single master in GFS managing millions of chunk servers? What are done to manage it without overloading single master? [8]
4. Explain the control flow of write mutation with diagram. [8]
5. Suppose your company got more investment so you can now increase your default replication order by 2 from current value 3 so as to make it your data more available and reliable. Suddenly master has to create two replicas of each file chunks. Yet, it has to satisfy client request which are more important than just replication. How does single master manage re-replication task? [8]
6. List and explain four main master operations in GFS. [4]
7. Explain term 'NoSQL'. Why does normalization fail in data analytics scenario? [4+4]
8. Define the components that make up a basic MapReduce job and illustrate with diagram how does the data flow through Hadoop MapReduce. [8]

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Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Distributed System *(Elective I)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *__All__ questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. a. Discuss pitfalls of distributed system.
   b. What are goals of distributed system? Explain scalability goal in detail.
2. a. Explain Distributed computing systems.
   b. Define architectural styles. Describe common architectural styles.
3. a. Explain different centralized system architectures.
   b. Discuss super peer in decentralized architecture.
4. a. Discuss the single master aspect of GFS architecture.
   b. Enlist GFS metadata. Why chunk locations not persisted by master, discuss it.
5. a. Discuss consistency guarantees made by GFS.
   b. Explain the lease mechanism in GFS with examples.
6. a. Discuss GFS high availability.
   b. Discuss re-replication and rebalancing role of GFS master.
7. Define referential transparency with example. Explain mapreduce program execution flow.
8. a. Write pseudo code for inverted index (term vector per host) generation through mapreduce.
   b. Discuss fault tolerance of mapreduce jobs.

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INSTITUTE OF ENGINEERING
Examination Control Division
2067 Mangsir

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Distributed System *(Elective II)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Discuss the important characteristics of Distributed Systems. Explain distribution transpareny goal of distributed systems (3+7)
2. What is an architectural style? Discuss with one example structured P2P architecture. What is a super peer , discuss its usage in P2P systems? (2+4+4)
3. Discuss assumptions made in GFS design and their consequences. Explain the metadata of GFS? (6+4)
4. Explain data and control flow and working of lease mechanish in normal write operation of GFS. (10)
5. Discuss the main points that MR draws from referential transpareny in functional programming. With an example of your choice explain the MapReduce programming model. (3+8)
6. You are given student records consisting of following fields in each record: (10)
   rollno(integer),department id (integer), name (string),subject code(integer),score on the subject (double). You can assume the delimiter of the fields as space. It is required to calculate the agerage value of score for a student and present the average score and total score along with name, department and rollno of the student in the output records. The order of the output be according to rollno, and if the same rollno appear in two departments then by rollno+department. (Note here that the rollno and department id are integers not strings).
   Write a complete code for mapper,reducer,combiner(if any),partitioner(if any)in Java language on Hadoop platform. You can ommit the job submission and imports part. Clearly specify the key/value data types in each phase.

   OR

   Write a complete pseudocode for mapper,reducer,partitioner(if any),combiner(if any) along with clear explanation of the key/value types in each phase. (10)
7. Discuss the problems associated with parameter passing in RPC. Explain with diagram different alternatives of asynchronous RPC. (6+4)
8. Explain any 3 of the following (3X3)
   a) Use of multicast communication in Distributed systems
   b) External sort is related with MR programming model in Hadoop
   c) Compression can improve the performance of MapReduce job
   d) P2P style of architecture of Cassandra (just discuss to show the p2p style not the entire architecture)

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TRIBHUVAN UNIVERSITY	Exam.	New / Back (2066 & Later Batch)	
INSTITUTE OF ENGINEERING	Level	BE	Full Marks 80
Examination Control Division	Programme	BCT	Pass Marks 32
2072 Kartik	Year / Part	IV / I	Time 3 hrs.

Subject: - Computer Network *(CT702)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. You are assigned to design a network infrastructure for a 3-star hotel. Recommend a network solution with hardwares and softwares in current trend that can be used in the hotel. Make necessary assumptions and justify your recommendation with logical arguments where possible. [8]
2. List out the functions of physical layer in TCP/IP reference model. Explain different types of transmission media. [2+6]
3. What are the functions of data-link layer? Explain the channel allocation problem with example. [3+5]
4. What are the functions of network layer? Explain briefly about multicast routing protocols and unicast routing protocols. [2+6]
5. Network layer is one of the key layers in OSI reference model, why? Differentiate between distance vector routing and static link routing. [2+6]
6. What is a TCP connection? Explain how a TCP connection can be gracefully terminated. [2+6]
7. What are the different components of email server? Explain different types of electronic mail sending and accessing protocol. [2+6]
8. What is IPV6? What methods are used so that IPV6 and IPV4 networks are interoperable? [2+6]
9. What is firewall? What are their types? Encrypt and decrypt "OVEL" message using RSA algorithm. [1+1+6]
10. Write short notes on: [4×2]
    a) Digital signature
    b) IPSec

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INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	[redacted]		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: Computer Networks (CT702)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. What is computer network? Distinguish between OSI and TCP/IP reference model. [2+6]
2. What is transmission media? Explain about any three transmission media in detail. [2+6]
3. What are the major functions of data link layer? Explain about framing in detail. [3+5]
4. What is routing? Differentiate between link state routing and distance vector routing. [2+6]
5. Write short notes on: (any two) [4×4]
   a) ARP
   b) ICMP
   c) IP
6. Distinguish between TCP and UDP. How is TCP connection established? Explain. [3+5]
7. SMTP is a text based protocol and uses 7 bit ascii. How can this be used to transmit sometimes like images? Explain. [8]
8. What are the drawbacks of IPV4? Which of these drawbacks do IPV6 solve? Explain. [2+5]
9. What is cryptography? Differentiate between symmetric key and public key cryptography. [2+6]
10. Write short notes on: (any two) [4×2]
    a) WEP
    b) IDS
    c) SSL

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2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network *(CT702)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by network architecture? Compare TCP/IP and OSI reference models. Explain X.25 Network with its key feature. [2+3+3]
2. What is ISDN? Explain about the ISDN architecture in detail with example. [2+6]
3. What are multiple access protocols? Explain how multiple access is achieved in IEEE 802.5. [2+6]
4. What is network security? Explain Virtual Private Network (VPN) with an example. [2+4]
5. You are given the following address space 10.10.10.0/24. You have to assign addresses to 4 departments with the following hosts 5, 16, 23 and 27 respectively. Perform the subnetting in such a way that the IP address wastage in each department are minimum. Also find out the subnet mask, network address, broadcast address and unassigned range in each department. [10]
6. Why port number is used in networking? What are the services of transport layer? Differentiate between TCP and UDP protocol. [1+2+5]
7. What is DNS? Explain the structure of DNS request and response with practical example. [2+6]
8. What are the problems of IPv4? How IPv6 reduce these problems? Explain different strategies to transit from IPv4 and IPv6. [2+2+4]
9. What is public key cryptography? Explain about RSA algorithm in detail. [2+6]
10. Write short notes on: [4×2]
    a) SSL
    b) WEP

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2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Networks *(CT702)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the features of Client/Server Architecture? What are headers and trailers and how do they get added and removed? Explain. [4+4]
2. What do you mean by data switching? Explain about various types of switching with practical implementation example. [8]
3. What is the difference between Error Correcting and Error detection process? A bit string 01111011111011111110 needs to be transmitted at the data link layer what is string actually transmitted after bit stuffing, if flag patterns is 01111110. [5+3]
4. Explain the working principle of different types of network devices Repeater, HUB, Bridge, Switch and Router. [8]
5. How can you dedicate 10, 12, 8, 14 public IP addresses to department A, B, C and D respectively from the pool of class C with minimum losses of IP? Explain. [8]
6. Explain the UDP segment structure. Illustrate your answer with appropriate figures. [8]
7. What do you mean by email server? What are the protocols used on it? [2+6]
8. Explain the IPv6 datagram format with appropriate figures. [8]
9. Explain briefly how firewalls protect network and also explain different types of Firewall. Illustrate your answer with appropriate figures. [8]
10. What do you mean by Network security? Explain the operation of Data Encryption Standard Algorithm? [3+5]

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Examination Control Division
2070 Ashad

Exam.	Old Back (2065 & Earlier Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network *(EG741CT)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by protocol and interfaces? Write the protocols used in each layer of ICP/IP model. [4+4]
2. How do you define network topology? Discuss the types of network topologies based on its size and geographical distributions. [3+5]
3. What are the functions of LLC and MAC sub-layer? Discuss different farming approaches used in data link layer. [2+2+6]
4. How data transfer occurs in Ethernet network? Explain. [6]
5. Discuss how CSMA works? Differentiate it with CSMA-CD. Explain the optical fiber cabling standards with examples. [2+2+4]
6. What is virus circuit switching? Describe the operation of Frame-Relay network. [2+6]
7. Differentiate between adaptive and non-adaptive routing. Explain shortest path finding algorithm in link state routing. [3+5]
8. Compare between leaky bucket and token bucket algorithm with the operation how token bucket works. [3+5]
9. What are the major problems with existing IPv4 network? Explain IPv4 addressing and sub-netting with example. [4+4]
10. Write short notes on: [4+4]
    a) ALOHA system
    b) TCP header

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Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network *(CT702)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain the need of Networking Software in the form of Hierarchy? Mention in which level layer of OSI reference model following tasks are done. [6+2]
   i) Timing and voltage of received signal
   ii) Encryption and decryption of data
   iii) Data framing
   iv) Point-to-point connection of socket.
2. Define switching and multiplexing. Differentiate between circuit switching and packet switching. [4+4]
3. Explain different types of Data link layer framing mechanisms. [8]
4. What is the contribution of sub-netting in IP address management? Show the importance in this case. Banijya bank need to allocate 15 IPs in HR department; 30 in finance department, 24 in customer care unit and 25 in ATM machines. If you have one network of class C range public IP address. Describe how you will manage it. [8]
5. Why is routing protocol necessary? Explain the working process of Routing Information protocol (RIP) with example. [3+5]
6. Why do you think that there exist two protocols in transport layer where as there exists only one protocol in Internet layer in TCP/IP reference model. Explain token bucket algorithm for congestion control. [5+3]
7. What is HTTP protocol? With an example explain how a request initiated by a HTTP client is served by a HTTP server. [2+6]
8. Explain the IPv6 datagram format and the function of each field with necessary figure. [8]
9. Compare symmetric key encryption method with asymmetric key encryption. Describe the operation of RSA algorithm. [4+4]
10. What is network security? How can firewalls enhance network security? Explain how firewalls can protect a system. [2+2+4]

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Examination Control Division
2068 Chaitra

Exam.		Regular / Back	
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Why are the network softwares defined with distinct layers stacked on top of one another? What are the factors to be considered when designing these layers? [2+6]
2. Why do we need RAID in the computer networks? Define and discuss the differences between RAID 0, RAID 1 and RAID 5. [2+6]
3. What is a telephone? With a simple diagram of a telephone network explain how the system works. [2+6]
4. Why channel access mechanism is important in computer networking? Explain the operation of IEEE 802.5 with its frame format. [3+7]
5. Differentiate: [2×5]
   a) Distance vector and link state routing algorithm
   b) Circuit switching and packet switching
6. What is X.25? Explain the format of X.25 packet in detail. [3+5]
7. What are the differences between TCP and UDP services? Explain the TCP datagram format in detail. [3+5]
8. Suppose there are 4 departments A, B, C and D. The department A has 23 hosts, B has 16, C has 28 and D has 13 hosts. You are given a networks 202.70.64.0/24. Perform the subnetting in such a way that the IP address wastage in each department are minimum and also find out the sunbet mask, network address, broadcast, and unable host range in each department. [10]
9. Write short notes on: [2×5]
   a) Network Security
   b) Router and Gateway

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06/BCT

31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What is a switching? Differentiate between packet switching and circuit switching. [2+6]
2. What are types of twisted pair cable? Calculate the efficiency of slotted Aloha. [4+4]
3. What is a virtual LAN? Design a network which consists of two VLAN named student and department. Explain with necessary diagram, IP addresses and configurations. [2+6]
4. What is a logical address? You are given the IP address block 200.10.80.32/25. If there are five departments which require 5, 40, 28, 12, 6 hosts respectively. Design the subnet. [2+6]
5. What are the functions of transport layer? Draw the segment structure of TCP. [3+5]
6. What is a fragmentation and re-assembly? Explain about any intra-AS routing protocol. [3+5]
7. What are the advantages of IPV6? The maximum payload segment is 65495 byte. Why was such strange number chosen? [4+4]
8. What is the function of proxy server? Explain about electronic mail. [3+5]
9. What is a secure socket layer? Encrypt the message "DANGER" using RSA algorithm. [2+6]
10. Compare x.25 and frame relay network. A bit string 0111101111101111110 needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? [6+2]

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31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Ashadh

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Networks

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Why network software should be in hierarchical form? Explain in detail about OSI layer. [3+5]
2. If you are assigned to design a LAN for Pulchowk Campus having 5 departments. Each department will have 100 computers locating in 5 rooms each equipped with 20 computers. Make your own justification while selecting connecting devices and accessories. [6+2]
3. What do you mean by ISDN and what is it contribution in the field of data communication? Explain various types of multiplexing mechanism used in communication. [3+5]
4. Describe what do you understand by switching along with various types of switching mechanism. Explain the fault tolerance mechanism of FDDI. [4+4]
5. Why access control of channel is essential? Compare operating details of IEEE 802.4 and IEEE 802.5. [2+6]
6. Explain along with the packet format about the virtual circuit connection of X.25. [4+4]
7. Why routing is essential in computer networking? Compare working of distance vector routing algorithm with link state routing algorithm. [2+6]
8. Explain in detail about IP frame format. [8]
9. If you need to assign IP addresses to all computers of question no. 2 making each department as network. What will be your approach? Explain with IP address ranges you are suggesting. [8]
10. How the protocol SMTP does operate? Explain the procedures to make your network secured. [3+5]

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36 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 Bhadra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Way do communication process within computer network is divided into layers? How the process of data encapsulation occurs in transmission mode described by seven layers of OSI model. Compare OSI model with TCP/IP model. [2+2+4]

   b) What is client/server networking? Explain Active Networking model framework comparing with traditional legacy network. [3+5]

2. a) What are the services provided by data link layer? Explain any one methods of framing and flow control. [2+3+3]

   b) Calculate SNR and maximum channel capacity of a cat6 channel having bandwidth 300 MHz with 2mW and 200 μW as signal and noise power respectively. [4+4]

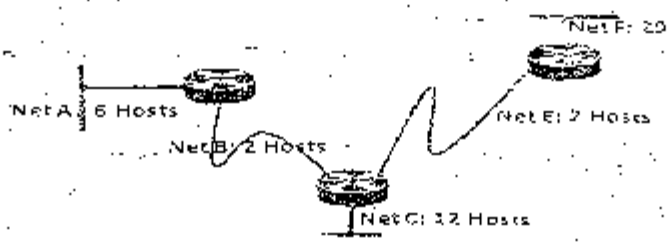
3. a) Describe the 802.3 Ethernet standard for CSMA/CD and compare it with 802.4 token bus technology. Explain how DSSS technique is applied in wireless transmission. [5+3]

   b) Differentiate between circuit switching and packet switching technology. Explain the operation how switched virtual circuit in frame relay network is established, maintained and teardown. [2+6]

4. a) What is unicast and multicast routing? Describe the concept of optimality principle. Describe how the routers in link state routing come into fully adjacency state. [2+6]

   b) What are the factors that cause congestion within WAN? Propose your best traffic shaping approach to manage congestion in packet switched network. [3+5]

5. a) Give the reason why the current world is moving to IPv6 addressing mechanism. Describe the IPv6 address types with its representation format. You are given the IPv4 address block 203.71.53.0/26; assign the IP subnet for the following network. [2+2+6]



   b) Write short notes on (any two) [3+3]

   i) TCP Sliding Window Protocol
   ii) Secrete Key Algorithm: DES
   iii) ISDN Signalling and ATM AAL
   iv) ICMP Message Types

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2066 Poush

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Define network and protocol for network. Explain peer-to-peer network process with example. [2+6]
2. Describe guided and unguided media used in computer network with their advantages. [8]
3. Explain the operation of pure ALOHA system. How CSMA/CD works? [4+4]
4. List the functions of Data Link Control Layer. Explain any two sliding window protocols with the advantages of piggybacking. [5+3]
5. Describe the policies that help in preventing the congestions within the network? Differentiate between leaky bucket and token bucket algorithm with their operation and working of token bucket. [4+6]
6. What do you understand by virtual circuit switching? Explain the X.25 virtual circuit switching. [2+6]
7. Explain the seven layers of OSI model with their example protocols. [8]
8. Briefly describe ICMP error and informational message types in IPv4 network infrastructure. [8]
9. How can we maintain the security within the communication network? Explain any one cryptography algorithm with example. [2+6]
10. Write short notes on (any two): [3+3]
    a) UDP and its application
    b) Network Devices: Hubs, Switches and Routers
    c) IPv4 Header Structure

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TRIBHUVAN UNIVERSITY INSTITUTE OF ENGINEERING **Examination Control Division** 2072 Kartik	Exam.	**Back (2068 & Old Back)**	
	Level	BE	Full Marks 80
	Programme	BCT	Pass Marks 32
	Year / Part	IV / I	Time 3 hrs.

Subject: - Digital Signal Analysis and Processing *(CT704)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Define energy and power signal. Check the signal x[n] = u[n] and x[n] = δ[n] is Energy or Power type. [2+3]
2. Find the output of LTI system having impulse response h[n] = (1/3)^n {u[n+1]-u[n-2]} and input signal x[n] = {2,1,0.5,3}. [5]
3. State the properties of region of convergence (ROC). Drive the convolution property of Z-transform. [3+3]
4. Find the output of LTI System having impulse response h[n] = (1/2)^n u[n] and input signal x[n] = $5e^{j\pi n/2}$ for $-\infty < n < \infty$. [4]
5. Plot Magnitude Response (not to the scale) of the system described by difference equation. [6]

   y[n]-0.5y[n-1]+0.3y[n-2] = x[n]+0.7x[n-1]
6. Determine the Direct Form II realization of the following system [4]

   y(n) = -0.5y(n-1)+0.72y(n-2)+0.72x(n)+0.36x(n-2)
7. Compute the lattice coefficients and draw the lattice structure of following FIR system [6]

   $H(z) = 1 + 2z^{-1} - 3z^{-2} + 4z^{-3}$
8. Draw the flowchart of Remez-Exchange theorem and explain it. Design an FIR linear phase filter using Kaiser window to meet the following specifications: [6+8]

   $0.99 \le |H(e^{jw})| \le 1.01$, for $0 \ge w \ge 0.19\pi$

   $|H(e^{jw})| \le 0.01$, for $0.21\pi \le w \le \pi$
9. Design a low pass digital filter by Bilinear Transformation method to an approximate Butterworth filter, if passband edge frequency is 0.25 π radians and maximum deviation of 1 dB below 0 dB gain in the passband. The maximum gain of -15 dB and frequency is 0.45 π radians in stopband. Consider sampling frequency 1Hz. [15]
10. Find 8-point DFT of sequence x[n] = {1,1,0,1,0,1,2} using Decimation in Time Fast Fourier Transform (DITFFT) algorithm. [7]
11. Why we need DFT? If $X_1(k)$ and $X_2(k)$ are DFT of sequence $x_1[n] = \{1,2,4\}$ and $x_2[n] = \{-1,2,3,1\}$ respectively, then find the sequence $x_3[n]$, if DFT of $x_3[n]$ is given by $X_3(k) = X_1(k) X_2(k)$. [2+6]

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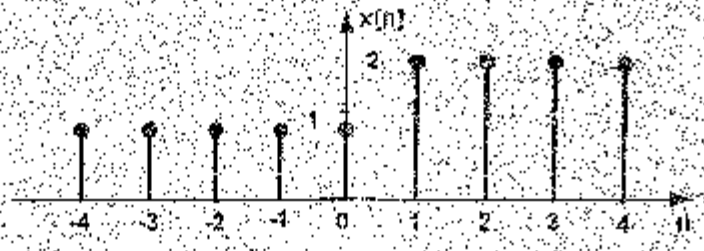
TRIBHUVAN UNIVERSITY INSTITUTE OF ENGINEERING **Examination Control Division** 2071 Shawan	Exam			
	Level	BE	Full Marks	80
	Programme	BCT	Pass Marks	32
	Year / Part	IV / I	Time	3 Hrs.

Subject - Digital Signal Analysis and Processing *(CT704)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>*
- ✓ *Assume suitable data if necessary.*

1. Find the odd and even part of the following signal. [4+5]



A discrete time LTI system has input signal and impulse response as,

$x[n] = \begin{cases} 1 & -1 \le n \le 1 \\ 0 & elsewhere \end{cases}$ and $h[n] = \begin{cases} 1 & -1 \le n \le 1 \\ 0 & elsewhere \end{cases}$ Find the output of the system using graphical method.

2. Find the inverse z transform of: [6]

$X(Z) = (1+2z^{-1}+z^{-2})/(1+1.5z^{-1}+0.5z^{-2}),\ |z| > 1$

using partial fraction method.

3. Why do we need difference equation? State linear constant coefficient difference equation and corresponding system function. [2+3+5]
Consider an LTI system with impulse response $h[n]=(1/2)^n u[n]$. Determine $y[n]$, if the input is $x[n] = Ae^{j\omega n}$.

4. If a 3 stage lattice filter for all pole polynomial has coefficients [5]
$K_1 = \frac{1}{4}, K_2 = \frac{1}{2}$ and $K_3 = \frac{1}{3}$. Obtain the system function of this filter.

5. What is the importance of quantization in Digital Signal Processing? Which one is better rounding or truncation? Explain about limit cycles in recursive system? Define dead band. [1+1+2+1]

6. Explain in detail about how rectangular window is used in FIR filter design. How Gibb's oscillations arise in this process. [6]

7. What is a Remez exchange algorithm? Derive its equation and draw its flow chart. [9]

8. Design a low pass digital filter by Bilinear Transformation method to an approximate Butter worth filter if passband frequency is 0.2π radians and maximum deviation of 1 db below 0 dB gain in the pass band. The maximum gain of -15 db and frequency is 0.4π radians in stop band, consider sampling frequency 1 Hz. [15]

9. A system has input signal $x[n] = \{1,2,3,4\}$ and impulse response $h[n] = \{1,3,5,7\}$ and the DFT of $x[n]$ is $X[k]$ and the DFT of $h[n]$ is $H[k]$. Find the output of the system $y[n]$ if $G[k] = X[k].H[k]$ [7]

10. Find DFT for $\{1, 1, 2, 0, 1, 2, 0, 1\}$ using FFT DIT butterfly algorithm and plot the spectrum. [6+2]

37 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam		Regular	
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing (CT 704)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Find the even and odd part of signal x[n]. [3]

$$x[n] = \begin{cases} 1 & \text{for } -4 \le n \le 0 \\ 2 & \text{for } 1 \le n \le 4 \end{cases}$$

2. A discrete time LTI system has impulse response $h(n) = \{1,3,2,-1,1\}$ for $-1 \le n \le 3$. Determine the system output y(n) if the input x(n) is given by $x(n) = 2\delta(n) - \delta(n-1)$. [6]

3. Define ROC. Find inverse Z-transform of [1+5]

$X(z) = 1/\{(z - 0.5)(z + 2)\}$, if
- i) ROC: $0.5 < |z| < 2$
- ii) ROC: $|z| < 0.5$
- iii) ROC: $|z| > 2$

4. The poles of a system are located at: 0.45+0.77i and -2 ± 0.3i and zeroes at 1.2 ± 3i. Map the poles and zero in the z-plane and plot the magnitude response of the system. [2+8]

5. Compute Lattice coefficients and draw lattice structure for given IIR system $H(z) = 1/(1-0.01z^{-1} - 0.23z^{-2} + 0.5z^{-3})$. Also check the stability of given system. [4+2+1]

6. What is limit cycle effect in recursive system? Describe with one example showing how it occurs. [3]

7. Design a low pass FIR filter having Pass band edge frequency $\omega_p = 0.3\pi$, Stop band edge frequency $\omega_s = 0.5\pi$ and Stop band attenuation $\alpha_s = 40$ dB using any appropriate window function. [8]

8. What is optimum filter? Show mathematical expression of Remez exchange algorithm for FIR filter design. [1+6]

9. What is the advantage of bilinear transformation? Design a low pass discrete time Butterworth filter applying bilinear transformation having specifications as follows: [2+9+4]
Pass band frequency (w_p) = 0.25 π radians
Stop band frequency (w_s) = 0.55 π radians
Pass band ripple (δ_p) = 0.11
and stop band ripple (δ_s) = 0.21
Consider sampling frequency 0.5 Hz.

Also, convert the obtained digital low-pass filter to high-pass filter with new pass band frequency (w'_p) = 0.45 π using digital domain transformation.

10. Why do we need Discrete Fourier Transform (DFT) although we have Discrete-time Fourier Transform (DTFT)? Find circular convolution between $x[n] = \{1, 2\}$ and $y[n] = u[n] - u[n-4]$. [2+5]

11. How fast is FFT? Draw the butterfly diagram and compute the value of X(7) using 8 pt DIT-FFT for the following sequences: [2+6]
$x(n) = \{1, 0, 0, 0, 0, 0, 0, 0\}$

6

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36 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing *(CT704)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Determine which of the following signals are periodic and compute their fundamental period: [3]
   i) $\text{Cos}(\pi n^2/8)$
   ii) $\text{Cos}(n/2)\cos(\pi n/4)$
2. Find output, y(n) when: h(n) = {5,4,3,2} and x(n) = {1,0,3,2} [6]
3. List out the properties of Region of Convergence. Find the Z-transform and locate the ROC of the signal. [2+4]
   $$x[n]=\left(-\frac{1}{3}\right)^n u[n]-\left(\frac{1}{3}\right)^n u[-n-1]$$
4. Find the output of LTI System having impulse response [4]
   $h[n] = (1/3)^n u[n]$ and input signal $x[n] = 5e^{j\pi n/2}$ for $-\infty < n < \infty$.
5. Plot Magnitude Response (not to the scale) of the system described by difference equation. $y[n] - 0.3\, y[n-1]+0.225y[n-2] = x[n] - 0.5x[n-1]$ [6]
6. Determine the Cascade Form realization of the following system. [4]
   $$y[n]-\frac{3}{4}y[n-1]+\frac{1}{8}y[n-2]-x[n]-2x[n-1]=0$$
7. Compute the lattice coefficients and draw the lattice structure of following FIR system
   $H(z)=1+3.1z^{-1}+5.5z^{-2}+4.2z^{-3}+2.3z^{-4}$ [6]
8. Describe how FIR filter can be designed by window method. Discuss the characteristics of different type of window function. [4+4]
9. What is an optimum filter? Show mathematical expression of Remez exchange algorithm for FIR filter design. [1+6]
10. Using bilinear transformation method, design a digital filter using Butterworth approximation which satisfiers the following conditions: [10]
    $$0.8 \le \left|He^{jw}\right| \le 1 \qquad \text{for } 0 \le w \le 0.2\pi$$
    $$\left|He^{jw}\right| \le 0.2 \qquad \text{for } 0.6\pi \le w \le \pi$$
11. A digital LPF with cut off frequency $w_c = 0.2575\,\pi$ is given as $H(Z)=\frac{0.1+0.4z^{-1}}{1-0.6z^{-1}+0.1z^{-2}}$
    Design a digital high pass filter with $w'_c = 0.3567\pi$. [5]
12. Define Padding zones. Find 8-point DFT of sequence. [1+6]
    x[n] = {1,1,0,0,1,1,2} using Decimation in Time Fast Fourier Transform (DITFFT) algorithm.
13. Why we need DFT? State and prove Circular Convolution property of DFT. [2+2+4]

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division.
2069 Bhadra

Exam.	Regular / Back.		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing *(EG774CT)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Plot the sequence $x[n] = u[n+8] - u[n-4]$. [3]

2. What is the period of following signals? [4]
   (a) $x[n] = \cos\left(\frac{11\pi}{3}n\right)$
   (b) $x[n] = e^{j\frac{7}{5}n}$

3. What is a sampling? How are the spectrum of continuous time signal and the spectrum of signal obtained by sampling the continuous time signal related? Illustrate with diagram. [6]

4. Write about the following properties of discrete time system:
   [a] linearity, [b] time invariance, [c] memory, [d]causality [e] stability. [5]

5. Find the frequency response $H(e^{j\omega})$ of the system characterized by difference equation $y[n] - 0.8\,y[n-1] + 0.15\,y[n-2] - x[n] = 0$. Plot the frequency response of the system. [6]

6. Realize the system function
$$H(z) = \frac{1}{(1-0.5z^{-1})\left(1-0.7e^{-j\frac{\pi}{4}}z^{-1}\right)\left(1-0.7e^{j\frac{\pi}{4}}z^{-1}\right)(1-0.3z^{-1})}$$
   in terms of cascade of second order sections. Draw the block diagram of the cascade realization. [6]

7. Write about the sign magnitude and 2's complement representation of binary fractional number. Write about truncation error and rounding error. [6]

8. Describe digital Butterworth filter design using impulse invariance technique. What are the limitations of impulse invariance technique? [15]

9. Derive the expression for frequency response of symmetric linear phase filter of length M, where M is odd. [6]

10. Use the Hanning window to design a digital low-pass FIR filter with Pass band frequency $(\omega_p) = 0.25\pi$ and Stop band frequency $(\omega_s) = 0.3\pi$. [8]

11. Perform circular convolution of the sequences $x[n] = [1\ 0\ 1]$ and $h[n] = [1\ 0\ 2\ 1]$. [5]

12. Write about multiplication and convolution property of Discrete Fourier Transform. [6]

13. Draw the flow diagram of four point decimation in time Fast Fourier Transform algorithm. [4]

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Bhadra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Find the energy and power of the signal $x[n] = u[n]$. [5]
2. Find the period of the signal $x[n] = \sum_{m=-\infty}^{\infty} \delta[n - 2 - 3m]$. Find the Fourier series coefficients of the signal x[n]. [6]
3. State whether or not the system $y[n] = e^{x[2n]}$ is (a) linear (b) time invariant (c) memoryless (d) causal. Where x[n] is input to system and y[n] is output of system. [5]
4. Convolve the sequences $x[n] = 3^n u[-n-5]$ and $y[n] = u[n-5]$. [5]
5. Find the frequency response of the linear time invariant system characterized by difference equation $y[n] - \frac{10}{24}y[n-1] + \frac{1}{24}y[n-2] = x[n]$. If input to the system is $x[n] = \sin\left(\frac{\pi}{3}n\right) + \sin\left(\frac{\pi}{5}n\right)$ then determine output y[n] of the system. [7]
6. Realize the overall system function: [9]

$$H(z) = \frac{(1 - \frac{1}{5}e^{-j\frac{\pi}{5}}z^{-1})(1 - \frac{1}{3}z^{-1})(1 - \frac{1}{5}e^{j\frac{\pi}{5}}z^{-1})}{(1 - \frac{4}{5}z^{-1})(1 - \frac{1}{7}e^{j\frac{\pi}{7}}z^{-1})(1 - \frac{1}{5}z^{-1})(1 - \frac{1}{7}e^{-j\frac{\pi}{7}}z^{-1})}$$

In terms of direct from I and direct from II structures. Draw the corresponding block diagrams of direct from I and direct from II structures.

7. How the spectrum of continuous time signal is related to spectrum of corresponding discrete time signal obtained by sampling the continuous time signal? Explain. Discuss what is aliasing and how it occurs. [8]
8. If passband edge frequency $\omega_p = 0.25\pi$, stopband edge frequency $\omega_s = 0.45\pi$, passband ripple $\delta_p = 0.17$ and stopband ripple $\delta_p = 0.27$ then design a digital lowpass Butterworth filter using bilinear transformation technique. [18]
9. Use Blackman window method to design a digital low-pass FIR filter with passband edge frequency $\omega_p = 0.24\pi$, stopband edge frequency $\omega_s = 0.34\pi$ where main lobe width of Blackmen window is $\frac{12\pi}{M}$, M is filter length. [9]
10. Use the Fast Fourier Transform decimation in frequency algorithm to find the discrete Fourier Transform of the sequence $x[n] = [1\ -2\ 2\ 1]$. [8]

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36 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing *(CT704)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Find the even and odd part of signal x[n], [3]
$$x[n]=\begin{cases}1 & \text{for} -4\le n\le 0\\ 2 & \text{for} 1\le n\le 4\end{cases}$$
2. Illustrate the significance of convolution summation in digital signal analysis. Compute the convolution of the following signals: $h(n)=\{1,0,1\}$ and $x(n)=\{1,-2,-2,3,4\}$ [2+4]
3. Define Region of Convergence. Find inverse Z - transform of
$X(z)=z/\{(z-1)(z-2)^2\}$, ROC: $|Z|<1$ [1+5]
4. Given H(z) for a system with the following difference equation:
$$y(n)=x(n)+x(n-2)$$ [2+6+2]
Plot its poles and zeros in Z plane. Determine its magnitude response. Also, determine whether system is causal and stable.
5. Draw lattice structure for given pole - zero system [6]
$H(z)=(0.5+2z^{-1}+0.6z^{-2})/(1-0.3z^{-1}+0.4z^{-2})$
6. What do you mean by Limit Cycle? How it occurs in recursive system? [1+3]
7. What is the condition satisfied by Linear phase FIR filter? Show that the filter with $h(n)=\{-1,0,1\}$ is a linear phase filter. [2+4]
8. Use Hanning window method to design a digital low-pass FIR filter with pass-band edge frequency (w_p) = 0.25π, stop-band edge frequency (w_s) = 0.35π where main lobe width of Hanning window is 8π/M, M is the filter length. [9]
9. Why Spectral Transformation is required? [2]
10. Design a low pass digital filter by impulse invariance method to an approximate Butterworth filter, if passband edge frequency is 0.2 π radians and maximum deviation of 0.5 dB below 0 dB gain in the passband. The maximum gain of -15 dB and frequency is 0.35 π radian in stopband, consider sampling frequency 1Hz. [13]
11. Why do we need Discrete Fourier Transform (DFT) although we have Discrete-time Fourier Transform (DTFT)? Find circular convolution between [2+5]
$x[n]=\{1,2\}$ and $y[n]=u[n]-u[n-4]$.
12. How fast is FFT? Draw the butterfly diagram and compute the value of x(7) using 8 pt DIT-FFT for the following sequences: [2+6]
$x(n)=\{1,0,0,0,0,0,0,0\}$

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36 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing *(CT704)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define Energy and Power type signal with suitable example. Check the signal $x[n]=\cos(2n\pi/5) + \sin(\pi n/3)$ is periodic or not. [2+2]
2. Define LTI system. Find the output of LTI system having impulse response $h[n] = 2u[n] - 2u[n-4]$ and input signal $x[n] = (1/3)^n u[n]$. [1+4]
3. State the properties of region of convergence (ROC)? Derive the time shifting property of Z-transform. [3+3]
4. Why do we need Difference Equation? Draw Pole-zero in Z-Plane and plot magnitude response (not to the scale) of the system described by difference equation [2+2+6]
   $y[n]- 0.4\, y[n-1] +0.2y[n-2] = x[n] + 0.1x[n-1] -0.06x[n-2]$
5. Determine the Direct Form II realization of the following system [4]
   $y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) - 0.252x(n-2)$
6. Compute the lattice coefficients and draw the lattice structure of following FIR system [6]
   $H(z) = 1+2z^{-1} - 3z^{-2} + 4z^{-3}$
7. Design a digital FIR filter for the design of the low pass filter having $\omega_p = 0.3\pi$, $\omega_s = 0.5\pi$, $\alpha_s = 40$ dB using suitable window function. [8]
8. What is optimum filter? Describe Remez exchange algorithm for FIR filter design with flow chart. [1+6]
9. What is the advantage of bilinear transformation? Design a low pass discrete time Butterworth filter applying bilinear transformation having specifications as follows: [2+9+4]

   Pass band frequency (w_p) = 0.25π radians
   Stop band frequency (w_s) = 0.55π radians
   Pass band ripple (δ_p) = 0.11
   And stop band ripple (δ_s) = 0.21

   Consider sampling frequency 0.5Hz

   Also, convert the obtained digital low-pass filter to high-pass filter with new pass band frequency (w'_p) = 0.45π using digital domain transformation.
10. Why do we need FFT? Find 8-point DFT of sequence $x[n] = \{1,1,2,2,1,1,2,1\}$ using Decimation in frequency FFT (DIFFT) algorithm. [2+7]
11. Find $x_3[n]$ if DFT of $x_3[n]$ is given by $X_3(k) = X_1(k)\, X_2(k)$ where $X_1(k)$ and $X_2(k)$ are 4-point DFT of $x_1[n] = \{1,2,-2\}$ and $x_2[n] = \{1,2,3,-1\}$ respectively. [6]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Mangsir

Exam.		Regular / Back	
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Compute and plot even and odd component of the sequence $x(n) = 2u[n] - 2u[n-4]$ where $u[n]$ is unit step sequence. [2]
2. Write whether or not the following sequences are periodic and write the period. [4]

   a) $x[n] = \cos\left(\frac{5\pi}{3}n\right)$

   b) $x[n] = \sin\left(\frac{\pi n}{\sqrt{2}} + \frac{\pi}{8}\right)$
3. Find the discrete Fourier coefficients of the periodic sequence with period N = 11 defined over a period as $x[n] = \begin{cases} 1, & |n| \le 2 \\ 0, & 2 < |n| \le 5 \end{cases}$ [4
4. Show whether or not the system $y(n) = nx[2(n-2)]$, $n > 0$ is (a) linear, (b) time invariant, (c) memoryless. [
5. Find the system function H(z) of the system characterised by difference equation $y[n] - \frac{5}{6}y[n-1] - \frac{1}{6}y[n-2] - x[n] = 0$. Find the poles and zeros of the system. Use the pole-zero diagram to plot the approximate frequency response magnitude of the system. [1
6. Realize the system function $H(z) = \frac{\left(1-\frac{1}{3}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)\left(1-\frac{1}{8}z^{-1}\right)}{\left(1-\frac{5}{6}z^{-1}\right)\left(1-\frac{1}{6}z^{-1}\right)\left(1-\frac{3}{4}e^{-j\frac{\pi}{4}}z^{-1}\right)\left(1-\frac{3}{4}e^{-j\frac{\pi}{4}}z^{-1}\right)}$ in terms of cascade of second order sections. Draw the block diagram of the cascade realization.
7. Show by giving examples that the quantization error by truncation for sign magnitude number, e_{tsm}, lies in the range $-(2^{-b} - 2^{-b_0}) \le e_{tsm} \le (2^{-b} - 2^{-b_0})$ and that for the 2's complement number, e_{t2c}, lies in the range $-(2^{-b} - 2^{-b_0}) \le e_{t2c} \le 0$. b_0 is the number of bits before quantization and b is the number of bits after quantization.
8. How does an IIR filter differ from an FIR filter?

9. Find the system function for digital filter using impulsive invariance technique from the analog Butterworth filter transfer function $H(s) = \frac{1}{(s+1.3)(s-1.3e^{j\frac{2\pi}{3}})(s-1.3e^{-j\frac{2\pi}{3}})}$. T = 1 second, and draw the block diagram of the system function, H(z), realized in terms of second order sections. [12]

10. Show that the filter with impulse response h[n], $0 \le n \le N-1$, where $h[n] = h[N-1-n]$, is a linear phase filter. [6]

11. Use the window method to design a digital low-pass FIR filter with Pass band frequency (ω_p) = 0.35π, Stop band frequency (ω_s) = 0.45π with stop-band attenuation of at least 54dB. [8]

12. Perform circular convolution of the sequences $x_1[n] = [1,2,1]$, $0 \le n \le 2$ and $x_2[n] = [1,2,0,1]$, $0 \le n \le 3$. [5]

13. The duality property of Discrete Fourier Transform (DFT) is, if $x[n] \xrightarrow{DFT} X[k]$ then $X[n] \xrightarrow{DFT} nx[[-k]]_N$. For input sequence x[n] an algorithm can compute DFT using the formula $X[k] = \sum_{n=0}^{N-1} x[n] e^{-j\frac{2\pi}{N}kn}$. How can this same formula be used to find inverse discrete Fourier transform (IDFT) of input sequence as X[k] with output sequence as x[n] (use duality property)? [8]

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32 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2066 Magh

Exam.		Regular/Back	
Level	BE	Full Marks	80
Programme	BCT (069 & Later Batch)	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Digital Signal Analysis and Processing

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Plot the sequence $x(n) = u(n) - u(n-5) + 5\delta(n-6) + nu(n-7) - nu(n-9)$ where $u(n)$ is the unit step sequence and $\delta(n)$ is unit sample sequence. [2]
2. Write whether or not the following sequences are periodic and write the period. [4]

   a) $x(n) = \cos\left(\frac{3\pi}{8}n + \frac{\pi}{4}\right)$

   b) $x(n) = \sin(0.8n)$
3. Find the expression for discrete Fourier series of the sequence. [4]

   $x(n) = \sum_{m=-\infty}^{\infty} \delta(n - 4m)$.
4. Show whether or not the following systems are (a) linear, (b) time invariant, (c) causal, (d) memoryless, (e) BIBO stable. [10]

   a) $y(n) = 2^{\log_2(x(n))} + 2^{\log_2(x(n))}$

   b) $y(n) = \sin\{x(n) - x(n-1)\}$
5. Perform circular convolution of the sequences $x_1(n) = [1,2]$, $0 \le n \le 1$ and $x_2(n) = [1,3,4,5]$, $0 \le n \le 3$. [4]
6. Show the computation of DFT of sequence $x(n) = [1,3,4,5]$ using decimation in time FFT algorithm and find the values of X(k). [6]
7. Let a system be characterized by difference equation. [10]

   $y(n) - 0.5y(n-1) - 0.25y(n-2) - x(n) = 0$, where input $x(n) = 0.2^n u(n)$, initial conditions $y(-1) = 2$, $y(-2) = 4$.

   Find (a) zero input response of the system, (b) zero state response of the system, (c) total response of the system, (d) system function H(z) (e) poles of H(z).
8. Find the lattice-ladder filter structure for the LTI system with system function. [6]

$$H(z) = \frac{\frac{1}{2} + \frac{1}{3}z^{-1} + \frac{1}{4}z^{-2} + \frac{1}{5}z^{-3}}{1 + \frac{1}{5}z^{-1} + \frac{2}{5}z^{-2} + \frac{3}{5}z^{-3}}$$

9. For the first order filter, $y(n) = Q\{a\, y(n-1)\} + x(n)$, the product term "$a\, y(n-1)$" has been quantized by rounding it to 3 bits. $y(-1) = 0$, $x(n) = 0.875\delta(n)$, $a = -0.5$. Show whether the filter goes into limit cycle. What is the period of limit cycle? [4]

10. Design a digital low-pass Butterworth filter using Bilinear transformation. Filter specifications are as follows: Pass band frequency (ω_p) = 0.3π, Stop band frequency (ω_s) = 0.4π, Pass band ripple (δ_p) = 0.11, Stop band ripple (δ_s) = 0.21. [15]

    a) Find the order of filter (N)
    b) Find the cutoff frequency (ω_c)
    c) Find the poles (s_k) of the squared magnitude response of analog Butterworth filter
    d) Find H(s)
    e) Find the digital Butterworth filter H(z)

11. Design a digital low-pass FIR filter with the following specifications using Kaiser Window. Pass band frequency (ω_p) = 0.25π, stop band frequency (ω_s) = 0.65π, Pass band ripple (δ_p) = 0.035, Stop band ripple (δ_s) = 0.035.

    a) Find the order of filter (N)
    b) Find the cutoff frequency (ω_c)
    c) Find the value of shape parameter (β)
    d) Find Kaiser window (w(n))
    e) Find the filter impulse response (h(n))

    Some modified Bessel function values are as given below.

x	0	1.3165	1.7237	1.8455	1.9271	1.93	1.9903	2
$J_0(x)$	1	1.4826	1.8926	2.0508	2.1675	2.1718	2.2642	2.2796

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management *(ME708)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt* ***All*** *questions.*
- ✓ ***All*** *questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Define organization and explain the principle of organization.
2. What do you mean by management? Explain the function of management.
3. Explain Henry Fayol's 14th principle of management.
4. What do you mean by co-operative societies? Explain different types of co-operatives.
5. What do you mean by purchasing? Explain different function of purchasing department.
6. Define personal management and explain function of personal management.
7. What do you mean by incentive? Explain different factors of salary structure.
8. Define motivation and explain different technique of motivation.
9. Define leadership and explain different qualities of good leader.
10. How information system support for functional area of management.

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.			
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management *(ME 708)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Why is an organization necessary? Explain the principles of an organization. [4+4]
2. What are the differences between the terms organization and management? Why do you need scientific approach of management to an organization? [2+2+4]
3. What do you mean by organizational structure? How is it defined for a particular enterprise? Write advantages and disadvantage of line organization. [2+2+4]
4. What do you mean by purchasing and procurement? Explain the functions of marketing. [3+5]
5. Explain the motive behind personnel management? Describe various functions of personnel management. How does Human Resources Management System differ from personnel management? [2+4+2]
6. Define the term job analysis and explain scientific selections of manpower. [5+3]
7. What do you mean by Human need? How is a need used for motivation? Explain Herz Berg's Hygine theory of motivation. [2+7+4]
8. A reader is leader. Elaborate it in terms of leadership styles. What are the differences between a leader and a manager? [5+3]
9. Define Management Information System (MIS). Describe briefly about different types of Information System and their support to managers in decision making. [5+3]
10. What are the objectives of a case-study? Explain the needs, functions and importance of MIS. [3+5]

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12 TRIBHUVAN UNIVERSITY INSTITUTE OF ENGINEERING **Examination Control Division** 2071 Shrawan	Exam.	[redacted]		
	Level	BE	Full Marks	80
	Programme	BEL, BEX, BCT	Pass Marks	32
	Year / Part	IV / I	Time	3 hrs.

Subject: Organization and Management *(ME708)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. What are the principles of organization? Explain formal and informal organization. [4+4]
2. What are the managerial skills? Explain the importance of management. [4+4]
3. What are the forms of ownership? Explain advantages and disadvantages of single ownership organization. [4+4]
4. What do you understand by behavioral management approach? Explain administrative management approach. [4+4]
5. What are the methods of purchasing? Explain the various functions of marketing. [4+4]
6. What is personnel management? Explain recruitment and selection of staff. [3+5]
7. What do you mean by Training and Development of Human resources? Explain various incentives used in organization. [5+3]
8. What is motivation? Explain the difference between Maslow's Heirarchical need theory and Alderfer's ERG theory. [3+5]
9. Define the term Entrepreneurship and write the steps for establishing a small scale unit of Entrepreneurship. [3+5]
10. Write short notes on: (any two) [4×2]
    i) Objective of Case Study
    ii) Organization structure and
    iii) Organizing Information systems

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12/123

12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEI, BEX,BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management *(ME708)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe why organization is considered as an open system. Explain the importance of organization. [4+4]
2. Name the different models of management. Explain any three of them in detail. [3+5]
3. State and describe H.Fayol's administrative management theory. [8]
4. What is meant by 'Joint Stock Company'? Describe the procedure for forming 'Joint Stock Company'. [3+5]
5. Define marketing, advertising. Explain the function of purchasing in detail. [3+5]
6. Define the term personnel management. Explain the function of personal management. [3+5]
7. Define merit rating. State and describe the various methods of merit rating. [2+6]
8. What do you mean by human needs? Describe A. Maslow's hierarchy of needs theory in detail. [3+5]
9. Define leadership and explain by Blakes and Mouton's Management Grid. [3+5]
10. Define Management Information System. Explain information support for functional areas of management. [2+6]

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization & Management *(ME708)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Ten questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. What are the principles of Organization? Explain the Informal Organization? (4+4)
2. Explain the importance of Management and discuss the different function of Management. (3+5)
3. Explain Administrative Management Theory. (8)
4. What do you mean by organization structure? Explain Line Organization. (4+4)
5. Define the term purchasing. Explain different function of Purchasing department. (3+5)
6. Define the term Personnel management and explain its functions. (8)
7. What do you mean by incentives? Explain the different factors affecting the wage/salary structure. (3+5)
8. Define the term Motivation and explain different technique of motivation. (3+5)
9. Define the term leadership and Explain the different qualities of good leader. (3+5)
10. a. Define the term Entrepreneurship. (3)
    b. Explain the Vroom's Expectancy theory of Motivation. (5)
11. What do you mean by Case study? Explain the objective of case study. (4+4)
12. Define term MIS. How information support for functional areas of management? (3+5)

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and management *(ME708)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define Organization. Explain the importance of Organization in society.
2. Define the term Management and explain different levels of Management.
3. What do you mean by Joint Stock Company? Explain the advantages and limitations of Joint Stock Company.
4. What do you mean by motivation? Describe Maslow's hierarchy of needs briefly. Maslow's theory explain tireless quest of Laxmi Prasad Devkota for excellent literary works?
5. Explain the process of recruitment and selection of man power in an organization. What do you mean by outsourcing in this context?
6. a) Explain different Techniques of Motivation.
   b) Define term contingency approach of Leadership.
7. Define the term Entrepreneurship and explain the characteristics of Entrepreneurship.
8. Define Management Information System. Describe briefly various types of Management Information System.
9. Silicon Valley is the best example of successful entrepreneurship. Elaborate with your thoughts.
10. Write short notes on: (any two)
    a) Computer aided Advertising
    b) Objectives of case study
    c) Satisfaction progression Vs. Frustration Regression Process

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17 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BEL , BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is meaning of organization? Explain organization behavior as a multidisciplinary field. Explain the Scientific Management theory. [4+4+8]
2. What do you understand by policy and executive groups in an organization? Explain functional organization. What is responsibility and authority? Explain matrix organization chart. [4+4+3+5]
3. Why is MIS necessary for management? Explain computer and MIS. What is information Architecture? Explain database information system. [4+4+3+5]
4. Explain the two factors theory of motivation. How can you determine the most effective leadership style? Define the term informal organization. [5+7+4]
5. Define the term personnel management. Explain the different factors of wage and salary structure. What are the methods of performance appraisals? [4+8+4]
6. Write short notes on: (Any Four) [4×4]
   a) Leadership style
   b) Information system for planning process
   c) Marketing concept
   d) Database information system
   e) Incentive programs

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17 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2068 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) How can organization behavior be affected by management? Explain all the elements of an organization. [4+4]
   b) Define management. Explain contingency and system approach of management. [3+5]
2. a) How are Policy group and Executive groups different in an organization? Differentiates between marketing and purchasing. [4+4]
   b) What is organization structure? Differentiate between responsibility and authority. Explain functional organization with sketch. [2+3+3]
3. a) What is MIS? Why is hierarchy of information system necessary in an organization? Write in brief. [3+5]
   b) Justify that information system is vital for planning and control process in an organization. [8]
4. a) What is motivation? Write differences between Maslow's hierarchical need and Alderfer's ERG theory of motivation. [3+5]
   b) Why is leadership necessary in an organization? Explain various leadership styles. [3+5]
5. a) What do you understand by personnel management? Explain job description. [4+4]
   b) Explain recruitment and selection process in detail. [8]
6. Write short notes on: (any four) [4×4]
   a) Scientific Management
   b) Span of control
   c) Needs for MIS
   d) Management by objective
   e) Collective bargaining

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17 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Ashadh

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Differentiate between private limited and public limited company. Explain organization behaviour as a multidisciplinary field. What are the importance of contingency theory of management? [5+4+7]
2. What do you mean by purchasing and marketing concept? Explain the manufacturing methods in industrial organization. What do you mean by span of control in a line organization? [5+6+5]
3. Explain the importance of management information system. Discuss the role of information in the planning process. What do you mean by network information system? [5+6+5]
4. Discuss the Herzberg's theory of motivation. How will you determine the most effective leader in the business organization? Define the term informal organization. [6+6+4]
5. Explain the term job description. What are the processes of collective bargaining? Discuss the different steps of hiring and selecting staff. [4+6+6]
6. Write short notes on: (any four) [4×4]
   a) Partnership organization
   b) Industrial relation
   c) Job design and work efficiency
   d) Functional organization
   e) Computer integrated manufacturing plants

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16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2066 Bhadra

Exam.		Regular / Back	
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by organization behaviour? Explain the functions of management. Discuss the behavioural management theory. [4+4+8]
2. Discuss the activities of production development. What do you mean by industrial relation? Define the term line and staff organization. [5+6+5]
3. Discuss the hierarchy of information needs. What are the role of information system for decision making process? Explain database information system. [5+6+5]
4. What are the motivational theory of Herzberg's hygiene factors and motivational factors? Discuss the behavioural approach of leadership. Define the term authority and power. [6+5+5]
5. What do you mean by job analysis? Discuss the different steps of hiring and selecting staff. Explain the methods of performance appraisal. [6+5+5]
6. Write short notes any four of the following: [4×4]
   a) Contingency Management Theory
   b) Needs for Management Information System (MIS)
   c) Contingency Approach of Leadership
   d) Incentive Programs
   e) Value of Case Study

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16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 Shrawan

Exam.		Regular/Back	
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by organization? Explain the importance of organization in society. Discuss the concept of scientific management theory. [3+5+8]
2. Explain different activities of production development. What do you mean by purchasing? Define the term responsibility and authority. What do you mean by span of control? [5+3+5+3]
3. What do you mean by hierarchy of needs? Define the term information architecture. Discuss the term information system for planning process. Explain the database information system. [4×4]
4. Define the term theory 'X' and theory 'Y' in the motivation theory. Justify job design improve work efficiency. What do you mean by trait approach in leadership? Discuss the importance of participative management in organization. [5+3+4+4]
5. What do you mean by personal management? Define the term job analysis. Discuss deferent steps of hiring and selecting staff. What do you mean by collective bargaining?[3+5+5+3]
6. Write short notes any four of the following: [4×4]
   a) Single ownership organization
   b) Industrial relation
   c) Networking information system
   d) Informal organization
   e) Needs of MIS

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17 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 Kartik

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by scientific management theory? How does it differ from behavioral approach? Explain organization is a multidisciplinary field. [5+6+5]
2. What do you mean by marketing? Explain the relation between marketing concept and production development. What do you mean by industrial relation? [4+8+4]
3. What do you mean by management information system? Explain the sources of data. Define the term hierarchy of information needs and information system model. [4×4]
4. What is motivation and why is it necessary in an organization? Explain MacGregor's theory X and theory Y of motivation. [4+4+8]
5. Define the term Job analysis. How the personnel are selected in the organization explain? Does the job design help to work efficiency comment? [3+8+5]
6. Write short notes any four of the following: [4×4]
   a) Organization as an open system
   b) Authority and responsibility
   c) Informal organization
   d) Information system for decision making process
   e) Performance appraisals

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16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2064 Jestha

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define the term organization. Explain organization as an open system. What do you mean by management? Explain different function of management. [3+5+3+5]
2. What do you understand by division of labour? Define term span of control. Explain the term authority and responsibility. [4+4+8]
3. What is the contribution of computer in management information system? Explain the role of software to on-line information system for planning process. [7+9]
4. Explain different styles of leadership in brief. Which style you recommend as most effective leader in industrial organization? [10+6]
5. What do you mean by human resource management? Define the term collective bargaining. Explain the process of collective bargaining. [5+5+8]
6. Write short notes any four of the following: [4×4]
   a) Scientific management theory
   b) Industrial relation
   c) Maslow's hierarchy of needs theory
   d) Information system model
   e) Job analysis

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17 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2064 Kartik

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ ***All** questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Define the term management and discuss the concept of Taylor's scientific management theory.
2. What do you mean by organization structure? Explain the meaning of responsibility and authority.
3. What do you mean by hierarchy of information needs? Explain the information system for planning process.
4. Define the term 'Motivation'. How does Macgregor's theory 'X' and theory 'Y' apply to motivation?
5. What do you mean by job analysis? Explain different steps of hiring and selecting staff.
6. Write short notes any two of the following:
   a) Transactional Management Model
   b) Objective of Purchasing
   c) Networking Information System

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17 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2063 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ ***All** questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Explain the concept of management in an organization and describe the level of management in details.
2. Is there a need for leadership? Explain what provides the power of leaders over their followers. Describe leadership styles in brief.
3. What motivates people at work? Describe the Maslow's hierarchy need and compare with that of Herzberg.
4. Describe the importance of hiring procedure in an organization and explain the steps of hiring in details.
5. What is case study? Explain in details of steps involve in the case study.
6. Write notes on (any three)
   a) Organization
   b) Market Structure
   c) The Concept of Management Information System
   d) Business Process and Information System

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16/2-4 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2062 Baishakh

Exam.	Regular/Back		
Level	B.E.	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *All questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Define the terms organization and management. What is a closed system? Explain organization as a open system.
2. What do you mean by production development? Explain different activities of the production development function.
3. What do you mean by information architecture? Explain information system for planning process.
4. What do you mean by leadership? Explain different leadership theories you are familiar with.
5. Define the term personnel management and explain different methods of performance appraisal.
6. Write short notes any two of the following:
   a) Behavioural Management Theory
   b) Industrial Relation
   c) Participative Management

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16/2-5 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2061 Baishakh

Exam.	Regular / Back		
Level	B.E.	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt any Five questions.*
- *All questions carry equal marks.*
- *Assume suitable data if necessary.*

1. What do you mean by management? Explain the different models of management.
2. Define the term marketing and explain the importance of marketing management.
3. What is the contribution of computers for the management information system? Explain networking information system
4. What do you mean by participative management? Explain the role of informal organization in management.
5. What do you mean by collective bargaining? Explain the different process of collective bargaining.
6. Write short notes any two of the following:
   a) Joint Stock Company
   b) Information Architecture
   c) Incentive Programs

***

16/1-16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2059 Chaitra

Exam.	Regular / Back		
Level	B.E.	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. "People dominated not by individual but by organization", comment.
2. Define the term policy and executive group and explain the managerial function.
3. What is the contribution of computers in the management information system? Explain an importance of networking information system.
4. Define the term motivation and explain the theory of Maslow's hierarchy of needs.
5. What do you mean by collective bargaining and explain the different process of collective bargaining?
6. Writes short notes any two of the followings:
   a) Authority and power
   b) Information system model
   c) Case study

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3562-5 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2061 Baishakh

Exam.	Regular / Back		
Level	B.E.	Full Marks	80
Programme	BEL, SEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt any Five questions.*
- *All questions carry equal marks.*
- *Assume suitable data if necessary.*

1. What do you mean by management? Explain the different models of management.
2. Define the term marketing and explain the importance of marketing management.
3. What is the contribution of computers for the management information system? Explain networking information system.
4. What do you mean by participative management? Explain the role of informal organization in management.
5. What do you mean by collective bargaining? Explain the different process of collective bargaining.
6. Write short notes any two of the following:
   a) Joint Stock Company
   b) Information Architecture
   c) Incentive Programs

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16 / 1-3 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2058 Chaitra

Exam.	Regular / Back		
Level	B.E.	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *All questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Define the term 'Management' and explain the various function of management.
2. What do you mean by organizational structure? Explain the salient features of line and staff organization.
3. What is the contribution of computers for the management information system? Explain the importance of networking information system.
4. Define the term 'Motivation' and explain the Maslow's hierarchy of needs.
5. What do you mean by salary structure and explain the different factors of wage and salary structure?
6. Write short notes on any two of the following:
   a) Joint Stock Company
   b) Informal Organization
   c) Information Architecture

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16 / 12 - 23 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2057 Chaitra

Exam.	Regular / Back		
Level	B.E.	Full Marks	80
Programme	BEL/BEX	Pass Marks	32
Year / Part	IV / I	Time	3 h

Subject: - Organization and Management

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *All questions carry equal marks.*

1. Discuss the concept of Elton Mayo's human relation movement.
2. Define the term "purchasing" and explain the relation between marketing management and purchasing procedure.
3. What do you mean by management information system? Explain the hierarchy of information needs.
4. Describe the term "Authority and Power". Explain the sources of power in the organization.
5. What do you mean by performance appraisals and explain the different methods of performance appraisals.
6. Write short notes on any two of the followings.
   a) Organization behaviour
   b) Integrated approach to leadership
   c) Job description

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21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Project Management *(CT701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) List out the characteristics of a project. Explain the role of effective feasibility study for the successful completion of a project. [2+2]
   b) What is the role of project manager? What are suggested skills for all project managers and for information technology project managers? [5]
2. a) What is project management institute (PMI)? How is it related to project management? Discuss PMI framework in relation with project management. [4]
   b) Explain with example the concept of drivers of project success and inhibitors of project success. [2+3]
3. a) Discuss the concept of project management process groups (PGs). How is it related to project management knowledge area? Give the example of two processes with necessary inputs, tools and techniques and outputs. [4]
   b) Define work break down structure and its importance in project management. What are different ways/approaches to prepare a work breakdown structure for a project? [5]
4. a) What do you understand by Quality planning, Quality Assurance and Quality Control? Explain different approaches to these processes. [4]
   b) Why better communication management is critical for projects? Discuss the communication management plan that should be considered for ICT projects. [5]
5. a) Explain the integrated change control process in depth. [4]
   b) Define WBS technique in scope management. [3]
6. Being an IT project manager how are you going to manage an IT based project that demands regular updates with new trends in market. [5]
7. Consider you are hired as a consultant in a IT college where every year 50 students are admitted in 4 year program. You are asked to prepare a tender. Specification document for setting up a digital library to be set-up on that college. State your all assumptions that you will be making while preparing the document. [6]
8. If schedule performance index (SPI) is 0.75 in a mega project undergoing near Devikapur district with earned value of being 60. Now calculate the planned value and also state whether the project is ahead schedule or behind schedule. [6]
9. Write short notes on: (any five) [4×5]
   a) Balanced Scorecard
   b) Tornado analysis
   c) Critical path analysis
   d) Decision tree analysis
   e) Trends in cloud computing
   f) Outsourcing and off-shoring options

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21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Project Management *(CT701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is a project? List out its characteristics. [2+2]
2. What are different skill sets required by a project manager? Briefly explain each of them. [5]
3. Define project management body knowledge. [2]
4. Explain about Project Management Institute Framework. [4]
5. What are the phases in project life cycle? How does a project life cycle differ from a product life cycle? [5]
6. Explain a Matrix Organization Structure with it's advantages and disadvantages. [4]
7. Discuss the concept of project management process groups (PGs). List down two processes of project management process group with their inputs, tools and techniques and output. [4]
8. Explain about Integrated Change Control in IT project development. [5]
9. Why is it important to determine activity sequencing on projects? What are different diagrams/methods that can be used to sequence activities in the project? [5]
10. Given the following information for one-year project, use Earned Value Management (EVM) method to calculate, cost variance, schedule variance, cost performance index (CPI) and Schedule performance index (SPI) for the project. [6]
    Planned Value = NPR 23,000
    Earned Value = NPR 20,000
    Actual Cost = NPR 25,000
    Budget at Completion = NPR 1,20,000
11. What is a Maturity Model for software development? Explain them. [5]
12. Explain about the necessity of information distribution and its tools and techniques. [5]
13. What are different tools and techniques for risk identification? Discuss brainstorming and Delphi Technique for risk management. [4]
14. What is a procurement process? How is it performed in a project? [1+4]
15. Discuss about IT project management methodology. [5]
16. Write short note on: [2×6]
    a) Project stakeholders
    b) Project management information system
    c) Critical Chain Scheduling
    d) Categories of Risk
    e) Balanced Score Card
    f) Constructive Cost Model (COCOMO)

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02 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCE, BEL, B.Agri.	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Project Engineering *(CE701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Differentiate between Bilateral, Multilateral and Joint Venture project with example? Discuss the external environment in which a project is operated. [4+6]
2. Define concept of project appraisal. Explain about contents of technical and financial proposal. Also explain input analysis of project formulation. [2+7+3]
3. a) Construct the CPM network for a project with following activities: [16]

Activities	A	B	C	D	E	F	G	H	I	J
Predecessor	-	-	A,B	B	A	C	E,F	D,F	G,H	I
Days	4	7	4	8	2	1	6	5	8	9

Find:

i) Critical path
ii) Project completion time
iii) EST, EFT, LST, LFT, Total float,
Free float (F_F), independent float (I_dF) and Interfering float (If)

b) Define the terms resource histogram, resource levelling limited resource allocation and work break structure. [2+2+2+2]

4. a) Write the concept of Monitoring, Evaluation and Controlling and also explain project control cycle. [3+4]

b) Why cost control is important in project? 15 houses were to be completed in three months with per unit cost of Rs 25,00,000/-. In one month 4 houses were completed with total expenditure of Rs 96,00,000/- use earn value analysis to find the status of the project. [3+4]

5. Define 'risk'. Explain various sources of project risk. Elaborate risk response planning. [1+5+4]
6. Define the term project financing. Explain features of capital structure planning. A project has total capital of Rs 5,00,000 which consists of 2000 shares @ Rs 100, 1,50,000 preference share 18% interest and remaining loan @ 14% interest. Earning before interest and tax in a year is Rs 1,00,000. Calculate EPS and book value of share if tax rate is 25%. [2+4+4]

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INSTITUTE OF ENGINEERING

Examination Control Division

2072 Kartik

Exam	BE	Full Marks	80
Programme	BEX, PCE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject – Project Management *(CT701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the triple constraints of Project with figure and describe their relationship? [2+2]
   b) What are the essential interpersonal and managerial skill to be a successful project manager? [5]
2. a) Explain the Project Management Institute's (PMI) framework. [4]
   b) What is PMBOK? What are the knowledge contents that falls under PMBOK? [1+4]
   c) Explain various types of matrix organization. [4]
3. Compare project management with project portfolio management. Explain the characteristics of simple generic life cycle with necessary diagrams. [1+4]
4. What is Earned Value Management (EVM)? Derive the formulas that are used in schedule and cost performance, explain their significances. [1+3=3]
5. A big software project is under consideration for development. Overall 10 different activities as WBS are identified as listed below table with their timings in number of weeks.

Activities	a	m	b
(1,2)	7	11	13
(2,3)	1	4	7
(2,4)	10	15	18
(3,5)	12	20	26
(3,6)	4	7	16
(3,7)	4	7	16
(6,7)	3	8	11
(4,7)	2	8	14
(7,8)	9	12	15
(8,9)	1	4	7

Where
a = Optimistic time
b = Pessimistic time
m = most likely time

Calculate the following:
   a) What is the expected time of completion of the project? [3]
   b) What is the probability of completing the project in 34 weeks? [3]
   c) What is the probability of the activity 7 being completed in the twentieth week? [3]
6. Explain different types of Risk and illustrate the Risk management model with block diagram according to PMI Project Risk Management process. [7]
7. Define project integration management. Explain the necessary inputs, tools and techniques and outputs to develop a project charter. [1+4]
8. Does effective communication management skill reduce the associated risk of an IT project? Explain with example. [4]
9. What makes the project procurement process of very crucial component in project management? What are typical issues to be considered in e-bidding as a procurement processing tool? [2+4]
10. Write short notes on: [3×5]
    a) COCOMO (constructive cost model) for IT project
    b) Contract closure procedure
    c) Balanced scorecard framework
    d) Pare to analysis
    e) Quality Audit Plan

26 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.			
Level	BE	Full Marks	80
Programme	BCE, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Project Management *(CT701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Briefly explain the traits of being an effective and ineffective project manager? [2+2]
   b) Explain the necessity of IT Project Management? How do you perform feasibility study in IT project? [2+2]
2. a) Explain about knowledge areas of PMI framework. [4]
   b) Describe project management? Explain the roles and responsibilities of key project members. [2+2]
3. What is a project charter? How do you develop a project charter, explain the inputs and tools and techniques to develop it. [2+5]
4. A project work consists of the following activities as listed below in table. [9]

Activity	Description	Duration in days
A (1-2)	Start earth work	3
B (1-4)	Vendor selection	2
C (1-7)	Start handling	1
D (2-3)	Continue earth work	3
E (3-6)	Finish earth work	2
F (4-5)	Ordering raw material	4
G (4-8)	Excavation for drains	6
H (5-6)	Receiving raw material	5
I (6-9)	Base concreting	4
J (7-8)	Continue handing	4
K (8-9)	Laying drains	5

Draw the network diagram and trace the critical path of the network. What are the various timings and the total duration of the above project?

5. What do you mean by Project Procurement management and what are the different processes adopted for procurement? [5]
6. Explain various tools and techniques for performance reporting. [5]
7. If earned value is twice its actual cost for a project, calculate its cost performance index and cost variance percentage. Is the project over/under budget? [6]
8. a) Is there always a tradeoff between quality and productivity? Explain with an IT related example. [3]
   b) What are the possible steps to improve project quality? [4]
9. What are the essential components of project scope management? Explain. [5]
10. Write short notes on: [5×4]
    a) Sensitivity analysis
    b) The Balanced Scorecard
    c) Six sigma
    d) Project Management Maturity
    e) Decision tree analysis

15

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21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX, BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Project Management *(CT701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is a project, and what are its main attributes? How is a project different from what most people do in their day-to-clay jobs? Discuss the specific attributes that are specific to IT related projects. [4]
2. What is a Project Management Body of knowledge? Explain different general management skills necessary to be a good project manager. [2+5]
3. What does it mean by the term "project management practice"? Discuss project management framework as per the standard of Project Management Institute (PMI) along with the concept. [5]
4. What is a Software Development Life Cycle (SDLC)? Explain any one of its kind that you prefer in developing an IT project. Why? [2+5]
5. Most of the project follows functional organizational structure. If you agree, justify. [4]
6. Discuss about Project Management Process Groups. [4]
7. Discuss the process of defining project scope in more detail as a project progresses, going from information in a project charter to a project scope statement, WBS and WBS dictionary. [5]
8. Why is there necessity of Project Time management? Explain how is that performed. [1+4]
9. What is a cost estimating? Explain different tools and techniques used for cost estimating. [1+4]
10. What do you understand by Quality in the context of project management? Discuss quality control process and its major outputs. [5]
11. Why better communication is critical for ICT projects? Discuss the contents of communication management plan that should be considered. [5]
12. What is a Project Risk Management? Explain the processes involved briefly. [5]
13. Why are organization moving towards the trend of outsourcing? Discuss the challenges of outsourcing. [5]
14. What are the roles of award and assessment in achieving Excellency in project completion, Briefly explain. [5]
15. Write short notes on: [3×3]
    a) Expert Judgement
    b) Arrow Diagramming Method
    c) Balance score card

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21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

Subject: - Energy Environment and Society *(EX701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by Appropriate Technology? Which types of Technology would be appropriate in context of Nepal in transport sector? Explain. [8]
2. Describe the principle of solar cell (PV) technology and its applications. [8]
3. A potential site has the net head of 100 m with 200 lit/sec of flow, what will be the power deliver from such site if the constructed power house overall efficiency is 50%? Which types of turbines would be suitable for such plants / site and also write its features. [8]
4. What is biomass? List any four major routes for the conversion of biomass to energy and other useful products. [1+3]
5. Describe the basic construction of solid oxide fuel cells (SOFCs). [4]
6. What are the energy storage technologies? Why energy storage become challenge in 21st century. [2+2]
7. What is climate change? How can Renewable Energy Technologies can help mitigate climate change. [4]

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21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

Subject - Energy Environment and Society *(EX201)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe technology transfer and its importance to society and nation. [4]
2. Explain how development of any country depend upon its energy consumption rate? Explain HDI and compare HDI for Nepal with other developed country with example of energy consumption. [8]
3. Discuss the need of energy in each steps of Maslow's hierarchy of needs. [4]
4. What are the various biomass ~~conservation~~ (conversion) process? Explain the IV curve for solar photovoltaic cell with temperature variation. How can you have the wind mapping data? Explain in brief. [8]
5. Write about solar thermal energy and its application. [4]
6. What is Hydrogen Fuel? Describe about advantages and disadvantages of Hydrogen Fuel. [4]
7. Write short notes on: [4×2]
   i) Hybrid vehicle
   ii) Smart grid system

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shrawan

Exam:	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

Subject: - Energy Environment and Society (EX701)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What are the impacts of technology on society? How the appropriate technology helps in the sustainable development of the country? [2+3]
2. Describe the relation between "Human Development Index and Energy Consumption". [4]
3. How do you classify the water turbines? Differentiate between impulse and reaction turbines? [1+2]
4. What is biomass? Describe any thermo-chemical conversion process of biomass? [1.5+2.5]
5. Define beam, diffuse and global radiation and show the relation between them. [3]
6. What are the different economic and environmental advantages of wind and geothermal energy in Nepal? [4]
7. What is fuel cell? How hydrogen fuel cell functions? [3]
8. Explain somatic and genetic effects due to nuclear hazards in human beings. [3]
9. What are the types of batteries? Describe about smart grid system? [2+3]
10. Write short notes on: (any three) [2×3]
    a) Solar Constant
    b) Storage of hydrogen
    c) Global warming
    d) SO_2 emission and its impact

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23 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

Subject: - Energy Environment and Society *(EX701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by appropriate technology? Describe the impact of technology on society. [4]
2. What is the trend of consumption of energy sources in the world? Describe the importance of renewable energy sources? [2.5+2.5]
3. Define E number. How biofuels differ from other sources of energy? [1+3]
4. List out different factors affecting the solar intensity and applications of solar energy. [2+2]
5. What are the minimum constructional requirements to develop a hydropower system? [4]
6. What are the environmental impacts of wind machine? [4]
7. What is fuel cell? How does a solid oxide fuel cell work? [4]
8. The wide spread use of batteries has created many environmental concerns. Describe this concept. [4]
9. Write briefly about the working principle of hybrid vehicles. Also discuss the environment impacts. [2+2]
10. How the energy crisis of our country Nepal can be avoided? Describe its potential solutions in short. [3]

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23 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

Subject: - Energy, Environment and Society *(EX701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you understand by the term "Appropriate Technology"? [3]
2. What are the conventional and non-conventional energy sources? [3]
3. Write in short about the working of a solar cell. [3]
4. What is a source of hydropower? How can you categorize the hydropower plants? [1+2]
5. What is the major factor determining the availability of wind power? What are the major components of wind turbine? [1+3]
6. What is biomass? Write example of any two different conversion of biomass into fuel. [2+2]
7. Write about battery along with the working principle of anyone type. [4]
8. Write briefly about the emission hazard and their impact. [4]
9. Write very briefly your experience on the case study you performed. [2]
10. Define the following briefly: [2×5]
    a) Technology transfer
    b) Certified Emission Reduction
    c) Characteristics curve of solar cell
    d) Solar dryer
    e) Classification of hydropower plant

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23 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

Subject: - Energy, Environment and society *(EX701)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is a technology transfer? What impact technology has in your life? [1.5+1.5]
2. What is a clean Development Mechanism (CDM). What are the potential areas of CDM in Nepal? [2+2]
3. What do you understand by solar constant, global irradiation and peak sun? [3]
4. What is geothermal energy? Write down its application. [1+2]
5. Write briefly about briquette and biogas as energy sources in the context of Nepal. [4]
6. What are fuel cells? Explain briefly its working. [4]
7. What are the potential hazard of batteries. How you think this hazard can be prevented? [2+1]
8. What are smart grid and super-capacitor? [2+2]
9. Very briefly give your experience of the case study which you performed. [2]
10. Define the following is not more than three sentences. [2×5]
    a) Appropriate technology
    b) HDI
    c) Solar water heater
    d) Hydrogen as fuel
    e) Application of Geothermal Energy

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