

INSTRUCTIONS

1. Answer all questions.
2. All questions carry equal marks.
3. Only one answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as 1, 2, 3, 4. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL-POINT PEN**.
6. 1/3 part of the mark(s) of each question will be deducted for each wrong answer. (A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
7. The candidate should ensure that Series Code of the Question Paper Booklet and Answer Sheet must be same after opening the envelopes. In case they are different, a candidate must obtain another Question Paper of the same series. Candidate himself shall be responsible for ensuring this.
8. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt as per rules.
9. Please correctly fill your Roll Number in O.M.R. Sheet. 5 marks will be deducted for filling wrong or incomplete Roll Number.

Warning : If a candidate is found copying or if any unauthorised material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted under Section 3 of the R.P.E. (Prevention of Unfairmeans) Act, 1992. Commission may also debar him/her permanently from all future examinations of the Commission.

निर्देश

1. सभी प्रश्नों के उत्तर दीजिए।
2. सभी प्रश्नों के अंक समान हैं।
3. प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर पत्रक पर नीले बॉल प्वाइंट पेन से गहरा करना है।
6. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है। किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।
7. प्रश्न पत्र पुस्तिका एवं उत्तर पत्रक के लिफाफे की सील खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि उसके प्रश्न पत्र पुस्तिका पर वही सीरीज अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से प्रश्न-पत्र की ही सीरीज वाला दूसरा प्रश्न पत्र का लिफाफा प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।
8. मोबाइल फोन अथवा इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानी पूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांकों में से अनिवार्य रूप से काटे जाएंगे।

चेतावनी : अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराई जायेगी और आर पी. ई. (अनुचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

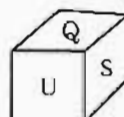
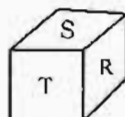
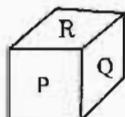
- 1 How many numbers lie between 300 and 500 in which 4 comes only one time ?

- (1) 98 (2) 99
(3) 100 (4) 101

300 तथा 500 के बीच कितनी ऐसी संख्याएँ होंगी जिसमें 4 केवल एक बार आयेगा ?

- (1) 98 (2) 99
(3) 100 (4) 101

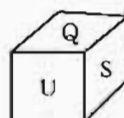
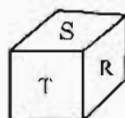
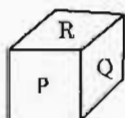
- 2 Three views of a cube following a particular motion are given below :



What is the letter opposite to P ?

- (1) S (2) T
(3) R (4) U

एक घन के तीन विभिन्न आकृतियों को नीचे दिए गए विशेष प्रकार से दिया गया है -



P अक्षर के विपरित अक्षर कौन सा है ?

- (1) S (2) T
(3) R (4) U

- 3 Given that :

- (i) L is the brother of M (ii) N is the father of L
(iii) O is the brother of P (iv) P is the daughter of M

Then the uncle of O is -

- (1) L (2) M
(3) N (4) P

दिया है :

- (i) L, M का भाई है (ii) N, L का पिता है
(iii) O, P का भाई है (iv) P, M की पुत्री है

तब O के चाचा है -

- (1) L (2) M
(3) N (4) P

- 4 If a car moves from Jaipur to Delhi at a speed of 60 km/hr and comes back from Delhi to Jaipur at a speed of 40 km/hr. What is the average speed during the journey ?

- (1) 46 km/hr (2) 48 km/hr
(3) 50 km/hr (4) 52 km/hr

यदि एक कार जयपुर से दिल्ली 60 किमी/घण्टा की चाल से चलती है, तथा वही कार दिल्ली से जयपुर 40 किमी/घण्टा की चाल से आती है। यात्रा के दौरान कार की औसत चाल क्या है ?

- (1) 46 किमी/घण्टा (2) 48 किमी/घण्टा
(3) 50 किमी/घण्टा (4) 52 किमी/घण्टा

- 5 Statement If $P = x\%$ of y

$$Q = y\% \text{ of } x.$$

Then which of the following is true based on statement ?

- (1) $P > Q$ (2) $P < Q$
(3) $P = Q$ (4) None of these

कथन यदि $P = y$ का $x\%$

$$Q = x \text{ का } y\%$$

तो कथन के अनुसार निम्न में से कौन सा सत्य है ?

- (1) $P > Q$ (2) $P < Q$
(3) $P = Q$ (4) इनमें से कोई नहीं

- 6 The numbers follow a specific pattern. The missing number is -

84	81	88
14 12	18 9	? 11
(i)	(ii)	(iii)

- (1) 8 (2) 12
(3) 16 (4) 22

निम्न संख्याएँ एक विशेष प्रकार से लिखी गई है, अज्ञात संख्या होगी -

84	81	88
14 12	18 9	? 11
(i)	(ii)	(iii)

- (1) 8 (2) 12
(3) 16 (4) 22

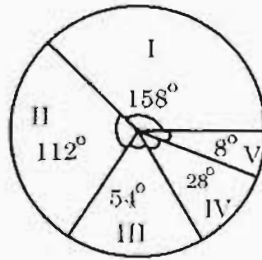
- 7 The remainder obtained when a prime number greater than 6 is divisible by 6 is :

- (1) 1 or 3 (2) 3 or 5
(3) 2 or 5 (4) 1 or 5

6 से बड़ी अभाज्य संख्या को 6 से विभाजित करने पर शेषफल प्राप्त होगा -

- (1) 1 या 3 (2) 3 या 5
(3) 2 या 5 (4) 1 या 5

- 8 The total population in a city is 40,000. The various sections of them are indicated below in the circle diagram :

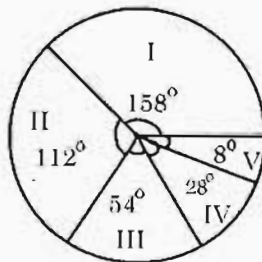


- I - Employed in public sector II - Employed in private sector
III - Employed in corporate sector IV - Self employed
V - Unemployed.

The number of persons employed in corporate sector is -

- (1) 3,000 (2) 6,000
(3) 8,000 (4) 9,000

एक शहर की जनसंख्या 40,000 है। इनके विभिन्न समूहों को नीचे दिए गये वृत्त आरेख में दर्शाया गया है :



- I - सार्वजनिक क्षेत्र में रोजगाररत II - निजी क्षेत्र में रोजगाररत
III - निगमित क्षेत्र में रोजगाररत IV - स्वरोजगारयुक्त
V - बेरोजगार

निगमित क्षेत्र में रोजगार प्राप्त व्यक्तियों की संख्या है -

- (1) 3,000 (2) 6,000
(3) 8,000 (4) 9,000

- 9 In the following number series, one number is wrong. Find the Odd number
2, 6, 24, 96, 285, 568, 567

- (1) 24 (2) 96
(3) 285 (4) 567

निम्नलिखित संख्या श्रृंखला में एक संख्या गलत है, विषम (गलत) संख्या है -

2, 6, 24, 96, 285, 568, 567

- (1) 24 (2) 96
(3) 285 (4) 567

- 10 Given a question and two statements numbered I and II are following. Give answer as :

- (1) If the data in statement I alone is sufficient to answer the question.
(2) If the data in statement II alone is sufficient to answer the question.
(3) If the data even in both statement I and II together is sufficient to answer the question.
(4) If the data neither statement I nor statement II is sufficient to answer the question.

Question : What is the sum of 5 real numbers ?

Statements : (I) The product of the numbers is 630.

(II) The average of the numbers is 30.

एक प्रश्न तथा दो कथन (I व II) दिये गए हैं। कथनों में उपलब्ध आंकड़ों के आधार पर उत्तर दे :

- (1) यदि प्रश्न का उत्तर देने के लिए मात्र कथन I के ही आंकड़े पर्याप्त हैं।
(2) यदि प्रश्न का उत्तर देने के लिए मात्र कथन II के ही आंकड़े पर्याप्त हैं।
(3) यदि प्रश्न का उत्तर देने के लिए कथन I और II दोनों के आंकड़े मिलकर पर्याप्त हैं।
(4) यदि ना तो कथन I और न ही कथन II के आंकड़े प्रश्न के उत्तर देने में पर्याप्त हैं।

प्रश्न : 5 वास्तविक संख्याओं का योग क्या होगा ?

कथनों : (I) संख्याओं का गुणनफल 630 है।

(II) संख्याओं का औसत 30 है।

11 The Chief of Army staff of India is -

- | | |
|------------------|-----------------|
| (1) Bikram Singh | (2) Bimal Kumar |
| (3) V. K. Singh | (4) D. K. Joshi |

भारत के स्थल सेनाध्यक्ष हैं -

- | | |
|------------------|------------------|
| (1) बिक्रम सिंह | (2) बिमल कुमार |
| (3) वी. के. सिंह | (4) डी. के. जोशी |

12 The Agni-IV Missile was tested on -

- | | |
|--------------------|---------------------|
| (1) November, 2012 | (2) September, 2012 |
| (3) December, 2010 | (4) September, 2010 |

अग्नि-IV मिसाइल का परीक्षण किया गया -

- | | |
|------------------|-------------------|
| (1) नवम्बर, 2012 | (2) सितम्बर, 2012 |
| (3) दिसंबर, 2010 | (4) सितम्बर, 2010 |

13 Who first used the word Swaraj ?

- | | |
|--------------------|----------------------------|
| (1) Ram Mohan Roy | (2) Ram Krishna Paramhansa |
| (3) Swami Dayanand | (4) S. N. Banerjee |

किसने सर्वप्रथम स्वराज शब्द का प्रयोग किया ?

- | | |
|-------------------|----------------------|
| (1) राम मोहन राय | (2) राम कृष्ण परमहंस |
| (3) स्वामी दयानंद | (4) एस. एन. बनर्जी |

14 How many persons have been honoured with Bharat Ratna till now ?

- | | |
|--------|--------|
| (1) 60 | (2) 41 |
| (3) 61 | (4) 43 |

कितने लोगों को अभी तक भारत रत्न से सम्मानित किया गया है ?

- | | |
|--------|--------|
| (1) 60 | (2) 41 |
| (3) 61 | (4) 43 |

15 Hawa Mahal at Jaipur was constructed by -

- | | |
|------------------|---------------|
| (1) Man Singh | (2) Ram Singh |
| (3) Pratap Singh | (4) Jai Singh |

जयपुर स्थित हवामहल का निर्माण कराया -

- | | |
|----------------|-------------|
| (1) मानसिंह | (2) रामसिंह |
| (3) प्रतापसिंह | (4) जयसिंह |

16 The total length of roads in Rajasthan in March, 2012 was -

- | | |
|----------------|----------------|
| (1) 189402 km. | (2) 199502 km. |
| (3) 170402 km. | (4) 155372 km. |

मार्च, 2012 तक राजस्थान में सड़कों की कुल लंबाई थी -

- | | |
|------------------|------------------|
| (1) 189402 किमी. | (2) 199502 किमी. |
| (3) 170402 किमी. | (4) 155372 किमी. |

17 When the 'MGNREGA' first launched in Rajasthan ?

- | | |
|---------------------------------|-------------------------------|
| (1) 2 nd Feb. 2006 | (2) 2 nd May, 2007 |
| (3) 1 st April, 2008 | (4) 2 nd Feb. 2009 |

राजस्थान में 'मनरेगा' सर्वप्रथम कब प्रारंभ की गयी ?

- | | |
|--------------------|-------------------|
| (1) 2 फरवरी, 2006 | (2) 2 मई, 2007 |
| (3) 1 अप्रैल, 2008 | (4) 2 फरवरी, 2009 |

18 The Mangarh Dham is situated in the district -

- | | |
|-----------------|--------------|
| (1) Dungarpur | (2) Udaipur |
| (3) Chittorgarh | (4) Banswara |

मानगढ धाम जिस जिले में स्थित है -

- | | |
|----------------|---------------|
| (1) डूंगरपुर | (2) उदयपुर |
| (3) चित्तौडगढ़ | (4) बांसवाड़ा |

19 The Tenth Pravasi Bhartiya Divas Conclave was held at -

- | | |
|------------|---------------|
| (1) Ajmer | (2) New Delhi |
| (3) Mumbai | (4) Jaipur |

दसवाँ प्रवासी भारतीय दिवस कॉन्क्लेव सम्पन्न हुआ -

- | | |
|------------|---------------|
| (1) अजमेर | (2) नई दिल्ली |
| (3) मुम्बई | (4) जयपुर |

20 The amount fixed for the Chief Minister scholarship for higher education in Rajasthan is -

- | | |
|-------------|-------------|
| (1) ₹ 5,000 | (2) ₹ 6,000 |
| (3) ₹ 7,000 | (4) ₹ 8,000 |

राजस्थान में उच्च शिक्षा हेतु मुख्यमंत्री छात्रवृत्ति योजना में निर्धारित राशि है -

- | | |
|-------------|-------------|
| (1) ₹ 5,000 | (2) ₹ 6,000 |
| (3) ₹ 7,000 | (4) ₹ 8,000 |

- 21 Which one of the following problems can occur due to introducing locks in a concurrent transaction scenario?
- (1) Information overwrite
 - (2) Loss of information
 - (3) Deadlock
 - (4) Lack of integrity
- 22 Which one of the following techniques is sometimes used to solve integrity problems in a concurrent transaction scenario?
- (1) First-come first-served
 - (2) Greedy algorithms
 - (3) Strassens's algorithm
 - (4) Two-phase locking
- 23 In transaction, cascade rollback
- (1) Can occur in systems which use deferred writeback
 - (2) Can occur in systems which use immediate writeback
 - (3) Occurs in systems which use the "waterfall" transaction management system
 - (4) Is a result of simultaneous transaction commits.
- 24 Given a relation country(name, continent, population) which of the following is a valid SQL statement?
- (1) SELECT continent, population FROM country GROUP BY continent
 - (2) SELECT continent, SUM(population) FROM country GROUP BY continent
 - (3) SELECT name, population FROM country GROUP BY continent
 - (4) SELECT name, SUM(population) FROM country GROUP BY continent

- 25 An athletics meeting involves several competitors who participate in a number of events. The database is intended to record who is to take part in which event and to record the outcome of each event. As results become available the winner attribute will be updated with the cid of the appropriate competitor.

Competitor(cid, name, nationality)

Event(eid, description, winner)

Competes(cid, eid)

Competitor			Event			Competes	
cid	name	nationality	eid	description	winner	cid	eid
01	Pat	British	01	running		01	01
02	Hilary	British	02	jumping		02	01
03	Sven	Swedish	03	throwing		03	02
04	Pierre	French				04	02
						04	03

Select the true statement :

- (1) There is a British competitor in every event.
- (2) Pierre does not compete in any event
- (3) Sven has been entered in two events
- (4) Hilary has entered only the running event

- 26 An athletics meeting involves several competitors who participate in a number of events. The database is intended to record who is to take part in which event and to record the outcome of each event. As results become available the winner attribute will be updated with the cid of the appropriate competitor.

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Competitor			Event			Competes	
cid	name	nationality	eid	description	winner	cid	eid
01	Pat	British	01	running		01	01
02	Hilary	British	02	jumping		02	01
03	Sven	Swedish	03	throwing		03	02
04	Pierre	French				04	02
						04	03

Identify the result of the following SQL statement :

SELECT eid FROM Competes, Competitor

WHERE Competes.cid=Competitor.cid

AND nationality = 'Swedish'

(1) 01

(2) 02

(3) 03

(4) 04

- 27 Relation C is a projection of relation A. Which of the following statements must be true in all cases where relation C is different from relation A?
- (1) The cardinality of C is greater than the cardinality of A
 - (2) The cardinality of C is less than the cardinality of A
 - (3) The arity of C is greater than the arity of A
 - (4) The arity of C is less than the arity of A
- 28 When the referential integrity rule is enforced, which one is usually not a valid action in response to the deletion of a row that contains a primary key value referenced elsewhere?
- (1) Do not allow the deletion
 - (2) Accept the deletion without any other action
 - (3) Delete the related rows
 - (4) Set the foreign keys of related rows to null
- 29 When an equi-join is performed on a table of N rows and a table of M rows, the resulting table has the following number of rows :
- (1) M
 - (2) N
 - (3) The smaller of M or N
 - (4) A number in the range 0 to $M*N$
- 30 In an SQL query that gets its data from two tables, and where the keywords WHERE, GROUP, ORDER and HAVING appear, which operation is performed before the other ones?
- (1) Restriction on WHERE conditions
 - (2) Restrictions on HAVING conditions
 - (3) ORDER BY
 - (4) Sort on GROUP BY

- 31 A Trigger is
- (1) A statement that enables to start any DBMS
 - (2) A statement that is executed by the user when debugging an application program
 - (3) A condition the system tests for the validity of the database user
 - (4) A statement that is executed automatically by the system as a side effect of modification to the database
- 32 With regard to the expressive power of the formal relational Query Languages which of the following statements is TRUE ?
- (1) Relational algebra is more powerful than relational calculus.
 - (2) Relational algebra has the same power as relational calculus.
 - (3) Relational algebra has the same power as safe relational calculus.
 - (4) None of these
- 33 In SQL, relation can contain null values, and comparisons with null values are treated as unknown suppose all comparisons with a null value are treated as false.
- Which of the following pairs is not equivalent?
- (1) $x = 5$ not (not ($x = 5$))
 - (2) $x = 5$ $x > 4$ and $x < 6$, where x is an integer
 - (3) $x \neq 5$ not ($x = 5$)
 - (4) none of these
- 34 The SQL expression
- Select distinct T. branchname from branch T, branch S where T. assets > S. assets and S. branchcity = "XYZ"
- Finds the names of
- (1) All branches that have greater assets than some branch located in XYZ
 - (2) All branches that have greater assets than all branches located in XYZ
 - (3) The branch that has the greatest asset in XYZ
 - (4) Any branch that has greater asset than any branch located in XYZ

- 35 Let $R = (A, B, C, D, E, F)$ be a relation scheme with the following dependencies :

$C \rightarrow F, E \rightarrow A, EC \rightarrow D, A \rightarrow B$

Which of the following is a key for R ?

- | | |
|----------|----------|
| (1) CD | (2) EC |
| (3) AE | (4) AC |

- 36 Consider the schema $R = (S, T, U, V)$ and the dependencies $S \rightarrow T, T \rightarrow U, U \rightarrow V$ and $V \rightarrow S$. Let $R = (R_1 \text{ and } R_2)$ be a decomposition such that $R_1 \cap R_2 = \phi$. The decomposition is

- | | |
|-----------------------------|-----------------------------|
| (1) not in 2 NF | (2) in 2 NF but not in 3 NF |
| (3) in 3 NF but not in 2 NF | (4) in both 2 NF and 3 NF |

- 37 A functional dependency of the form $x \rightarrow y$ is trivial if

- | | |
|---------------------|-------------------------------------|
| (1) $y \subseteq x$ | (2) $y \subset x$ |
| (3) $x \subseteq y$ | (4) $x \subset y$ and $y \subset x$ |

- 38 Given the functional dependencies.

$x \rightarrow w, x \rightarrow y, y \rightarrow z$ and $z \rightarrow pq$

Which of the following does not hold good?

- | | |
|------------------------|-----------------------|
| (1) $x \rightarrow z$ | (2) $w \rightarrow z$ |
| (3) $x \rightarrow wy$ | (4) None of these |

- 39 Consider Join of a relation R with a relation S . If R has m tuples and S has n tuples, then maximum and minimum sizes of the Join respectively are

- | | |
|-------------------------|-----------------------------|
| (1) $m + n$ and 0 | (2) $m \cdot n$ and 0 |
| (3) $m + n$ and $ m-n $ | (4) $m \cdot n$ and $m + n$ |

- 40 For two union compatible relations $R_1 (A, B)$ and $R_2 (C, D)$, what is the result of the operation $R_1 \bowtie_{A=C \wedge B=D} R_2$?
- (1) $R_1 \cup R_2$ (2) $R_1 \times R_2$
 (3) $R_1 - R_2$ (4) $R_1 \cap R_2$
- 41 A primary key, if combined with a foreign key creates
- (1) Parent child relationship between the tables that connect them.
 (2) Many-to-many relationship between the tables that connect them
 (3) Network model between the tables connect them
 (4) None of these
- 42 The employee's salary should not be more than Rs. 6000. This is
- (1) Integrity constraint (2) Referential constraint
 (3) Over-defined constraint (4) Feasible constraint
- 43 A relational model which allows non-atomic domains is
- (1) Nested relational data model (2) Non-atomic data model
 (3) Hierarchical data model (4) None of these
- 44 If adjacency relation of vertices in a graph is represented in a table $Adj(x,y)$, then which of the following Queries cannot be expressed by a relational algebra expression of constant length ?
- (1) List all vertices adjacent to given vertex
 (2) List all vertices which have self-loops
 (3) List all vertices which belong to cycle of less than three vertices
 (4) List all vertices reachable from a given vertex
- 45 Which of the following is true of the data manipulation language (DML) ?
- (1) It refers to data using physical addresses
 (2) It cannot interface with high-level programming language
 (3) It is used to define the physical characteristics of each record
 (4) None of these

- 46 Using relational algebra, the query that finds customers, who have a balance of over 3000 is
- (1) $\pi_{\text{customer_name}} (\sigma_{\text{balance} > 3000}(\text{Deposit}))$
 - (2) $\sigma_{\text{customer_name}} (\sigma_{\text{balance} > 3000}(\text{Deposit}))$
 - (3) $\pi_{\text{customer_name}} (\sigma_{\text{balance} > 3000}(\text{Borrow}))$
 - (4) $\sigma_{\text{customer_name}} (\pi_{\text{balance} > 3000}(\text{Borrow}))$
- 47 Embedded pointer provides a/an
- (1) Secondary access path
 - (2) Physical record key
 - (3) Inverted index
 - (4) All of these
- 48 The physical locations of a record is determined by a mathematical formula that transforms file key into a record location in a/an
- (1) B-tree file
 - (2) Indexed file
 - (3) Hashed file
 - (4) All these
- 49 Minimum number of record movements required to merge five files A (with 10 records), B (with 20 records), C (with 15 records), D (with 5 records) and E (with 25 records) is
- (1) 165
 - (2) 90
 - (3) 75
 - (4) 65
- 50 Which command allows us to add to our database file ?
- (1) CLEAR
 - (2) CREATE
 - (3) APPEND
 - (4) APPEND BLANK
- 51 Which of the following commands permanently delete the record marked for deletion from the data base field?
- (1) PACK
 - (2) ZAP
 - (3) SEEK
 - (4) SKIP

- 52 A relational database which is in 3NF may still have undesirable data redundancy because there may exist
- (1) Transitive functional dependencies.
 - (2) Non-trivial functional dependencies involving prime attributes and the right side.
 - (3) Non-trivial functional dependencies involving prime attributes only on the left side.
 - (4) Trivial functional dependencies involving number of attributes.
- 53 Data security threats include
- (1) Privacy invasion
 - (2) Hardware failure
 - (3) Fraudulent manipulation of data
 - (4) All of these
- 54 Which of the following queries finds the clients of banker xyz and the city they live in ?
- (1) $\pi_{client_customer_name, customer_city}(\sigma_{client_customer_name=customer_customer_name}(\sigma_{Banker_name="xyz"}(Client \times Customer)))$
 - (2) $\pi_{customer_name, customer_city}(\sigma_{Banker_name="xyz"}(Client \times Customer))$
 - (3) $\pi_{client_customer_name, customer_city}(\sigma_{Banker_name="xyz"}(\sigma_{client_customer_name=customer_customer_name}(Client \times Customer)))$
 - (4) $\pi_{Customer_name, Customer_city}(\sigma_{Banker_name="xyz"}(Client \times Customer))$
- 55 If P and Q are predicates and P is the relational algebra expression, then which of the following equivalence are valid ?
- (1) $(\sigma_P(\sigma_Q(e)) = \sigma_Q(\sigma_P(e)))$
 - (2) $(\sigma_P(\sigma_Q(e)) = \sigma_{P \cup Q}(e))$
 - (3) $(\sigma_P(\sigma_P(e)) = \sigma_P(e))$
 - (4) None of these

56 Find the correct match for terms in Column I to those in Column II :

Column I		Column II	
a	Roll back	P	Relationship
b	Atomicity	Q	Checkpoint
c	Entity	R	Attribute
d	Domain	S	Transaction
(1)	a - S, b - P, c - R, d - Q		
(2)	a - Q, b - S, c - P, d - R		
(3)	a - S, b - Q, c - R, d - P		
(4)	a - Q, b - P, c - R, d - S		

57 Consider a weak entity set W and its identifying (owner) entity set O . Primary key of W is composed of

- (1) Discriminator of W and primary key of O
- (2) Superkey of W and primary key of O
- (3) Discriminator of W and foreign key of O
- (4) Superkey of W and foreign key of O

58 Which of the following is an assertion in DBMS?

- | | |
|-----------------------|--------------------|
| (1) Domain Constraint | (2) Generalization |
| (3) Trigger | (4) View |

59 Find the correct match for terms in Column I to those in Column II :

Column I		Column II	
a	Audit Trail	P	Tuple
b	Row	Q	Privileges
c	Revoke	R	Event-Condition-Action
d	Trigger	S	Security
(1)	a - S, b - P, c - R, d - Q		
(2)	a - P, b - S, c - Q, d - R		
(3)	a - S, b - Q, c - R, d - P		
(4)	a - S, b - P, c - Q, d - R		

- 60 Consider the statement, "Either $-2 \leq x < -1$ or $1 \leq x \leq 2$." The negation of this statement is
- (1) $x < -2$ or $2 \leq x$ or $-1 < x < 1$
 - (2) $x < -2$ or $2 < x$ or $-1 \leq x < 1$
 - (3) $x \leq -2$ or $2 < x$ or $-1 \leq x < 1$
 - (4) None of these
- 61 Let $A = \{0, 1\} \times \{0, 1\} \times \{0, 1\}$ and $B = \{a, b, c\} \times \{a, b, c\} \times \{a, b, c\}$. Suppose A is listed in lexicographic order based on $0 < 1$ and B is listed in lexicographic order based on $a < b < c$. If $A \times B \times A$ is listed in lexicographic order, then the next element after $((1, 0, 0), (c, c, c), (1, 1, 1))$ is
- (1) $((1, 0, 1), (a, a, b), (0, 0, 0))$
 - (2) $((1, 0, 1), (b, a, a), (0, 0, 1))$
 - (3) $((1, 0, 1), (a, a, a), (0, 0, 0))$
 - (4) $((1, 0, 0), (a, a, b), (0, 0, 1))$
- 62 Which normal form is considered adequate for database design?
- (1) 2NF
 - (2) 3NF
 - (3) 4NF
 - (4) 5NF
- 63 Which of the following statements is FALSE?
- (1) $\{2, 3, 4\} \in A$ and $\{2, 3\} \in B$ implies that $\{4\} \subseteq A - B$.
 - (2) $\{2, 3, 4\} \subseteq A$ implies that $2 \in A$ and $\{3, 4\} \subseteq A$.
 - (3) $A \cap B \supseteq \{2, 3, 4\}$ implies that $\{2, 3, 4\} \subseteq A$ and $\{2, 3, 4\} \subseteq B$.
 - (4) $A - B \supseteq \{3, 4\}$ and $\{1, 2\} \subseteq B$ implies that $\{1, 2, 3, 4\} \subseteq A \cup B$.

64 Find the correct match for terms in Column I to those in Column II :

Column I		Column II	
a	topological sorting	P	grant
b	privileges	Q	concurrency
c	multivalued dependency	R	4NF
d	improved throughput	S	serializable order
(1)	a - P, b - Q, c - R, d - S		
(2)	a - Q, b - S, c - P, d - R		
(3)	a - S, b - Q, c - R, d - P		
(4)	a - S, b - P, c - R, d - Q		

65 Two concurrent transactions T1 and T2 are in conflict when

- (1) T1 reads from x, T2 reads from y
- (2) T1 reads from x, T2 writes to x
- (3) T1 reads from x, T2 writes to y
- (4) T1 writes to x, T2 writes to y

66 Identify correct matching of the following sets :

a	Transaction	1	index
b	Natural join	2	relational algebra
c	B-tree	3	two phase locking
d	Concurrency control	4	ACID
(1)	a-4, b-2, c-3, d-1	(2)	a-4, b-1, c-3, d-2
(3)	a-3, b-2, c-1, d-4	(4)	a-4, b-2, c-1, d-3

- 67 In context of two phase locking protocol, which of the following statements is correct ?
- (1) Growing phase occurs after shrinking phase.
 - (2) In shrinking phase, transaction can obtain as well as release locks but in growing phase, it can only obtain locks.
 - (3) In growing phase, transaction can obtain as well as release locks but in shrinking phase, it can only release locks.
 - (4) In growing phase, transaction can only obtain locks and in shrinking phase, it can only release locks.
- 68 Which one of the following is not related to Normal Forms (Normalization) rule with regards to the Relational Model?
- (1) All fields within a table must relate to or directly describe the Primary Key.
 - (2) Repeating Groups must be eliminated from tables.
 - (3) Fields that can contain non-numeric data are to be removed and placed within their own tables with an associated Primary key.
 - (4) Redundant data is to be eliminated by placing the offending fields in another table.
- 69 Which of the following SQL query shall output names of all customers ending with "Smith" ?
- (1) Select name from customer where name like '_Smith'
 - (2) Select name from customer where name like '%Smith'
 - (3) Select name from customer where name like 'Smith%'
 - (4) Select name from customer where name like '%Smith%'
- 70 Which of the following is correct ?
- (1) An SQL query automatically eliminates duplicates.
 - (2) An SQL query will not work if there are no indexes on the relations.
 - (3) SQL queries can be nested.
 - (4) SQL permits attribute names to be repeated in the same relation.

- 71 172.17.225.125 IP address belong to
- (1) Public IP address (2) Private IP address
(3) Both (4) None
- 72 Wired Equivalent Privacy (WEP) and Wi-Fi Protected Access (WPA) are examples of
- (1) packet filtering services.
(2) network address translation protocols.
(3) security protocols.
(4) service set identifiers.
- 73 Match the following acronyms to their definitions :
- | | | | |
|-----|------|---|---------------------------------------|
| I | HTTP | a | protects IP addresses from hackers |
| II | SMTP | b | a protocol associated with Web pages |
| III | NAT | c | a protocol used for e-mail |
| IV | WAP | d | an access point on a wireless network |
- (1) I-b, II-a, III-d, IV-c
(2) I-b, II-c, III-a, IV-d
(3) I-c, II-a, III-d, IV-b
(4) I-c, II-d, III-a, IV-b
- 74 In the p-persistent approach of CSMA protocol, when a station finds an idle line, it _____.
- (1) Waits 1 sec before sending (2) Sends with probability $1 - p$
(3) Sends with probability p (4) Sends immediately
- 75 You have a network ID of 131.107.0.0 and you need to divide it into multiple subnets. You need 600 host IDs for each subnet with the largest amount of subnets available. Which subnet mask should you assign ?
- (1) 255.255.224.0 (2) 255.255.240.0
(3) 255.255.248.0 (4) 255.255.252.0

76. What protocol is used to convert IP addresses to MAC addresses?

- (1) IP
- (2) ARP
- (3) RARP
- (4) ICMP

77. A system has an n-layer protocol hierarchy. Applications generate messages of length M bytes. At each of the layers, an h-byte header is added. What fraction of the network bandwidth is filled with headers?

- (1) $\frac{h}{M}$
- (2) $\frac{hn}{M + nh}$
- (3) $\frac{nh}{M}$
- (4) $1 - \frac{nh}{M}$

78. The ABC Corporation of XYZ has a fully connected mesh network consisting of 99 devices. Calculate the number of ports for each device.

- (1) 4950
- (2) 4851
- (3) 100
- (4) 98

79. FDDI is a

- (1) Ring network
- (2) Star network
- (3) Mesh network
- (4) Bus based network

80. In networking terminology UTP means

- (1) Unshielded Twisted pair
- (2) Unshielded Teflon port
- (3) Uniformly terminating port
- (4) Unshielded T-connector port

- 81** Four bits are used for packed sequence numbering in a sliding window protocol used in a computer network. What is the maximum window size?
- (1) 4 (2) 8
(3) 15 (4) 16
- 82** IP address can be used to specify a broadcast and map to hardware broadcast if available. By conversion broadcast address has hosted with all bits
- (1) 0 (2) 1
(3) Both (1) and (2) (4) None of these
- 83** ICMP (internet control message protocol) is
- (1) A protocol that handles error and control messages
(2) A protocol used to monitor computers
(3) Both (1) and (2)
(4) None of these
- 84** Error detection at the data link level is achieved by
- (1) Bit stuffing (2) Cyclic redundancy codes
(3) Hamming codes (4) Equalization
- 85** The topology with highest reliability is
- (1) By topology (2) Star topology
(3) Ring topology (4) Mesh topology
- 86** How many characters per sec (7 bits + 1 parity) can be transmitted over a 2400 bps line if the transfer is synchronous (1 start and 1 stop bit)?
- (1) 300 (2) 240
(3) 250 (4) 275

- 87 In Ethernet CSMA/CD, the special bit sequence transmitted by media access management collision handling is called
- (1) Preamble
 - (2) Postamble
 - (3) Jam
 - (4) None of these
- 88 A terminal multiplexer has six 1200 bps terminals and 'n' 300 bps terminals connected to it. If outgoing line is 9600 bps, then maximum value of n is
- (1) 4
 - (2) 16
 - (3) 8
 - (4) 28
- 89 In time division switches, if each memory access takes 100 ms and one frame period is 125 ms, then maximum number of lines that can be supported is
- (1) 625
 - (2) 1250
 - (3) 2300
 - (4) 318
- 90 If data rate of ring is 20 Mbps, signal propagation speed is 200 b/ms, then number of bits that can be placed on the channel of 200 km is
- (1) 2,000 bits
 - (2) 20,000 bits
 - (3) 1,000 bits
 - (4) None of these
- 91 Decryption and encryption of data are responsibilities of
- (1) Physical layer
 - (2) Data link layer
 - (3) Presentation layer
 - (4) Session layer
- 92 Router function in which layers
- (1) Physical and data link layer
 - (2) Physical, data link layer and network
 - (3) Data link and network
 - (4) Network and transport

- 93 A channel has a bit rate of 4 kbps and one-way propagation delay of 20 ms. The channel uses stop and wait protocol. The transmission time of the acknowledgement frame is negligible. To get a channel efficiency of at least 50%, the minimum frame size should be
- (1) 80 bytes
 - (2) 80 bits
 - (3) 160 bytes
 - (4) 160 bits
- 94 In IEEE 802.11, a BSS without an AP is called _____
- (1) an ad hoc architecture
 - (2) an infrastructure network
 - (3) either an ad hoc architecture or an infrastructure network
 - (4) None of the choices is correct
- 95 In a network of LANs connected by bridges, packets are sent from one LAN to another through intermediate bridges. Since more than one path may exist between two LANs, packets may have to be routed through multiple bridges. Why is the spanning tree algorithm used for bridge-routing?
- (1) For shortest path routing between LANs
 - (2) For avoiding loops in the routing paths
 - (3) For fault tolerance
 - (4) For minimizing collisions
- 96 The _____ layer is responsible for moving frames from one hop (node) to the next.
- (1) physical
 - (2) data link
 - (3) transport
 - (4) none of the above
- 97 A port address in TCP/IP is _____ bits long.
- (1) 32
 - (2) 48
 - (3) 16
 - (4) none of the above

98 Which of the following IP address class is

- | | |
|-------------|-------------|
| (1) Class-A | (2) Class-B |
| (3) Class-C | (4) Class-D |

99 Which of the following layer of OSI model also called end-to-end layer ?

- | | |
|------------------------|---------------------|
| (1) Presentation layer | (2) Network layer |
| (3) Session layer | (4) Transport layer |

100 For a sliding window of size $(n-1)$ (n sequence numbers), there can be maximum of how many frames sent but yet to be acknowledged

- | | |
|---------|-------------|
| (1) 0 | (2) $n - 1$ |
| (3) n | (4) $n + 1$ |

101 Pick the incorrect statement in error retransmission used in continuous ARQ method

- (1) Go back N method requires more storage at the receiving side
- (2) Selected repeat involves complex logging than Go back N
- (3) Go back N has better line utilisation
- (4) Selective repeat has better line utilisation

102 An IP Network subnet has been assigned a subnet mask of 255.255.255.192. What is the maximum number of hosts that can belong to this subnet?

- | | |
|--------|---------|
| (1) 14 | (2) 30 |
| (3) 62 | (4) 126 |

- 103 An organization having IP Network has a class B network and wishes to form subnets for 64 departments. The subnet mask would be
- (1) 255.255.0.0 (2) 255.255.64.0
(3) 255.255.128.0 (4) 255.255.252.0
- 104 A local area network operates Ethernet with CSMA/CD mechanism and runs at a transmission rate of 8 Mbps and a one-way signal propagation time of 25 μ s. How long (μ s) has a station to wait before trying to access the channel again, after experiencing 5 successively collisions?
- (1) 125 (2) 625
(3) 800 (4) 1600
- 105 What is the term for two modems establishing communications with each other ?
- (1) Handshaking (2) Syncing
(3) Pinging (4) Linking
- 106 In computer network terminology, RTS is :
- (1) Ready to Sequence (2) Ready Task Set
(3) Request to Send (4) Ready Time Status
- 107 RS-232 is a standard that is for :
- (1) RAM checksum (2) Serial ports
(3) BIOS error checking (4) Parallel ports
- 108 The first section of a URL identifier is the _____.
- (1) protocol (2) path
(3) host (4) port

109 In HTTP, _____ server is a computer that keeps copies of responses to recent requests.

- (1) a regular
- (2) a proxy
- (3) an auxiliary
- (4) a remote

110 During an FTP session the data connection may be opened _____.

- (1) only once
- (2) only two times
- (3) as many times as needed
- (4) none of the choices is correct

111 In FTP, there are three types of _____: stream, block, and compressed.

- (1) file types
- (2) data types
- (3) transmission modes
- (4) none of the choices is correct

112 The formal protocol that defines the MTA client and server in the Internet is called _____.

- (1) SMTP
- (2) SNMP
- (3) TELNET
- (4) SSH

113 In the stop-and-wait protocol, the maximum send window size is _____ and the maximum receive window size is _____ where m is the number of bits in the sequence.

- (1) 1; 1
- (2) 2^m ; - 1
- (3) 1; 2^m
- (4) 2^m ; 2^m

114 In TCP, a SYN segment consumes _____ sequence number(s).

- (1) No
- (2) One
- (3) Two
- (4) None of the choices is correct

- 115 A serious problem can arise in the sliding window operation when either the sending application program creates data slowly or the receiving application program consumes data slowly, or both. This problem is called the _____.
(1) silly window syndrome
(2) unexpected syndrome window
(3) bug
(4) None of the choices is correct
- 116 In TCP's _____ algorithm the size of the congestion window increases exponentially until it reaches a threshold.
(1) congestion avoidance (2) congestion detection
(3) slow start (4) None of the choices is correct
- 117 The number of addresses assigned to an organization in classless addressing can be _____.
(1) any number (2) must be a multiple of 256
(3) must be a power of 2 (4) None of the choices is correct
- 118 _____ allows a site to use a set of private addresses for internal communication and a set of global Internet addresses for communication with the rest of the world.
(1) DHCP (2) NAT
(3) ICMP (4) None of the choices is correct
- 119 Which of the following is true about ICMP messages?
(1) An ICMP error message may be generated for an ICMP error message.
(2) An ICMP error message may be generated for a fragmented datagram.
(3) An ICMP error message may be generated for a multicast datagram.
(4) None of the choices is correct
- 120 The Open Shortest Path First (OSPF) protocol is an intradomain routing protocol based on _____ routing.
(1) distance vector (2) link state
(3) path vector (4) None of the choices is correct

SPACE FOR ROUGH WORK

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