POSTAL BOOK PACKAGE 2027

COMPUTER SCIENCE & IT

OBJECTIVE PRACTICE SETS VOLUME-III

CONTENTS

DATABASES

OBJECTIVE PRACTICE SETS

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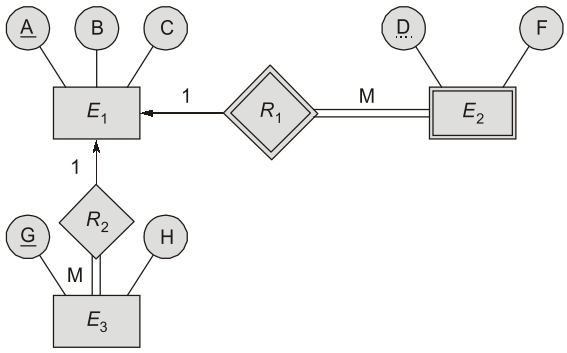
1 CHAPTER
The Relational Model

Multiple Choice Questions & NAT Questions

1. Consider the following ER-diagram:



The minimum number of tables needed to represent E_1, E_2 and E_3 are _____.

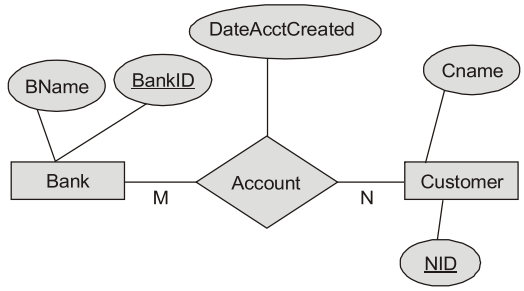
2. A weak entity _____.
   (a) is an entity with no attributes beside its key.
   (b) inherits part of its key from the 'parent' entities to which it is related.
   (c) is an entity with no key.
   (d) None of these

3. In the Relational Model, the number of attributes and number of tuples in a relation are termed as _____ and _____ respectively.
   (a) Cardinality, domain
   (b) Degree, cardinality
   (c) Domain, degree
   (d) Cardinality, degree

4. An ER model of a database consists of entity types A and B. These are connected by a relationship R which does not have its own attribute. Under which one of the following conditions, can the relational table for R be merged with that of A?
   (a) Relationship R is one-to-many and the participation of A in R is total.
   (b) Relationship R is one-to-many and the participation of A in R is partial.
   (c) Relationship R is many-to-one and the participation of A in R is total.
   (d) Relationship R is many-to-one and the participation of A in R is partial.

5. In an Entity-Relationship (ER) model, suppose R is a many-to-one relationship from entity set E1 to entity set E2. Assume that E1 and E2 participate totally in R and that the cardinality of E1 is greater than the cardinality of E2.
   Which one of the following is true about R?
   (a) Every entity in E1 is associated with exactly one entity in E2.
   (b) Some entity in E1 is associated with more than one entity in E2.
   (c) Every entity in E2 is associated with exactly one entity in E1.
   (d) Every entity in E2 is associated with at most one entity in E1.

6. Consider the following ERD diagram illustrating the relationship of customers and banks.

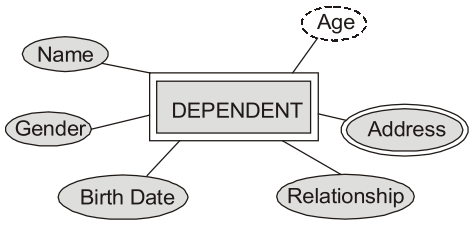


Select from among the following, candidates for relations, if the above ERD is mapped into a relational model.

1. Customer(NID, CName)
2. Account(DateAcctCreated, BName, CName)
3. Bank(BankID, NID, BName)
4. Bank(BankID, BName)
5. Account(BankID, NID, DateAccCreated)

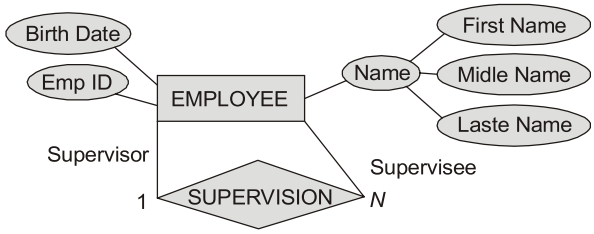
(a) 1, 2 and 4 (b) 1, 4 and 5
(c) 1, 3 and 5 (d) 1, 2 and 4

7. The following diagram represents the dependent entity from an Entity Relationship diagram.



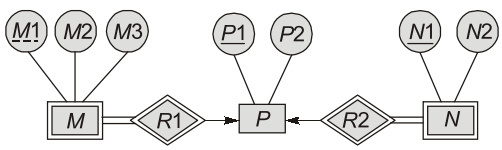
Select the characteristics which are not represented by the above diagram.
(a) Age is a derived attribute
(b) Gender is an atomic attribute
(c) Address is a multivalued attribute
(d) Name is a key attribute

8. Consider the following ERD diagram depicting the relationship of an employee and supervisor.



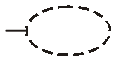
Which is the possible relations if the above ERD is mapped into a relational model?
(a) Employee (EmpID, BirthDate, Salary, Name(FirstName, MiddleName, LastName))
(b) Supervision (EmpID,BithDate, Salary, Name(FirstName, MiddleName, LastName), EmpId)
(c) Supervisor (SupervisorID, BirthDate, Salary, Name(FirstName, MiddleName, LastName), EmpID), {EmpID})
(d) Employee (EmpID, BirthDate, Salary, Name(FirstName, MiddleName, LastName), SupervisorID)

9. Consider the following ER diagram:



The minimum number of table needed to represent *M*, *N*, *P*, *R*1, *R*2 is
(a) 2 (b) 3
(c) 4 (d) 5

10. Match **List-I** with **List-II** and select the correct answer using the codes given below the lists:

List-I		List-II
A.		1. Identifying relationship
B.		2. Weak entity
C.		3. Derived attribute
D.		4. Multivalued attribute

Codes:

	A	B	C	D
(a)	1	3	4	2
(b)	2	4	3	1
(c)	2	3	4	1
(d)	1	4	3	2

11. Given the basic ER and relational models, which of the following is INCORRECT?
(a) An attribute of an entity can have more than one value
(b) An attribute of an entity can be composite
(c) In a row of a relational table, an attribute can have more than one value
(d) In a row of a relational table, an attribute can have exactly one value or a NULL value

12. Consider an Entity-Relationship (ER) model in which entity sets E_1 and E_2 are connected by an $m : n$ relationship R_{12}. E_1 and E_3 are connected by a $1 : n$ (1 on the side of E_1 and n on the side of E_3) relationship R_{13}.

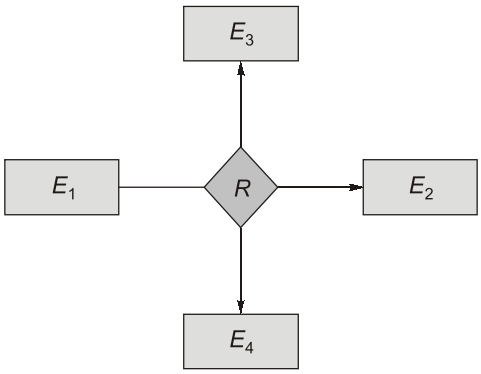
E_1 has two single-valued attributes a_{11} and a_{12} of which a_{11} is the key attribute. E_2 has two single-valued attributes a_{21} and a_{22} of which a_{21} is the key attribute. E_3 has two single-valued attributes a_{31} and a_{32} of which a_{31} is the key attribute. The relationships do not have any attributes.

If a relational model is derived from the above ER model, then the minimum number of relations that would be generated if all the relations are in 3NF is _____.

13. R is relationship with 1 : 1 cardinality, 30% participation at E_1 end 70% participation at E_2 end which is the best possible design?

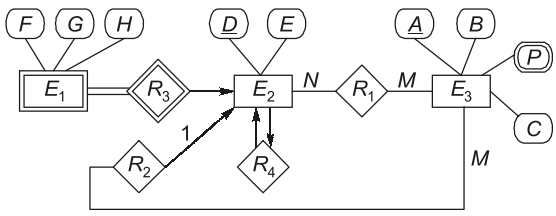
(a) E_1 and E_2 kept separate with foreign key at E_1 end
(b) E_1 and E_2 kept separate with foreign key at E_2 end
(c) E_1 and E_2 kept separate with foreign key at E_1 as well as E_2
(d) E_1 and E_2 merges into a single table with no foreign key

14. Consider the following *ER* diagram with three entity sets E_1, E_2, E_3 and relationship set R



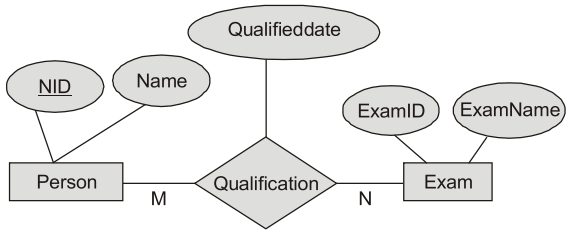
If E_1, E_2 and E_3 has 50, 30, 100 and 400 records respectively. What is the maximum number of records of entities that could be in the relationship set R?

15. Consider the following ER diagram.



The minimum number of RDBMS tables are required for the above drawn ER diagram _____ which satisfies 3NF.

16. Consider the following Entity Relationship Diagram (ERD):



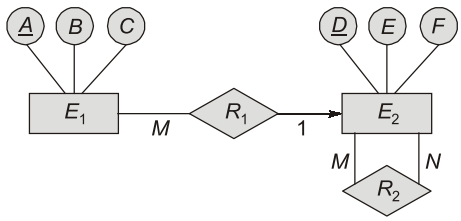
Which of the following possible relations will not hold if the above ERD is mapped into a relation model?

(a) Person (NID, Name)
(b) Exam (ExamID, NID, ExamName)
(c) Exam (ExamID, ExamName)
(d) Qualification (NID, ExamID, QualifiedDate)

17. Which one of the following is used to represent the supporting many-one relationships of a weak entity set in the entity relationship diagram?

(a) Diamonds with double/bold border
(b) Rectangles with double/bold border
(c) Ovals with double/bold border
(d) Ovals that contain underline identifies

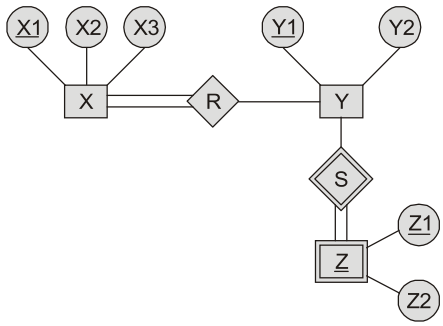
18. Consider the following ER diagram:



The minimum number of relations table required for above ER diagram are _____.

Multiple Select Questions (MSQ)

19. Consider the following ER diagram:



Which of the following is correct when ER-diagram is converted into minimum tables?

(a) Minimum 4 tables are required to represent X, Y, Z, R and S

(b) The one of the table will be {X1, X2, X3, Y1} where X1 is primary key and Y1 references Y

(c) The one of the table will be {Y1, Z1, Z2} where Y1 is primary key

(d) {Y1, Y2} is one of the table where Y1 is primary key.

20. Given the basic ER and relational modes which of the following are correct?

(a) An attribute of an entity can have more than one value.

(b) An attribute of an entity can be composite.

(c) In a row of relational table an attribute can have more than one value.

(d) In a row of a relational table an attribute can have exactly one value or a null value.

21. Which of the following is/are correct?

(a) An Entity set is a set of entities of the same type that share the same properties, or attributes.

(b) The attribute AGE is calculated from DATE_OF_BIRTH. The attribute AGE is Composite.

(c) Not applicable condition can be represented in relation entry as NULL.

(d) Data integrity constraints are used to Improve the quality of data entered for a specific property.

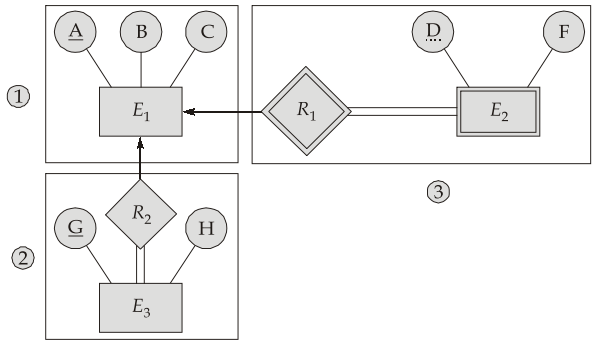
■■■■

Answers The Relational Model

1. (3)	2. (c)	3. (b)	4. (c)	5. (a)	6. (b)	7. (d)	8. (d)	9. (a)
10. (c)	11. (c)	12. (4)	13. (b)	14. (50)	15. (5)	16. (b)	17. (a)	18. (3)
19. (b, d)		20. (a, b, d)		21. (a, c, d)				

Explanations The Relational Model

1. (3)



R_1(A, B, C, G), R_2(G, H), R_3(D, F, A)
Only 3 tables are required.

2. (c)

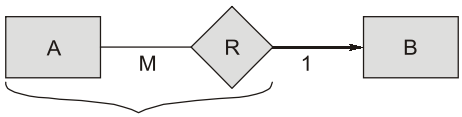
A weak entity is an entity which depends on some other entity and having no key.

3. (b)

Number of attributes are called as degree while number of tuples are called as cardinality.

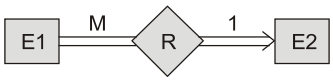
4. (c)

Entity sets A, B
Relationship set R
Relation R merges with that of A.

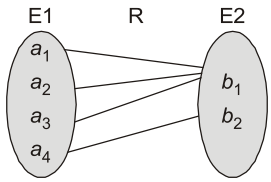


- Many to one relationship set can merge towards entity set 'A'.
- Participation towards A side can be total/ partial.

5. (a)

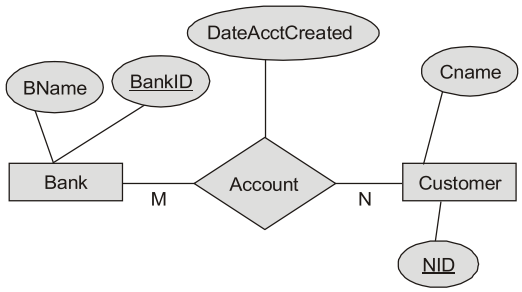


E1 entries > E2 entities



Every entity in E1 is associated with exactly one entity in E2.

6. (b)



Above ER diagram showing many to many relationship. Thus, a separate table is needed for relationship. Hence, 3 tables required i.e.,

1. Bank (BankID, BName)
2. Customer (NID, Cname)
3. Account (BankID, NID, DateAccCreated)

7. (d)

Dependent is a weak entity.
Age is a derived attribute since, inside dotted oval.
Gender is an atomic since under solid oval.
Address is multivalued attribute because it is double oval.
Name is not a key attribute since no underline.

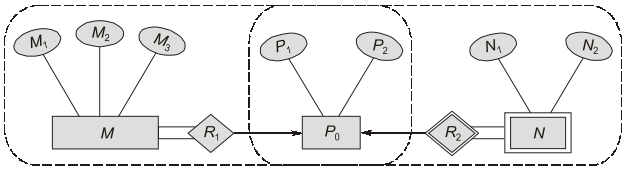
8. (d)

The given ERD shows the self recursively relationship among Employees.
1 is supervisor 2 is supervisee.

The possible relation is
Employee (Emp Id, Birthdate, Salary, Name (First Name, Middle Name, Last Name), Supervisor Id)

9. (a)

Minimum number of tables needed is 2 as



1st table have the relation between *M* and *P* and 2nd table as *P* and *N*.
Hence option (a) is correct.

10. (c)

 = Weak entity

 = Derived attribute

 = Multivalued attribute

 = Identifying relationship

11. (c)

Option (a) is correct as there are multivalued attribute e.g. phone no (attribute)
Option (b) is also correct.
Option (d) 'Null' values are allowed in a row of relational database (Null value arc constraints only for primary keys).
As in 1NF also we remove multivalued attribute.
∴ Option (c) is incorrect.

12. (4)

For E_1 relation: $\langle \mathbf{a_{11}}, a_{12} \rangle$
For E_2 relation: $\langle \mathbf{a_{21}}, a_{22} \rangle$
For E_3 and R_{13} relationship: $\langle \mathbf{a_{31}}, a_{32}, a_{11} \rangle$
For R_{12} : $\langle \mathbf{a_{11}}, \mathbf{a_{21}} \rangle$

13. (b)

If E_1 is merged with R it contains 70% NULL values.
If E_2 is merged with R it contains 30% NULL values.
Merging which gives less number of Null value is preferred.
E_1 and E_2 can't be merged into a single table because E_1RE_2 has NO primary key

14. (50)

For relationship set R candidate and E_1 candidate key is same because between E_1 to E_3, E_1 to E_2 and E_1 to E_4 there is one to many relationship.

15. (5)

The RDBMS tables that are need to be drawn will be:
(*i*) E_3R_2 which have 'A' as its candidate key.
(*ii*) E_2R_4 which have 'D' as its candidate key.
(*iii*) E_1R_3 which have 'D' as its candidate key.
(*iv*) R_1 which has 'AD' as the candidate key.
(*v*) E_3P; since P is a multi-valued attribute, which has 'A' as its candidate key.

16. (b)

Since, there is many to many relationship thus a separate table must be created for relationship.
Hence, 3 tables are needed except the one which is given in option (b).

17. (a)

Diamonds with double/bold border are used to represent a relationship for a weak entity set.

18. (3)

E_1R_1 (A B C D)
E_2 (D E F)
R_2 (A D)
So, minimum 3 relational tables are required.

19. (b, d)

Tables:

XR(X1, X2, X3, Y1)

SZ(Y1, Z1, Z2)

Y(Y1, Y2)

Total 3 tables are required.

■■■■

COMPUTER NETWORKS

OBJECTIVE PRACTICE SETS

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1 CHAPTER
Networking Fundamentals and Physical Layer

Multiple Choice Questions & NAT Questions

1. Computer networks is
   (a) Collection of hardware components and computers
   (b) Interconnected by communication channels
   (c) Sharing of resources and information
   (d) All of the above

2. Protocols are
   (a) Agreements on how communication components and DTE's are to communicate.
   (b) Logical communication channels used for transferring data.
   (c) Physical communication channels used for transferring data.
   (d) None of the above

3. Match the following groups based on layer of OSI model.

Group-1	Group-2
A. Hub	1. Physical layer
B. Bridge	2. Data link layer
C. Router	3. Network layer
D. Server	4. Application layer

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	2	3	3
(c)	2	3	3	3
(d)	1	3	3	4

4. Match the following groups:

Group-1	Group-2
A. Link	1. Message
B. Network	2. Segment
C. Application	3. Datagram
D. Transport	4. Frame

Codes:

	A	B	C	D
(a)	3	4	2	1
(b)	4	3	2	1
(c)	4	3	1	2
(d)	3	4	1	2

5. Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I
A. Session layer
B. Transport layer
C. Application layer
D. MDI (Medium Dependent Interface)

List-II
1. Connects DCE into physical channel.
2. Provides end to end connectivity.
3. Provides organized means to exchange data between users. (Like synchronization points).
4. Supports an end user process and performs required file transfer.

Codes:

	A	B	C	D
(a)	3	4	2	1
(b)	3	2	4	1
(c)	2	4	1	3
(d)	4	3	2	1

6. Match the following:

List-I
A. Data link layer
B. Physical layer
C. Presentation layer
D. Network layer

List-II
1. The lowest layer whose function is to activate, deactivate and maintain the circuit between DTE and DCE.
2. Performs routing and communication.
3. Detection and recovery from errors in the transmitted data.
4. Concerned with for the syntax of the data.

Codes:

	A	B	C	D
(a)	3	1	4	2
(b)	2	1	4	3
(c)	4	1	2	3
(d)	2	1	3	4

7. Which of the following OSI level is more closely related to the physical communications facilities?
(a) Application (b) Session
(c) Network (d) Data link

8. Which of the following connectivity devices typically work at the physical layer of the OSI model?
(a) Routers (b) Bridges
(c) Repeaters (d) Gateways

9. The method of communication in which transmission takes place in both directions, but only in one directions at a time is called
(a) Simplex (b) Four wire circuit
(c) Full duplex (d) Half duplex

10. In a broad sense, a railway track is an example of
(a) Simplex (b) Half-duplex
(c) Full-duplex (d) All of these

11. Which of the following is not true?
(a) Ring topology of N-devices contains (N – 1) dropline and N-Ring cables.
(b) Bus topology of N-devices needs 1 dropline and N-Backbone cables.
(c) Star topology of N-devices contains N + 1 links and N-ports.
(d) All of these

12. A network that requires human intervention to route signals is called a
(a) Bus network (b) Ring network
(c) Star network (d) T-switched network

13. Match the following cables with there bandwidth

List-I	List-II
I. Coaxial cable	A. 4 Mbps to 1 Gbps
II. UTP	B. 10 Gbps
III. STP	C. 10 Mbps
IV. Fiber optic	D. 10 to 100 Mbps

(a) I - B, II - D, III - A, IV - C
(b) I - C, II - A, III - D, IV - B
(c) I - C, II - D, III - B, IV - C
(d) I - B, II - A, III - D, IV - B

14. Baseband is
(a) Transmission of signals without modulation.
(b) A signal all of whose energy is contained within a finite frequency range is finite but near to zero.
(c) The simultaneous transmission of data to a number of stations.
(d) All of the above

15. Broad band uses
(a) Manchester encoding
(b) FSK encoding
(c) ASK encoding
(d) PSK encoding

16. Baud means the
(a) Number of bits transfer per unit time
(b) Number of bytes transmitted per unit time
(c) Rate at which the signal changes
(d) None of these

17. The effective bandwidth is based on _____.
(a) Average data rate
(b) Peak data rate
(c) Maximum burst size
(d) All of the above

18. Choose the correct statements(s):
(a) Baseband network uses analog technology.
(b) Baseband network is Time Division Multiplexed.
(c) Broadband network uses digital technology.
(d) In broadband network, the carrier signals operate at lower frequency.

19. A device that can convert digital signals to analog signals is (only in networking)
(a) An emulator (b) A packet
(c) A modem (d) None of these

20. When a signal travels through a transmission medium, its power becomes 100 times. Then there power would be
(a) Loss of 100 (b) Loss of 20 dB
(c) Gain of 100 (d) Gain of 20 dB

21. There are three IP addresses as given below:
X = 202.23.14.150
Y = 168.19.200.12
Z = 72.192.52.210
Which of the following statements is/are correct?
(a) X is Class A, Y is Class B and Z is Class C
(b) X is Class C, Y is Class A and Z is Class B
(c) X is Class C, Y is Class B and Z is Class A
(d) X is Class A, Y is Class C and Z is Class B

22. What is channel capacity of printer with a 1400 Hz bandwidth and a signal-to-noise ratio is 15 dB?
(a) 1700 bps (b) 5600 bps
(c) 4300 bps (d) 4200 bps

23. Class _____ has the greatest number of hosts per given network address.
(a) B (b) A
(c) D (d) C

24. Which of the following is not a class A host address?
(a) 117.4.5.1 (b) 117.8.0.0
(c) 128.4.5.6 (d) 117.0.0.0

25. To interconnect two IP classes, class A and class C networks
(a) A bridge is needed
(b) A class B network is needed
(c) A router is needed
(d) Can't say

26. Which of the following is class B host address?
(a) 230.0.0.0 (b) 117.4.5.1
(c) 130.4.5.6 (d) 30.4.5.6

27. In the IPv4 addressing format, the number of network allowed under class C addresses is
(a) 2^{14} (b) 2^{7}
(c) 2^{21} (d) 2^{24}

28. Match the following:

List-I (Packets)

A.

	Source IP	Destination IP
Data	250.255.255.255	40.40.40.40

B.

	Source IP	Destination IP
Data	22.21.23.24	255.255.255.255

C.

	Source IP	Destination IP
Data	24.23.22.21	24.22.23.24

List-II
1. Unicast packet within network
2. This packet never exists
3. Limited broadcasting

Codes:

	A	B	C
(a)	1	2	3
(b)	2	3	1
(c)	3	1	2
(d)	2	1	3

29. To form supernetting
(a) All the network should be contiguous
(b) Size of all network should be same (in power of 2)
(c) 1st Network ID is divisible by sir of all network
(d) All of the above

30. A subnet mask in class *A* can have _____ 1's with the remaining bits 0's.
(a) 8 (b) 4
(c) 33 (d) 3

31. Given an IP address 156.233.42.56 with a subnet mask of 7 bits. How many hosts and subnets are possible.
(a) 126 hosts and 510 subnets
(b) 128 hosts and 512 subnets
(c) 510 hosts and 126 subnets
(d) 512 hosts and 128 subnets

32. The default subnet mask for class C network can be 255.255 . ____ .0

33. A subnet mask in class *A* has fourteen 1's. How many subnet does it define?
(a) 32 (b) 8
(c) 64 (d) 128

34. The maximum number of subnets in class C using the masks 255.255.255.0?
(a) 256 (b) 2^{16}
(c) 1 (d) 0

35. Which of the following IP address is valid to be assigned to a host
(a) 150.7.0.0 (b) 25.5.55.55
(c) 127.0.0.1 (d) 192.248.16.255

36. What is the subnetwork address of 192.168.2.37 with the subnet mask of 255.255.255.248?
(a) 192.168.2.24 (b) 192.168.2.32
(c) 192.168.2.40 (d) 192.168.2.48

37. What will be the broadcast address of the above subnetwork?
(a) 192.168.2.31 (d) 192.168.2.47
(c) 192.168.2.55 (d) 192.168.2.39

38. A subnet mask in class C has 27 one's. How many subnets does it define?
(a) 4 (b) 8
(c) 6 (d) 7

Answers Networking Fundamentals and Physical Layer

1.	(d)	2.	(a)	3.	(a)	4.	(c)	5.	(b)	6.	(a)	7.	(d)	8.	(c)	9.	(d)
10.	(b)	11.	(d)	12.	(d)	13.	(b)	14.	(a)	15.	(d)	16.	(c)	17.	(d)	18.	(b)
19.	(b)	20.	(d)	21.	(c)	22.	(b)	23.	(b)	24.	(c)	25.	(c)	26.	(b)	27.	(c)
28.	(b)	29.	(d)	30.	(a)	31.	(c)	32.	(255)	33.	(c)	34.	(d)	35.	(b)	36.	(b)
37.	(d)	38.	(b)	39.	(d)	40.	(222)	41.	(a)	42.	(b)	43.	(b)	44.	(c)	45.	(c)
46.	(a)	47.	(b)	48.	(252 and 0)			49.	(d)	50.	(a)	51.	(a)	52.	(c)	53.	(d)
54.	(c)	55.	(c)	56.	(c)	57.	(c)	58.	(d)	59.	(d)	60.	(b)	61.	(16)	62.	(39.8)
63.	(a)	64.	(c)	65.	(c)	66.	(d)	67.	(c)	68.	(a)	69.	(c)	70.	(b)	71.	(b)
72.	(b)	73.	(c)	74.	(a)	75.	(33)	76.	(c)	77.	(c)	78.	(b)	79.	(a)	80.	(1)
81.	(2)	82.	(b)	83.	(a)	84.	(14)	85.	(d)	86.	(c)	87.	(62)	88.	(c)	89.	(d)
90.	(c)	91.	(a)	92.	(64)	93.	(a)	94.	(c)	95.	(d)	96.	(b)	97.	(a)	98.	(a)
99.	(d)	100.	(320)	101.	(111)	102.	(a, b, c, d)	103.	(b, c)	104.	(a, c)	105.	(b, c)	106.	(a, b)		
107.	(a, b)			108.	(a, c, d)	109.	(a, b, d)	110.	(a, b)			111.	(c, d)			112.	(b, c)

Explanations Networking Fundamentals and Physical Layer

2. (a)

Protocols is a set of rules. It is an agreement between the communicating parties on how communication should proceed.

3. (a)

Hub works in physical layer
Bridge works in data link layer
Router works in network layer
PC, Server works in application layer.

4. (c)

Link layer unit of data is frame
Network layer unit of data is datagram
Application layer unit of data is message
Transport layer unit of data is segment
Note: Network layer can use the term packet if communication is reliable (via TCP).

5. (b)

- Session layer provide organised means to exchange data between uses.
- Layer support an end user process and performs required file transfer.
- Transport layer provides end to end connectivity.
- Medium dependent interface connects DCE into physical channel.

6. (a)

Data link layer: It is associated with the detection and recovery from the errors in the transmitted data.
Physical layer: It is the lowest layer whose function is to activate, deactivate and maintain the circuit between Data Terminal Equipment (DTE).
Presentation layer: It is concerned with the syntax and semantics of the information exchanged between two systems.
Network layer: This layer has some specific responsibilities:
(i) Logical addressing [communication]
(ii) Routing

7. (d)

OSI model layer division is as application layer, session layer, transport layer, network layer, data-link layer, physical layer. Hence the ISO level which is more closely related to the physical communication facilities is data link layer among other given layers.

8. (c)

Router — network layer
Bridges — data link layer

Repeater — physical layer
Gateways — application layer

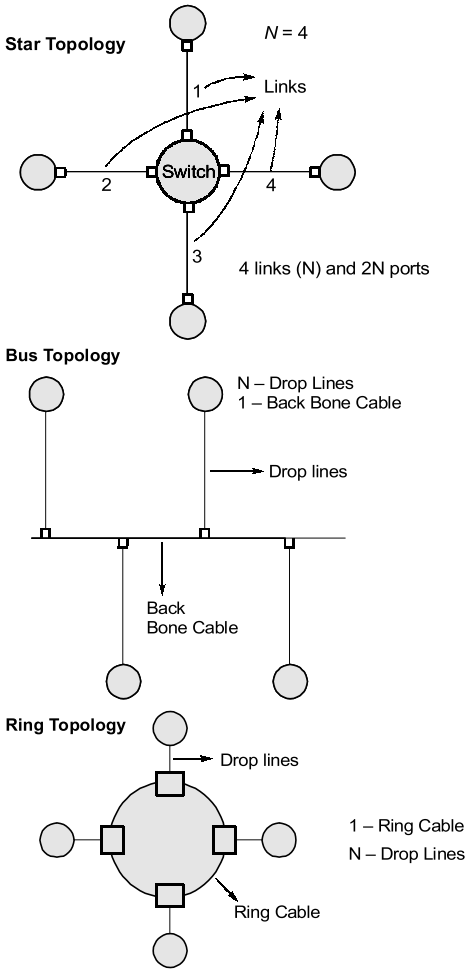
9. (d)

In simplex mode, transmission takes place in one direction.
In duplex mode, transmission take place simultaneously in both direction.
In half-duplex transmission take place in both direction but not at the same time.

10. (b)

In half duplex mode the transmission is takes place in both direction, but only in one direction at a time.
Hence, railway track is an example of this half-duplex mode.

11. (d)



12. (d)

T-switched network requires human intervention to route signals.

13. (b)

Coaxial : 10 Mbps
UTP : 4 Mbps to 1 Gbps
STP : 10 to 100 Gbps
Fiber optic : 10 Gbps

14. (a)

Baseband is a signal that has a very narrow and near zero frequency range. Baseband can be synonymous with low pass or non-modulated. In broadband simultaneous transmission of data to a number of station possible but not in baseband.

15. (d)

Broad band uses phase shift key encoding technique.

16. (c)

Baud rate is the number of signals units per second that are required to represents the bits transmitted during one second.

17. (d)

The effective data burst is a measure of average data rate, peak data rate and maximum data rate.

18. (b)

Baseband transmission typically use digital signalling over a single wire. Using this, it is possible to transmit multiple signals on a single cable by time-division multiplexing. In broadband transmission multiple channels are created using frequency-division multiplexing.

19. (b)

Modem stands for modulator/demodulator. Modulator converts a digital signals into an analog signal using ASK, FSK, PSK or QAM. Demodulator converts an analog signal into digital signal.

20. (d)

$$\text{Formulated at amplification} = 10 \log_{10} \frac{P_2}{P_1} \text{ dB}$$

Here, $P_2 = 100\, P_1$

$$\therefore \text{ Amplification} = 10 \log_{10} \frac{100 P_1}{P_1} \text{ dB}$$

$$= 10 \log_{10} 10^2 = 20 \text{ dB}$$

Here, value is +ve. Hence gain at 20 dB

21. (c)

In IP addresses class A, B, and C used for general purpose.

Range of class A: 1.0.0.0 to 12.255.255.255

Range of class B: 128.0.0.0 to 191.255.255.255

Range of class C: 192.0.0.0 to 223.255.255.255

Hence option (c) is correct.

22. (b)

$\frac{S}{N}$ is known as signal to noise ratio channel

$$\text{capacity} = \text{Bandwidth} \times \log_2\left(1+\frac{S}{N}\right)$$

$$= 1400 \times \log_2(1 + 15)$$

$$= 1400 \times \log_2 16 = 5600 \text{ bps}$$

23. (b)

Number of hosts in class A = $2^{24} - 2$

Number of hosts in class B = $2^{16} - 2$

Number of hosts in class C = $2^8 - 2$

24. (c)

Class A addresses are 0.0.0.0 to 127.255.255.255 so, 128.4.5.6 is not class address.

25. (c)

Router is used to connect two different class networks.

26. (b)

Class B address belongs to 128.0.0.0 to 191.255.255.255 so, here 130.4.5.6 belong to class B host address.

27. (c)

Number of networks in class C are 2^{21} as in class C there

Out of 24 bits, 3 bits are used for representation class C i.e. 110.

$\therefore$ 21 bits with 21 bits we can make 2^{21} network.

28. (b)

Packet A: The source IP contain direct broad cast address and we never use direct broadcast address in source IP. It is always used in destination IP. Hence packet A never exists.

Packet B: If destination IP address contain all 1's then it broadcasts within same network (Limited Broadcasting).

Packet C: It is a unicast packet within the same network as network ID 24.0.0.0 is same for both source and destination IP.

29. (d)

255.255.255.224 provides 0 subnet, each with 30 hosts. So this is useful.

30. (a)

Default subnet mask of class A network

11111111.00000000.00000000.00000000

$\Rightarrow$ 255.0.0.0

31. (c)

IP = 156.233.42.56, Class-B

Mask = 255.255.0.0

156.233.0.0

Taken 7 bits from host:

Subnet = $2^7 - 2 = 126$

Host = $2^9 - 2 = 510$

32. (255)

If IP address is AND with subnet mask result will network address.

Default subnet mask

Class A = 255.0.0.0

Class B = 255.255.0.0

Class C = 255.255.255.0

33. (c)

Subnet mask

= 11111111.11111100.00000000.00000000

Network bit | Host bit

6 bit are used for subnetting.

So number of possible subnets = $2^6 = 64$.

34. (d)

0 subnets because the subnet mask is the same as the network mask. (Since no host bit is used).

35. (b)

- 150.7.0.0 cannot be host address because last two octet, does not contain atleast one it represent network address for class B.
- 25.5.55.55 is valid host address of class A.
- 127.0.0.1 cannot used as host address because it is special address called loop back address.