Engineering Services (Preliminary) Examination, 2026

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

T.B.C. : RSPV-O-GSAT **Test Booklet Series**

Serial No.	TEST BOOKLET	A
0056493	General Studies and Engineering Aptitude	

Time Allowed : Two Hours ***Maximum Marks : 200***

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET ***DOES NOT*** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. **Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the *OMR* Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.**
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. ***DO NOT*** write ***anything else*** on the Test Booklet.
4. This Test Booklet contains **100** items (questions). Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case, you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
5. You have to mark your responses **ONLY** on the separate Answer Sheet provided. See directions in the Answer Sheet.
6. **All** items carry equal marks.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator ***only the Answer Sheet***. You are permitted to take away with you the Test Booklet.
9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong Answers :**

    THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE.

    (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to that question will be deducted as penalty.

    (ii) If a candidate gives more than one answer, it will be treated as **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

    (iii) If a question is left blank i.e. no answer is given by the candidate, there will be **no penalty** for that question.

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1. Consider the following statements regarding the projection of a point :

1. The line joining the top view and the front view of a point is always perpendicular to xy. It is called a reference line.
2. When a point is above the H.P., its front view is above xy; when it is below the H.P., the front view is below xy.
3. When a point is in front of the V.P., its top view is below xy; when it is behind the V.P., the top view is above xy.
4. As the point is below the H.P. and behind the V.P., its front view will be above xy and the top view is below xy.

Which of the above statements are correct ?

(a) 2 and 3

(b) 1 and 4

(c) 1 and 2

(d) 2 and 4

2. Consider the following statements regarding the traces of a line :

1. When a line is parallel to the HP and the VP, it has no trace.
2. When a line is inclined to HP and parallel to VP, it has only the VT but no HT.
3. A line PQ is perpendicular to the HP. Its HT coincides with its top view which is a point. It has no VT.
4. A line RS is perpendicular to the VP. Its VT coincides with its front view which is a point. It has no HT.

Which of the following statements are correct ?

(a) 2, 3 and 4

(b) 1, 3 and 4

(c) 1, 2 and 3

(d) 1, 2 and 4

3. Consider the following statements regarding the projections of planes :

1. When a plane is perpendicular to both the reference planes, its traces lie on a straight line perpendicular to xy.
2. When a plane is perpendicular to a reference plane, its projection on that plane is a straight line.
3. When a plane is parallel to a reference plane, its projection on that plane shows its reduced shape and size.
4. When a plane is parallel to the VP, beginning should be made with the front view and the top view projected from it.

Which of the following statements are correct ?

(a) 1, 3 and 4

(b) 2, 3 and 4

(c) 1, 2 and 3

(d) 1, 2 and 4

4. Consider the following statements regarding the projections of solids :

1. When the axis of a solid is perpendicular to a plane, its base will be parallel to that plane.

2. The projection of a solid on the plane to which its axis is perpendicular, will show the true shape and size of its base.

3. When the axis is perpendicular to the HP, the top view should be drawn first and the front view projected from it.

4. A solid in simple position has its axis parallel to one reference plane and perpendicular to other.

Which of the following statements are correct ?

(a) 1, 2 and 3

(b) 2, 3 and 4

(c) 1 and 2 only

(d) 3 and 4 only

5. Match the following lists :

List I *(Name of the curve)*	List II *(Eccentricity)*
P. Hyperbola	1. $e > 1$
Q. Ellipse	2. $e = 1$
R. Parabola	3. $e < 1$

Select the correct answer using the code given below :

	P	Q	R
(a)	1	2	3
(b)	1	3	2
(c)	2	3	1
(d)	2	1	3

6. Which one of the following statements comes under robust design in process design ?

(a) A tennis racket that returns the ball just as well when hit near the rim as when hit in dead center

(b) A hospital operating room that maintains lighting and life support systems when the electric power to the hospital is interrupted

(c) An airplane that flies as well in stormy weather as in clear weather

(d) A turning operation that produces a good surface finish throughout a wide range of cutting speeds

7. Which one of the following is used to show whether or not a characteristic or a property of the item complies with the stated specification under maintenance actions ?

(a) Compliance test

(b) Overhaul

(c) Monitoring

(d) Rebuilding

8. Action taken after maintenance actions to verify that the item is able to perform the required function, is known as

(a) Fault diagnosis

(b) Turnaround maintenance

(c) Function check-out

(d) Modification

9. Consider the following statements regarding maintenance of machineries :

1. Corrective maintenance actions are maintenance activities that are carried out after a failure has occurred.
2. Corrective maintenance must be initiated immediately to restore critical systems to their functional state or can be deferred to a more convenient timing if the failure is not critical and does not need immediate action.
3. Preventive maintenance must be initiated immediately to restore critical systems to their functional state or can be deferred to a more convenient timing if the failure is not critical and does not need immediate action.

Which of the above statements is/are correct ?

(a) 1 and 2

(b) 2 only

(c) 1 only

(d) 1 and 3

10. Which one of the following technologies is used to monitor the condition of an object and to decide on maintenance based on the condition ?

(a) Information and Communication Technology

(b) Sensor Technology

(c) Transit Technology

(d) Risk based Technology

11. How much estimated amount of power can be derived from solid energy mineral of 1 kg of coal ?

(a) 1 kWh power

(b) 3 kWh power

(c) 4 kWh power

(d) 50,000 kWh power

12. Which one of the following types of coal has high calorific value and lowest volatile content ?

(a) anthracite

(b) subbituminous

(c) bituminous

(d) lignite

13. A fuel cell in electric car generates electrical energy by combining

(a) Carbon dioxide (CO_2) and Hydrogen (H_2)

(b) Oxygen (O_2) and Hydrogen (H_2)

(c) Sulphur dioxide (SO_2) and Hydrogen (H_2)

(d) Carbon monoxide (CO) and Hydrogen (H_2)

14. Electrical power generation usually links to the load demand by a common regional or national network, often called

(a) Station

(b) Embedded Generator

(c) Grid

(d) Distributor

15. 1 kg of Hydrogen fuel burns with 8 kg of oxygen to give the product as

(a) 9 kg of hydrogen peroxide

(b) 9 kg of water

(c) 18 kg of hydrogen peroxide

(d) 18 kg of water

16. Consider the following statements regarding project :

1. Temporary project has a beginning and an end.

2. Project has predefined work assignments.

3. Project produces a unique output or deliverable.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

17. Which one of the following usually provides the resources, particularly the people who are involved in the project ?

(a) Sponsor

(b) Project Leader

(c) Project Customer

(d) Functional Manager

18. PERT calls for the following estimates to be provided for each activity :

1. Pessimistic
2. Optimistic
3. Most Likely

Which of the above estimates are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

19. Which one of the following means closing down a company and selling its assets ?

(a) Liquidation

(b) Revitalize

(c) Resurrect

(d) Enliven

20. Which one of the following is NOT a step comprised in the completion of a project ?

(a) Final inspection

(b) Defects liability period

(c) Maintenance retention sum

(d) Problem identification

21. How many total number of lattice parameters are required to fully specify Rhombohedral crystal system ?

(a) 2

(b) 3

(c) 4

(d) 6

22. If a and c represent, respectively, the short and long unit cell dimensions for Hexagonal crystal, the ideal c/a ratio should be

(a) 1·433

(b) 1·633

(c) 2·833

(d) 4·533

23. In characteristics of cubic crystal, the planes and directions having the same indices are always at the angle of

(a) 15° to one another

(b) 30° to one another

(c) 45° to one another

(d) 90° to one another

24. Consider the following statements regarding Face Centered Cubic Crystal Structure :

1. There are eight corner atoms, six face atoms and no interior atoms, then the number of atoms per unit are 6.

2. Coordination Number is 12.

3. Atomic packing factor is 0·74.

4. Volume of unit cell is $V = 16R^3\sqrt{2}$, where R is atomic radius.

Which of the above statements are correct ?

(a) 1, 2 and 3 only

(b) 1, 3 and 4 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

25. In crystal materials, the equilibrium number of vacancies in crystalline solid increases

(a) linearly with temperature

(b) exponentially with temperature

(c) exponentially and then decreases with temperature

(d) linearly and then exponentially with temperature

26. Consider the following statements regarding quantum dots :

1. A photon's polarization can be vertical or horizontal, or a superposition of both, and we can use this as a qubit.

2. Neutral atoms can be trapped at low temperatures using a magneto optical trap, which uses magnetic fields and lasers to cool and trap the atoms.

3. An electron can be bound to a small semiconductor device, similar to an electron bound to the nucleus of an atom. In these "artificial atoms", the spin of an electron, which can be "spin up" or "spin down", can be used as a qubit.

Which of the above statements is/are correct ?

(a) 1 only

(b) 2 only

(c) 3 only

(d) 1, 2 and 3

27. Five routers are to be connected in a point-to-point subnet. Between each pair of routers, the designers may put a high-speed line, a medium-speed line, a low-speed line, or no line. If it takes 100 ms of computer time to generate and inspect each topology, how long will it take to inspect all of them ?

(a) 108,578·6 sec

(b) 102,785·6 sec

(c) 110,857·6 sec

(d) 104,857·6 sec

28. A group of N stations share a 56-kbps pure ALOHA channel. Each station outputs a 1000-bit frame on average once every 100 sec, even if the previous one has not yet been sent (e.g., the stations can buffer outgoing frames). What is the maximum value of N ?

(a) 1003 stations

(b) 1100 stations

(c) 1010 stations

(d) 1030 stations

29. Which one of the following protocols is suitable for IoT communication that though it was originally designed to support IEEE 802.15.4 low-power wireless networks in the 2.4-GHz band ?

(a) Routing Protocol for Low power and Lossy networks (RPL)

(b) IPv4/IPv6

(c) 6LoWPAN

(d) MQTT

30. Which one of the following statements is related to key feature of ThreatRadar reputation to prevent DDoS attacks on cloud infrastructure ?

(a) ThreatRadar reputation service keeps track of users who are attacking other websites. By using this information, it will filter off any request from those users and prevent them from getting into the cloud system

(b) ThreatRadar reputation service helps to monitor and keep track of both user agents and DDoS attacks vectors

(c) ThreatRadar reputation service helps to detect users who have the pattern of generating and sending HTTP requests with long response times

(d) ThreatRadar reputation service has the capability to send a JavaScript challenge to users' browsers. The JavaScript challenge has the capacity to detect and block bots

31. In an RSA system, the public key of a given user is e = 65, n = 2881. What is the private key of this user ?

(a) 638

(b) 725

(c) 2031

(d) 3031

32. What happens if a k value used in creating a Digital Signature Algorithm (DSA) signature is compromised ?

(a) A user's public key is compromised if k is discovered

(b) A user's private key is not compromised if k is discovered

(c) A user's private key is compromised if k is discovered

(d) A user's public key is not compromised if k is discovered

33. Which one of the following is the time complexity of Iterative Deepening in Uninformed Search Strategies ?

(a) $O(bd)$

(b) $O(bl)$

(c) $O(b^d)$

(d) $O(b^l)$

34. Which one of the following algorithms is used in logic programming systems, which employ sophisticated compiler technology to provide very fast inference ?

(a) Backward chaining

(b) Forward chaining

(c) Constraint Satisfaction problem

(d) A^* algorithm

35. Which one of the following is a disadvantage of call-by-reference technique of passing arguments ?

(a) Since arguments are not copied into the new variables, it provides greater time and space efficiency

(b) The function can change the value of the argument and the change is reflected in the calling function

(c) A function can return only one value. In case we need to return multiple values, we can pass those arguments by reference, so that the modified values are visible in the calling function

(d) If inadvertent changes are caused to variables in called function then these changes would be reflected in calling function as original values would have been overwritten

36. Which one of the following types of programming languages is NOT used to develop the large of contents dynamically for server side scripts ?

(a) PHP (Hypertext Pre-processor)

(b) Java Server Pages (JSP)

(c) Active Server Page (ASP)

(d) HTML

37. In which one of the following layers, the firewalls can be installed to keep good packets and bad packets out ?

(a) Physical layer

(b) Transport layer

(c) Network layer

(d) Application layer

38. In cryptography, to construct an unbreakable cipher text, which one of the following logical operations is used in one-time pads ?

(a) XOR

(b) AND

(c) NAND

(d) XNOR

39. Which one of the following digital certificate standards is used for certificate-based authentication security frame work that can be used for providing secure transaction processing and private information ?

(a) X.502

(b) X.501

(c) X.510

(d) X.509

40. Which one of the following IEEE standard protocols prescribes a data link-level security which is designed to make the security of a wireless LAN as well as that of a wired LAN ?

(a) IEEE 802.11

(b) IEEE 802.3

(c) IEEE 802.1

(d) IEEE 802.4

41. Consider the following statements regarding ethics :

1. Ethics is to provide us with moral principles or universal rules that tell us what to do.

2. The fundamental question of ethics is not "What should I do ?" but "What kind of person should I be ?"

Which of the above statements is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

42. Consider the following statements regarding Risk-Benefit Analysis :

The major reason for the analysis of the risk benefit are

1. to know risks and benefits and weigh them each.
2. to decide on designs, advisability of product/project.
3. to suggest and modify the design so that the risks are eliminated or reduced.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

43. Consider the following regarding intellectual property rights :

The agreements with World Trade Organization (WTO) and Trade-Related aspects of Intellectual Property System (TRIPS) establish norms and conditions for following instruments of intellectual properties :

1. Patents
2. Copyright
3. Trademark
4. Trade secret

Which of the above instruments of intellectual properties are correct ?

(a) 1 and 3 only

(b) 1, 2 and 3 only

(c) 2 and 3 only

(d) 1, 2, 3 and 4

44. Consider the following statements regarding value education :

1. Value education is that part of education which deals with understanding one's participation in the larger order, and thus ensuring it in living.
2. The content of value education must be all encompassing, i.e., it must include all dimensions of a human being as well as all levels of human living.
3. The process of value education is essentially a process of self-exploration (self-reflection and self-discovery). Self-exploration does not include self-verification at the level of natural acceptance and experiential validation in living.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

45. Consider the following elements regarding quality characteristics :

1. Physical

2. Sensory

3. Time based

Which of the above elements are correct ?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

46. Consider the following methods regarding quality improvements in TQM :

1. Robust design

2. Taguchi loss function

Which of the above methods is/are correct ?

(a) 1 only

(b) 2 only

(c) Neither 1 nor 2

(d) Both 1 and 2

47. Consider the following statements regarding variations in quality control tools :

1. Common/Random/Chance variations are difficult to trace and difficult to control even under the best condition of operation.

2. Assignable variations are of higher magnitude which can be easily traced and detected.

Which of the above statements is/are correct ?

(a) 1 only

(b) 2 only

(c) Neither 1 nor 2

(d) Both 1 and 2

48. Consider the following statements regarding reverence :

1. Reverence is the feeling of acceptance for excellence.

2. If someone has achieved the state of excellence, we naturally have an acceptance for such a person. This feeling of acceptance for excellence is called reverence.

Which of the above statements is/are correct ?

(a) 1 only

(b) 2 only

(c) Neither 1 nor 2

(d) Both 1 and 2

49. Consider the following statements regarding fulfilment of relationship in human values :

Fulfilment of relationship means

1. ensuring the naturally acceptable feeling in oneself and sharing it with the other.

2. living with responsibility with the other unconditionally.

3. making effort for mutual development, i.e. development of one's own competence and being of help to the other in developing their competence.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

50. Consider the following characteristics regarding Harmony in the society-understanding universal human order :

1. Behaviour with Human Being

2. Continuous Happiness and Prosperity

3. Work with Rest of Nature

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

51. Who suggested pre-conventional, conventional and post conventional levels of moral development ?

(a) Kohlberg

(b) A. I. Melden

(c) John Locke

(d) Gilligan

52. Which one of the following inquiries seeks to identify and justify the morally-desirable norms or standards that should guide individuals and group ?

(a) Normative inquiry

(b) Conceptual inquiry

(c) Factual inquiry

(d) Descriptive inquiry

53. Duty ethics theory was proposed by

(a) John Stuart Mill

(b) Richard Brandt

(c) Jeremy Bentham

(d) Immanuel Kant

54. Who framed the ethical code for builders in 1758 ?

(a) A. I. Melden

(b) Aristotle

(c) C. W. D. Ross

(d) Hammurabi

55. Cost-benefit analysis is an application of

(a) Duty ethics

(b) Utilitarianism

(c) Human ethics

(d) Virtue ethics

56. Consider the following statements regarding cancellation laws :

Let A, B, C be n×n matrices, then

1. if rank A = n and AB = AC, then B = C.

2. if rank A = n, then AB = 0 implies B = 0. Hence if AB = 0, but $A \neq 0$ as well as $B \neq 0$, then rank A < n and rank B < n.

Which of the above statements is/are correct ?

(a) 1 only

(b) Both 1 and 2

(c) 2 only

(d) Neither 1 nor 2

57. Match the following lists :

List I	List II
P. $\sin^2\theta \cot\theta \sec\theta$	1. $\cot\theta$
Q. $\dfrac{\tan\theta+\sec\theta}{\sec\theta\left(1+\dfrac{\tan\theta}{\sec\theta}\right)}$	2. $\sec\theta - \tan\theta$
	3. $\sin\theta$
R. $\dfrac{1+\cot\theta}{1+\tan\theta}$	4. 1
S. $\sqrt{\dfrac{1-\sin\theta}{1+\sin\theta}}$	

Select the correct answer using the code given below :

	P	Q	R	S
(a)	3	1	4	2
(b)	1	3	2	4
(c)	3	4	1	2
(d)	4	3	2	1

58. The solution of differential equation $y' = \frac{xy^2 - \cos x \sin x}{y(1-x^2)}$, $y(0) = 2$ is

(a) $y^2(1+x^2) - \cos^2 x = 3$

(b) $y^2(1-x^2) + \cos^2 x = 5$

(c) $y^2(1-x^2) + \cos^2 x = 7$

(d) $y^2(1-x^2) - \cos^2 x = 3$

59. The solution of differential equation $y'' + 4y' + 3y = e^t$; $y(0) = 0$, $y'(0) = 2$ is

(a) $y(t) = \frac{e^t - 7e^{-3t}}{8} + \frac{3e^{-t}}{4}$

(b) $y(t) = \frac{e^t - 5e^{-3t}}{8} + \frac{3e^{-t}}{4}$

(c) $y(t) = \frac{e^t + 7e^{-3t}}{8} - \frac{3e^{-t}}{4}$

(d) $y(t) = \frac{e^t + 7e^{-3t}}{8} + \frac{3e^{-t}}{4}$

60. Which one of the following statements is correct in the context of quadratic forms $V = x^T Ax$, where $x = [x_1, x_2 \ldots x_n]^T$?

(a) $V < 0$ for all vectors x except $x = 0$, if and only if all the eigenvalues of A are positive

(b) $V \leq 0$ for all vectors x and $V = 0$ for at least one vector $x \neq 0$, if and only if all the eigenvalues of A are non-negative and at least one of the eigenvalues is zero

(c) V is negative-definite if $-V$ is positive-definite, with a corresponding condition on the eigenvalues of A

(d) V is negative-semi definite if $-V$ is positive-semi definite, with a corresponding condition on the eigenvalues of $-A$

61. What is the expectation of the number of failures preceding the first success in an infinite series of independent trials with constant probability p of success in each trial ?

(a) $\frac{q}{p^2}$

(b) $\frac{q}{p}$

(c) $\frac{q}{1+p}$

(d) $\frac{1}{1-q}$

62. A deck of n numbered cards is thoroughly shuffled and the cards are inserted into n numbered cells one by one. If the card number i falls in the cell i, we count it as a match, otherwise not, then what is the variance of total number of such matches ?

(a) 1

(b) 0

(c) $\frac{1}{2}$

(d) $\frac{3}{4}$

63. Let X_1 and X_2 be two independent random variables having variances k and 4 respectively. If the variance of $Y = 3X_2 - X_1$ is 49, then what is the value of k ?

(a) 7

(b) 13

(c) 9

(d) 11

64. What is the value of $P\left(X+Y<\frac{1}{2}\right)$ for the joint probability density function of X and Y $f(x, y) = 3(x+y)$; $0 \leq x \leq 1$, $0 \leq y \leq 1$; $0 \leq x+y \leq 1$?

(a) $\frac{1}{16}$

(b) $\frac{1}{8}$

(c) $\frac{1}{12}$

(d) $\frac{1}{7}$

65. What is the value of $\int_0^6 \frac{1}{1+3x+x^2} dx$ by applying Simpson's $3/8^{th}$ rule by taking $h = 1$?

(a) 0·8145

(b) 0·0295

(c) 0·5215

(d) 0·6315

66. If y_x is a polynomial for which fifth difference is constant and $y_1 + y_7 = -496$, $y_2 + y_6 = 334$, $y_3 + y_5 = 962$, then what is the value of y_4 ?

(a) 571·25

(b) 536·75

(c) 596·50

(d) 597·25

67. An unbiased coin is thrown n times. It is desired that the relative frequency of the appearance of heads should lie between 0·49 and 0·51. What is the smallest approximate value of n that will ensure this result with 90% confidence (z = 1·645) ?

(a) 5648

(b) 6765

(c) 4989

(d) 8785

68. The value of integral

$$\int_0^{\sqrt{2}} \int_{-\sqrt{4-2y^2}}^{\sqrt{4-2y^2}} y \, dx \, dy \text{ is}$$

(a) $\frac{3}{8}$

(b) $\frac{8}{3}$

(c) $\frac{5}{8}$

(d) $\frac{8}{5}$

69. What is the value of

$$\int_0^a \int_{\frac{y^2}{a}}^{y} \frac{y}{(a-x)\sqrt{ax-y^2}} \, dx \, dy$$

by changing the order of integration ?

(a) $\frac{3\pi a}{2}$

(b) $\frac{5\pi a}{4}$

(c) $\frac{\pi a}{2}$

(d) $\frac{\pi a}{4}$

70. What is the value of

$$\int_0^a \int_0^{\sqrt{a^2-y^2}} y^2 \sqrt{x^2+y^2} \, dy \, dx$$

by changing into polar coordinates ?

(a) $\frac{\pi a^3}{20}$

(b) $\frac{3\pi a^5}{20}$

(c) $\frac{3\pi a^3}{20}$

(d) $\frac{\pi a^5}{20}$

71. What is the missing (?) value ?

		7	4	1		
	8	1	7	2	3	
1	4	3	8	5	2	1
	2	1	4	1	4	
		7	?	3		

(a) 6

(b) 4

(c) 5

(d) 2

72. Consider a square of side 6 cm, a circle is inscribed inside the square. Another circle circumscribes the square. The ratio of the areas of the inscribed circle to the circumscribed circle is

(a) $1:\frac{\pi}{4}$

(b) $1:\pi$

(c) 1:15

(d) 1:2

73. What does this diagram demonstrate ?

(a) $1^2 + 2^2 + 3^2 + ... + n^2 = \frac{n(n+1)(2n+1)}{6}$

(b) $1 + 2 + 3 + ... + n = \frac{n(n+1)}{2}$

(c) $2^2 + 4^2 + 6^2 + ... + (2n)^2 = \frac{2n(n+1)(2n+1)}{3}$

(d) None of the above

74. What is the missing (?) letter ?

A	EGK	C
?		P
U		R
Q		V
B	OJF	D

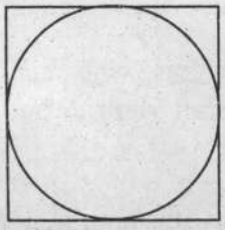
(a) H

(b) Z

(c) L

(d) Y

75. Following figure represents a circle inside a square. What does the diagram establish ?



(a) $\pi < 4$

(b) $\pi > 3$

(c) $\pi > 2$

(d) $\pi \geq 2\sqrt{2}$

76. A rectangular area of side 9 and 6 units is to be covered by square tiles of sides 1, 2 and 5 units. The minimum number of tiles needed for this is

(a) 13

(b) 11

(c) 12

(d) 15

77. Nandini walks a distance of 1 km towards North. She then turns left and walks 1 km. Finally she turns right at an angle of 45° and starts walking. In which direction she is moving finally ?

(a) South-West

(b) North-West

(c) North-East

(d) South-East

78. Read the following information and answer the question that follows :

1. Six scientists A, B, C, D, E and F of the disciplines, Chemistry, Botany, Zoology, Physics, Mathematics and Geology but not necessarily in this order, want to demonstrate an integrated experiment based on inter-disciplinary approach.
2. Each day only one scientist will perform the part of his discipline.
3. The experiment will start on Monday and end on Sunday. One day will be the rest day, which otherwise is a part of the experiment.
4. Chemistry will be on the very next day of Geology.
5. A, who is a Mathematician, can perform either on a second day or the last day but should not be immediately preceded by Botany.
6. C will demonstrate on the third day and Physics will be on the fifth day.
7. E, who is a Zoologist, performs on the second day.
8. B performs on Monday and the day after F's performance will be the rest day.

Which one of the following is the correct sequence of scientists performing ?

(a) DBCAFE

(b) BEDCFA

(c) BECDFA

(d) CBEFDA

79. The following question is based on the alphabet series :

ABCDEFGHIJKLMNOPQRSTUVWXYZ

If every alternate letter starting from B of the given alphabet is written in small letters, rest all are written in capital letters, how will the month of 'September' be written ?

(a) SEpteMbeR

(b) SEptEMbEr

(c) SEptembER

(d) sePTemBeR

80. The question below has some statement / argument / report / passage, followed by a few alternative answer choices marked A, B, C and D, of which only one would be the best possible answer. Read the passage / statement / argument carefully and choose the best possible answer from the alternatives given.

In an examination system of an institution, 100 students have been graded (from A – D in descending order) on the basis of the marks they received in the three terminal examinations, in which the pass-marks were 50%. Examiners are instructed to follow the following criteria :

1. All students who scored between 90% and 100% in any two examinations could receive an A.

2. Students who came in the top overall were to be awarded an A.

3. Notwithstanding I and II, if any student failed a paper, the highest he or she could get was a B.

4. The top 20 students in the whole year, when the overall examination percentages were averaged, could receive an A.

On the basis of above criteria, which of the following would definitely not be permissible ?

(a) Bikash, who got 95% in Chemistry and 92% in Biology, received a B

(b) Suparna, who stood first in Physics and got 96% in Mathematics, received a B

(c) Amitava failed in English, but because he ranked 9th overall out of 100 students was awarded an A grade

(d) Bandana was given an A because she came 20th though she had failed to get above 90% in any of the three examinations

81. A statement is given followed by three courses of action numbered 1, 2 and 3. Analyze the statement and decide which of the three courses of action logically follows and answer according to the alternative answers given along with the question.

Statement : The army has been alerted in the district following floods triggered by incessant rains.

Courses of action :

1. Relief to flood affected people should be arranged.
2. Supply of food articles should be arranged.
3. Adequate medical facilities should be arranged.

(a) Only 1 follows

(b) Only 2 follows

(c) Only 1 and 3 follow

(d) All follow

82. Ramesh starts walking from point 'A'. He walks 12 km towards North from there he turns right and walks 4 km, then he again turns right and walks 9 km. How far and which direction he is from his starting point ?

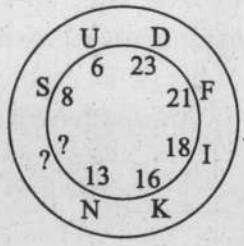
(a) 13 km East

(b) 13 km South

(c) 5 km North

(d) 5 km North-East

83. Indicate what will be the letter / numerical in the missing portion :



(a) R/9

(b) P/11

(c) Q/13

(d) P/16

84. The question below you will find, instead of two pairs of words with more or less similar relationships between the first two words and the last two words, only first and fourth words are given and the second and the third words are replaced by numbers 1 and 2, for each of which four alternatives marked E, F, G, H and P, Q, R, S, respectively. Study the alternatives carefully and choose the best answer.

Onomatology : 1 :: 2 : Language

1. (E) Names (F) Races (G) Reality (H) Insects
2. (P) Occultism (Q) Semantics (R) Concology (S) Ontology

(a) FS

(b) EQ

(c) GP

(d) HR

85. A solid figure is given followed by a problem. Each surface of the solid figure (marked with 1, 2, 3, 4, 5, 6, etc.) corresponds to certain specific surface of the given problem. Your task will be to find out how it corresponds.

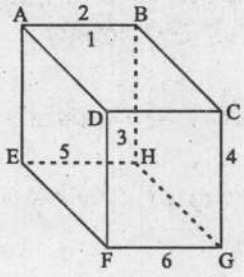


Figure 1

1 refers to the surface A B H E
2 refers to the surface A B C D
3 refers to the surface C D F G
4 refers to the surface B C G H
5 refers to the surface A D F E
6 refers to the surface E F G H

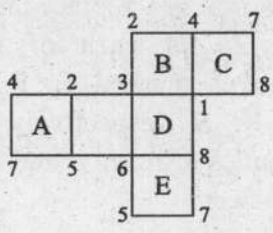


Figure 2

If surfaces B and D in figure 1 correspond to surfaces 1 and 3 respectively in key figure 2, then the points marked as 5 in figure 1 correspond to which point in the key figure 2 ?

(a) E

(b) F

(c) G

(d) D

86. What is the name of the national digital framework launched at India Maritime Week 2025 to make Indian ports data-driven and AI-enabled ?

(a) SmartPort Bharat

(b) Sagarmitra

(c) Digi Bandar

(d) PortNet India

87. According to the Reserve Bank of India's report, which two countries together accounted for over one-third of the total FDI in India ?

(a) United States and Singapore

(b) Mauritius and United Kingdom

(c) Singapore and Netherlands

(d) Japan and Germany

88. Which organization is responsible for implementing the National Beekeeping & Honey Mission (NBHM) ?

(a) National Horticulture Board (NHB)

(b) National Bee Board (NBB)

(c) National Cooperative Development Corporation (NCDC)

(d) Agricultural and Processed Food Products Export Development Authority (APEDA)

89. Laokhowa Wildlife Sanctuary is located in which state ?

(a) Sikkim

(b) Arunachal Pradesh

(c) Assam

(d) Manipur

90. Which state is home to India's first Silicon Carbide (SiC) semiconductor manufacturing plant ?

(a) Odisha

(b) Jharkhand

(c) Bihar

(d) Haryana

91. What is the name of the initiative launched by India and Denmark in November 2025 to enhance bilateral ties ?

(a) Indo-Danish Economic Forum

(b) India-Denmark Trade Partnership

(c) Indo-Danish Business Council

(d) India-Denmark Sustainability Initiative

92. Which Ministry released the India AI Governance Guidelines in 2025 ?

(a) Ministry of Science and Technology

(b) Ministry of Electronics and Information Technology

(c) Ministry of Corporate Affairs

(d) Ministry of Education

93. Which organization developed the Online National Drugs Licensing System (ONDLS) portal ?

(a) Centre for Development of Advanced Computing (CDAC)

(b) National Health Authority (NHA)

(c) Indian Pharmacopoeia Commission (IPC)

(d) Drug Controller General of India (DCGI)

94. Which institution released the report titled "India's Blue Economy : Strategy for Harnessing Deep-Sea and Offshore Fisheries" ?

(a) Indian Council of Agricultural Research (ICAR)

(b) NITI Aayog

(c) Ministry of Earth Sciences

(d) Reserve Bank of India

95. The NE-SPARKS programme has been launched to promote awareness about which field among students of the North Eastern Region of India ?

(a) Renewable Energy

(b) Space Science and Technology

(c) Digital literacy

(d) Agriculture

96. Which space organization launched the PUNCH Space Mission ?

(a) Indian Space Research Organisation (ISRO)

(b) National Aeronautics and Space Administration (NASA)

(c) European Space Agency (ESA)

(d) China National Space Administration (CNSA)

97. According to Environmental Accounting on forest 2025 report, which state showed the highest rise in Recorded Forest Area (RFA) share ?

(a) Chhattisgarh

(b) Odisha

(c) Jharkhand

(d) Uttarakhand

98. Where were the Fast Patrol Vessels (FPVs) ICGS Ajit and ICGS Aparajit launched ?

(a) Cochin Shipyard Limited

(b) Mazagon Dock Shipbuilders

(c) Goa Shipyard Limited

(d) Hindustan Shipyard

99. What is the theme of Global Media and Information Literacy (MIL) Week 2025 ?

(a) Empowering Citizens through Media Literacy

(b) Media Literacy for Peaceful Societies

(c) Building Critical Thinkers in the Digital Age

(d) Minds Over Artificial Intelligence (AI) – MIL in Digital Spaces

100. The Samriddh Gram Phygital Services Pilot Project was recently launched by which organization ?

(a) Telecom Regulatory Authority of India (TRAI)

(b) Bharat Sanchar Nigam Limited (BSNL)

(c) Telecom Centres of Excellence (TCoE)

(d) Ministry of Power

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