

TEST SERIES NTA-UGC-NET/JRF JUNE 2019

BOOKLET SERIES **C**

Paper Code **87**

Test Type: **TEST SERIES**

COMPUTER SCIENCE & APPLICATIONS

Duration: 01:30 Hours

Date: 02-06-2019

Maximum Marks: 140

Read the following instructions carefully:

1. Single Paper Test is divided into **TWO** Parts.
2. **Part - I:** This part shall carry **20** questions. Each question shall be of **2 marks**.
3. **Part - II:** This part shall contain **50** questions. Each question shall be of **2 marks**.
4. There will be no negative marking.
5. Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.
6. The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.



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PAPER – I

1. Which of the following is are considered unethical practice in research?
 1. Including a colleague as an author on a paper in return for a favor even though the colleague did not make a serious contribution to the paper.
 2. Discussing with your colleagues confidential data from a paper that you are reviewing for a journal.
 3. Using data, ideas, or methods you learn about while reviewing a grant or a papers without permission
 4. Trimming outliers from a data set without discussing your reasons in paper
 5. Using an inappropriate statistical technique in order to enhance the significance of your research

(a) 1, 2, 3 (b) 2, 3, 4 (c) 1, 3, 4, 5 (d) 1, 2, 3, 4, 5
2. Teaching will be more successful if the teacher
 1. is subject specialist
 2. is more experienced in teaching that subject.
 3. starts the topic from the point where the students have past knowledge
 4. uses audio-video teaching aids

(a) 1, 2, 3, 4 (b) 2, 3, 4 (c) 1, 2, 4 (d) 1, 2, 3
3. To encourage the students to become self-motivated independent learners, a teacher can
 - (a) give frequent posture feedback that support students belief that they can do well
 - (b) ensure opportunities for students success by assigning task
 - (c) create an atmosphere that is open and positive
 - (d) All of the above
4. Depending upon the way of acquiring knowledge the learning can be classified in how many categories?

(a) 5 (b) 2 (c) 3 (d) 4
5. Spontaneous and Enforced attention are the types of
 - (a) Voluntary attention (b) Involuntary attention
 - (c) Subjective attention (d) Objective attention
6. Which of the following is true about SWAYAMPRAKASHA?
 1. The channels are uplinked from BISAG, Gandhinagar.
 2. The contents are provided by NPTEL, IITs, UGC, CEC, IGNOU, NCERT and NIOS.
 3. The INFLIBNET Centre maintains the web portal.
 4. The DTH Channels shall cover the 4 areas

(a) 1, 2, 3 (b) 2, 3, 4 (c) 1, 3, 4 (d) 1, 2, 3, 4
7. Which of the following is not a basic assumption of science?
 - (a) Science cannot provide answers to all questions
 - (b) It is possible to distinguish between more and less plausible claims
 - (c) Researchers should follow certain agreed upon norms and practices
 - (d) Science is best at solving value conflicts
8. Which of the following orders is the recommended in the flowchart of the development of a research idea?
 - (a) Research topic, research problem, research purpose, research question, hypothesis
 - (b) Research topic, research purpose, research problem, research question, hypothesis
 - (c) Research topic, research problem, research purpose, research question, hypothesis
 - (d) Research topic, hypothesis, research problem, research question, research purpose
9. _____ is a philosophical theory stating that certain knowledge is based on natural phenomena and their properties and relations. Thus, information derived from sensory experience, interpreted through reason and logic, forms the exclusive source of all certain knowledge.

(a) Positivism (b) Post-positivism (c) Empiricism (d) Experiment

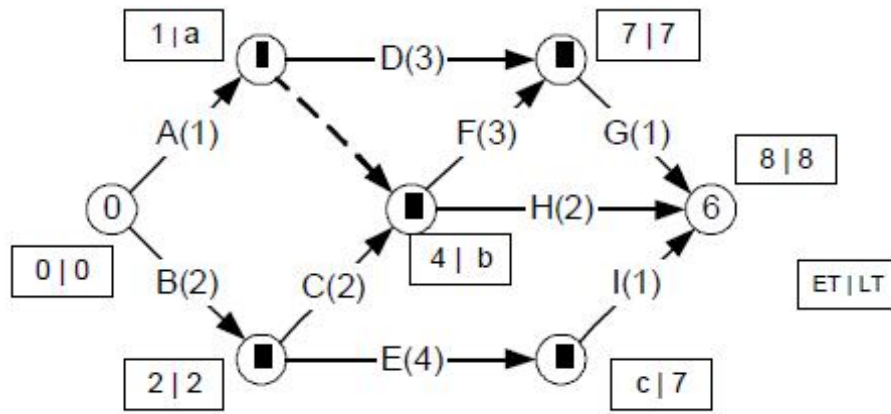


10. Manipulation of variables, careful measurement, and establishing cause and effect relationships are the characteristics of which of the following?
 (a) Inference (b) Experimental (c) Descriptive (d) Qualitative
11. Which of the following are objectives of value education?
 1. Full development of child's personality in its physical, mental, emotional and spiritual aspects,
 2. Inculcation of good manners and of responsible and cooperative citizenship.
 3. Developing respect for the dignity of individual and society.
 4. Inculcation of a spirit of patriotism and national integration.
 5. Developing autocratic way of thinking and living.
 6. Developing tolerance towards and understanding of different religious faiths.
 (a) 1, 2, 3, 4, 6 (b) 1, 2, 3, 4, 5, 6 (c) Only 1 and 6 (d) All except 4 and 6
12. Jaidev wrote Geet Govind at which of the ancient learning center?
 (a) Nalanda (b) Nadia (c) Vikramshila (d) Mithila
13. Which of the following states doesn't have its own council for higher education?
 (a) UP (b) Bihar (c) Tamilnadu (d) Himachal Pradesh
14. Which of the following is aimed at tapping the talent pool of scientists and entrepreneurs, internationally to encourage their engagement with the institutes of Higher Education in India so as to augment the country's existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence?
 (a) NPTEL (b) SWAYAM (c) GIAN (d) RUSA
15. Which of the following Statements is correct regarding the Election Commission of India?
 (a) It is an independent and statutory body.
 (b) It consists of members having a tenure of six years.
 (c) It acts as a court for arbitration of disputes related to granting of recognition to political parties.
 (d) Being an all-India body, it is also concerned with the elections with the elections to Gram Panchayats
16. India's pledge to the Paris summit offered to bring _____ of its electricity generation capacity (not actual production) from non-fossil sources (renewable, large hydro, and nuclear) by 2030.
 (a) 30 % (b) 50% (c) 40% (d) 35%
17. Which of the following is true about Sunderban?
 1. World's largest mangrove forest
 2. World heritage site
 3. Ramsar Site
 4. Biosphere Reserve designated by UNESCO
 5. Largest population of Royal Bengal Tiger at a single place
 (a) 1, 2, 3 (b) All except 3 (c) All of the above (d) None of these
18. Which of the following is responsible for eye irritation?
 (a) Carbon mono-oxide (b) Aldehyde
 (c) Oxides of Nitrogen (d) Oxides of Sulphur
19. Regarding which of the following MDGs India has performed better than other MDGs?
 (a) Goal 1: to eradicate extreme poverty and hunger;
 (b) Goal 2: to achieve universal primary education;
 (c) Goal 3: to promote gender equality and empower women;
 (d) Goal 4: to reduce child mortality;

20. Which of the following can be the impact of climate change?
1. there is death of flora and fauna in terrestrial and marine ecosystems,
 2. flora and fauna displacement searching for better life conditions.
 3. disease and death,
 4. destruction and loss of economic livelihoods
 5. migrations of climate refugees.
- (a) 1, 2, 4, 5 (b) 1, 2, 3, 4, 5 (c) 2, 3, 4, 5 (d) 1, 2, 5

PAPER – II

21. Maximize $z = 28 - c/6 - e/6 - 2f/3$
 Subject to : $a = 8 + c/6 + e/6 - f/3$
 $c = 4 - 8c/3 - 2e/3 + f/3$
 $d = 18 - c/2 + e/2$
 $a, b, c, d, e, f \geq 0$
 What is basic solution ?
 (a) 20 (b) 24 (c) 28 (d) None of these
22. If we are dealing with a problem in 20 variables and 15 constraints, what is an upper bound for the number of basic feasible solutions?
 (a) 15500 (b) 15504 (c) 15508 (d) None of these
23. Which of the following statements is/are correct?
 i. Every basic feasible solution of an assignment problem must be degenerate.
 ii. In order to apply the Hungarian algorithm, the assignment cost matrix must be square.
 iii. The transportation problem is a special case of a linear programming problem.
 iv. In PERT, the total completion time of the project is assumed to have a normal distribution.
 v. In the LP formulation of the project scheduling problem, the constraints include $Y_B - Y_A \geq d_A$ if activity A must precede activity B, where d_A = duration of activity A.
 (a) i, ii, iii (b) i, iii, iv (c) ii, iii, v (d) All of these
24. Match the problem domains in GROUP-I with the solution technologies in GROUP-II ?
- | Group-I | Group-II |
|---------------------------------------|---|
| P. Unbalanced transportation problems | 1. If this is not the case, degeneracy occurs; place a 0 in an empty cell and treat it as a value. |
| Q. Degeneracy | 2. Demand < Supply: introduce dummy destination with shipping costs of 0. |
| R. Hungarian Method | 3. Which are subject to one or more constraints. |
| S. Project Scheduling | 4. A technique in project management that overlooks resource allocation and resolves possible conflict arising from over-allocation. |
| T. Resource Levelling | 5. To communicate what tasks need to get done and which organizational resources will be allocated to complete those tasks in what timeframe. |
- (a) P-2, Q-1, R-5, S-5, T-4 (b) P-3, Q-5, R-2, S-4, T-1
 (c) P-2, Q-5, R-4, S-3, T-1 (d) None of these
25. Consider the project with the A-O-A (activity-on-arrow) network below. The activity durations are given on the arrows. The Earliest (event) Times (ET) and Latest (event) Times (LT) for each node are written in the box beside each node. Note: There are three different versions, each having different durations of activity A. Then number of activities and LT are



- (a) 8,3 (b) 8,4 (c) 9,4 (d) None of these
26. Let x = number of units of product 1 to produce and let y = number of units of product 2 to produce. Consider the following objective function: Maximize $z = x + 2y$. Subject to the following constraints: $x + y \leq 12$ (resource A), $x \leq 8$ (resource B), $y \leq 6$ (resource C), x and $y \geq 0$. What will the optimal objective function value be?
(a) 18 (b) 20 (c) 24 (d) None of these
27. What is/are general assumptions of Sensitivity Analysis?
i. We are considering several change in several input data values at a time
ii. We are considering a change in two input data values at a time.
iii. We are considering a change in only one input data value at a time.
(a) i, ii, iii (b) ii, iii, iv (c) i, iii, iv (d) None of these
28. Max $Z = -3x_1 - 2x_2 + 10$,
subject to: $x_1 - 2x_2 + x_3 = 52$
 $2x_1 + x_2 + x_4 = 32$
 $x_j \geq 0$ ($j = 1, 2, 3, 4$), x_2 and x_3 integer
(a) 8 (b) 9 (c) 10 (d) None of these
29. In PERT, what is slack time?
(a) $EST + t$ (b) $LST - EST$ (c) Zero (d) $EFT - EST$
30. What is difference between PERT and CPM?
(a) PERT uses dummy activities, and CPM does not.
(b) PERT uses three time estimates and CPM use a single time estimate.
(c) PERT does not allow us to monitor costs, and CPM does.
(d) PERT uses AOA networks, and CPM uses AON networks.
31. What is the reflection of a point $P(3, 5)$ with respect to $3x + 2y - 19 = 0$
(a) (3, 5) (b) (5, 3) (c) (7, 5) (d) None of these
32. A square consists of vertices $A(0, 0)$, $B(0, 1)$, $C(1, 1)$, $D(1, 0)$. After the translation C is found to be at the new location (6, 7). Determine the new location of other vertices.
(a) (5, 6), (5, 7), (6, 7), (6, 6) (b) (6, 5), (7, 5), (6, 8), (6, 7)
(c) (5, 4), (5, 9), (6, 7), (6, 6) (d) (5, 6), (7, 8), (6, 7), (6, 6)

33. Match the following lists:

List-1

- A. Ground
B. Cabinet projection
C. Collector
D. Orthographic projection

List-2

1. The direction of projection is chosen so that line perpendicular to the xy-planes are foreshortened by half their lengths.
2. Projections are characterized by the fact that the direction of projection is perpendicular to the view plane.
3. Used to discharged the collector.
4. Partly energised by flooding gun, stories the charge generated by the writing gun.

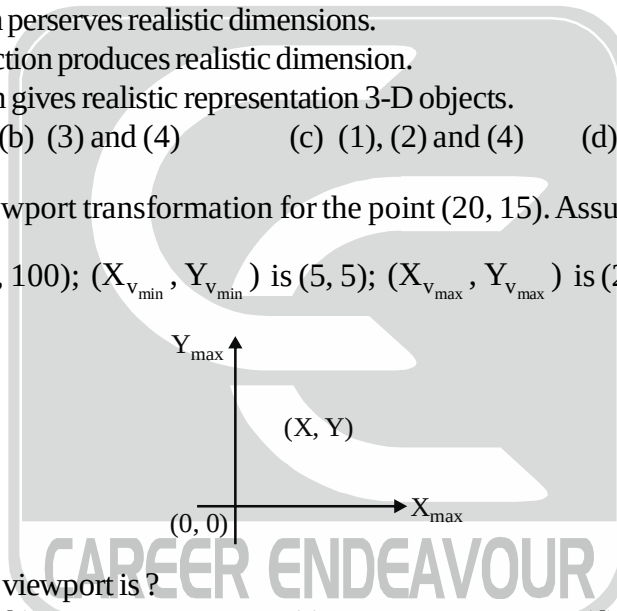
Codes:

- | | A | B | C | D |
|-----|-------------------|---|---|---|
| (a) | 3 | 1 | 4 | 2 |
| (b) | 3 | 1 | 2 | 4 |
| (c) | 3 | 2 | 1 | 4 |
| (d) | None of the above | | | |

34. Find the statement is/are INCORRECT ?

- (1) A perspective projection produces realistic view.
 - (2) A parallel projection preserves realistic dimensions.
 - (3) A perspective projection produces realistic dimension.
 - (4) A parallel projection gives realistic representation 3-D objects.
- (a) (1) and (2) (b) (3) and (4) (c) (1), (2) and (4) (d) All of these

35. Perform window to viewport transformation for the point (20, 15). Assume that $(X_{w_{min}}, Y_{w_{min}})$ is (0, 0); $(X_{w_{max}}, Y_{w_{max}})$ is (100, 100); $(X_{v_{min}}, Y_{v_{min}})$ is (5, 5); $(X_{v_{max}}, Y_{v_{max}})$ is (20, 20).



The value of X and Y in viewport is ?

- (a) X = 4, Y = 4 (b) X = 3, Y = 3 (c) X = 8, Y = 7.25 (d) X = 3, Y = 4

36. Consider a line AB with A(2, 4) and B(10, 20). Apply a simple DDA algorithm and compute the first four pixels?

- (a) (2, 4) (2.5, 5), (3, 6), (3.5, 7) (b) (2, 4), (2, 5), (3, 6), (3, 7)
(c) (2, 4), (2, 5.2), (2, 5), (3.5, 7) (d) None of these

37. Consider a shiny surface with diffused coefficient of 0.8 and ambient reflection coefficient of 0.7, the surface has normal in the direction of $2i + 3j + 4k$ say some light is incident on it from the direction $i + j + k$ such that ambient and diffused intensities are of order 2 and 3 units. Determine the intensity of reflected light?

- (a) 23 (b) 24 (c) 22 (d) None of these

38. What is the number of memory bits required for 3 bit-plane frame buffer for a 512×512 raster.

- (a) 78, 432 (b) 786, 342 (c) 78, 246 (d) None of these

39. The best suited hidden surface algorithm to deal with non-polygon, non-planar surface patches is

- (a) Painter's algorithm (b) Z-buffer algorithm (c) Raytracking (d) Scan-line algorithm

40. Match the following Lists:

List-1

A. Bezier Curves

B. B-Spline Curves

C. Viewing Pipeline

D. Clipping Algorithm

E. Shear Transformations

List-2

1. allows the local control over the curve surface because each vertex affects the shape of a curve only over a range of parameter values.
2. a parametric curve that uses the Bernstein polynomials as a basis.
3. a linear map that displaces each point in fixed direction, by an amount proportional to its signed distance from the line that is parallel to that direction and goes through the origin.
4. a series of transformations, which are passed by geometry data to end up as image data being displayed on a device. The 2D viewing pipeline describes this process for 2D data.
5. to selectively enable or disable rendering operations within a defined region of interest.

Codes:

	A	B	C	D	E
(a)	1	2	3	4	5
(b)	3	5	2	4	1
(c)	2	1	4	5	3
(d)	None of the above				

41. Why is/are handover request queuing possible?

- i. Handover request taking up to 800ms would not be noticed by the user. Queuing is possible within this time.
- ii. There exist a time interval between the mobile phone reaching the handover threshold and the receiver threshold.
- iii. Handover request can be made small packets. Therefore the queue can be processed very quickly.
- iv. The alternative to queuing handover request is queuing new originating calls which are far more delay sensitive.
- v. GSM operates in the frequency range of 900MHz while PCN operates in the 1800 MHz range.

(a) i, ii, iii (b) i, iii, iv (c) ii, iii, v (d) None of these

42. Which of the following is/are true.

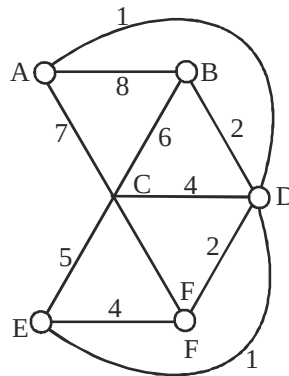
1. Cluster analysis does not classify variables as dependent or independent.
2. The average linkage method of hierarchical clustering is preferred to the single and complete linkage methods.
3. The centroid method is a variance method of hierarchical clustering in which the distance between two clusters is the distance between their centroids (means for all the variables).
4. The most commonly used measure of similarity is the Euclidean distance or its square.
5. Low earth orbits (LEO) are satellite systems used in telecommunication, which orbit between 400 and 1,000 miles above the earth's surface.

(a) 1, 2, 3 (b) 2, 3, 4 (c) 1, 3, 5 (d) All of these



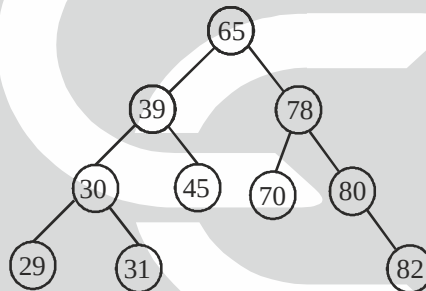
43. Which of the following statements is/are correct?
1. Mobile Switching Centre(MSC) would process the call made by one mobile phone user to another mobile phone user.
 2. Public Switched Telephone Network(PSTN) would be involved in processing a call when the call is made by a mobile phone user to a land phone.
 3. Both MSC and PSTN processes a call made from a mobile phone to a land phone.
 4. Electronic Serial Number(ESN) is the telephone number of the cellular instrument assigned to the subscriber.
 5. The handover rate will increase after borrowing.
- (a) 1, 2, 3 (b) 1, 3, 4 (c) 2, 3, 5 (d) None of these
44. Match the problem domains in GROUP-I with the solution technologies in GROUP-II:
- | Group-I | Group-II |
|-------------------------------|--|
| P. K-Nearest Neighbor | 1. It employs a NameNode and DataNode architecture to implement a distributed file system that provides high-performance access to data across highly scalable Hadoop clusters. |
| Q. Hidden Markov Model | 2. It allows users to analyze information from multiple database systems. |
| R. OLAP | 3. It is a non-parametric method used for classification and regression. |
| S. OLTP | 4. It provides low latency and consolidates data to reduce costs. |
| T. HDFS | 5. It is a finite set of states, each of which is associated with a probability. |
- (a) P-2, Q-1, R-5, S-5, T-4 (b) P-3, Q-5, R-2, S-4, T-1
(c) P-2, Q-5, R-4, S-3, T-1 (d) None of these
45. The novel system is 30 times faster and old system is busy with search queries 90% of the time, what is the speedup gained by integrating the enhanced system?
- (a) 5 (b) 6 (c) 7 (d) None of these
46. In networking terms, layer 2 is the data link layer (e.g. Ethernet), layer 3 is the network layer (e.g. IP), and layer 4 is the transport layer (e.g. TCP). Many cloud implementations prefer to virtualize the network at which layer.
- (a) 2 (b) 3 (c) 4 (d) None of these
47. Match the following Lists:
- | List-I | List-II |
|-------------------------------|--|
| P. Peer-to-peer | 1. All nodes are peer of each other and work towards a common goal. |
| Q. Client-server | 2. Some nodes are become server nodes for the role of coordinator, arbiter, etc. |
| R. n-tier architecture | 3. Different parts of an application are distributed in different nodes of the systems and these nodes work together to function as an application for the user/client. |
| S. Cluster computing | 4. A technique in which many computers are coupled together to work so that they achieve global goals. The computer cluster acts as if they were a single computer. |
| T. Grid computing | 5. All the resources are pooled together for sharing in this kind of computing turning the systems into a powerful supercomputer; essentially. |
- (a) P-2, Q-1, R-5, S-5, T-4 (b) P-3, Q-5, R-2, S-4, T-1
(c) P-2, Q-5, R-4, S-3, T-1 (d) None of these

56. Assume the graph:



Using Kruskal's algorithm to find out the spanning tree. Which of the following cannot be the sequence of edges added, in that order?

- (a) A – D, E – D, B – D, B – F, C – D (b) A – D, A – D, B – D, B – F, C – D
 (c) A – D, B – D, E – D, B – F, C – D (d) E – D, A – D, B – F, B – D, C – D
57. We have an array [12, 13, 14, 15, 16, 17, 18]. How many different max heap can be build
 (a) 80 (b) 70 (c) 60 (d) None of these
58. We have a hash function $H(k) = \text{mod } 11$ and Assume hash table size is 11. Now we insert sequence of keys 43, 36, 92, 87, 11, 4, 71, 13, 14 into hash table respectively at index 6 what will be key value
 (a) 14 (b) 71 (c) 92 (d) 43
59. What may be the sequence of the insertion into the empty B.S.T. for given B.S.T.?



- (a) 65, 39, 30, 31, 70, 78, 30, 82 (b) 65, 39, 78, 30, 45, 70, 80, 31, 29, 82
 (c) 65, 39, 78, 31, 45, 80, 70, 30, 29, 82 (d) None of these
60. What is the big-O estimate of the following $(n + n^2)(n^3 + 5^n)(n^3 + \log n^{100})$ is
 (a) $n^5 \log n^{100}$ (b) $n^{25} \log n^{100}$ (c) n^{55^n} (d) n^8
61. What is the minimum number of temporary variables needed to swap the contents of two variables ?
 (a) 1 (b) 2 (c) 3 (d) 0
62. If abc is the input then the following program fragment result in
 char x, y, z;
 printf ("%d", scanf ("%c%c%c", &x, &y, &z)); results in
 (a) a syntax error (b) a fatal error
 (c) segmentation violation (d) printing of 3
63. Which of the following are procedural languages ?
 (a) Pascal (b) Smalltalk (c) C++ (d) None of these
64. Choose the correct statements regarding inline functions ?
 (a) It speeds up execution
 (b) It shows down execution
 (c) It increases the code size and decreases code size
 (d) It decreases the code size

65. A function abc is defined as follows:

```
void abc(int x = 0, int y, int z = 0)
{
    cout << x << y << z;
}
```

Which of the following function call is/are illegal? (Assume h, g are declared as integers)

- (a) abc (); (b) abc (h, 2); (c) abc (h, h); (d) None of these

66. If the declaration of given program as follows:

mho operator - (mho y);

is replaced by

mho operator - (mho & y);

What is the output of the program will be

- (a) There was there was (b) Nothing
(c) There was There was a certain man (d) There was a certain man There was a certain man.

67. Which of the following is not a primitive data type ?

- (a) Boolean (b) Byte (c) String (d) Double

68. Consider the statement:

```
system.out.print(Math.round(Math.random ( )));
```

This statement can print ?

- (a) Only 0 (b) Only 1 (c) Only 0 or 1 (d) Any non-negative integer

69. Is null an object ?

- (a) Yes (b) No (c) Sometimes yes (d) None of these

70. Exceptions that are expected to possibly occur are called

- (a) checked exceptions (b) unchecked exceptions
(c) runtime exceptions (d) errors

***** END OF THE QUESTION PAPER *****

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ANSWER KEY

PAPER – I

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

PAPER – II

21. (c)	22. (b)	23. (d)	24. (a)	25. (b)
26. (a)	27. (d)	28. (d)	29. (b)	30. (b)
31. (a)	32. (a)	33. (a)	34. (b)	35. (c)
36. (a)	37. (a)	38. (b)	39. (c)	40. (c)
41. (d)	42. (d)	43. (d)	44. (b)	45. (d)
46. (d)	47. (d)	48. (d)	49. (d)	50. (d)
51. (a)	52. (b)	53. (a)	54. (a)	55. (c)
56. (c)	57. (a)	58. (b)	59. (b)	60. (c)
61. (d)	62. (d)	63. (a)	64. (a)	65. (a)
66. (c)	67. (c)	68. (c)	69. (b)	70. (a)

