

CII – iPATE 1.0 (2020)

Computer Based PAN India Examination

Category: GRADUATE ENGINEER

Engineering Discipline: AEROSPACE ENGINEERING

Question Paper Structure

| Question Nos. | Sections & Topics | | Marks |
|---------------|--|---|------------|
| 1 to 20 | Section I : Cognitive Abilities | <ul style="list-style-type: none">Quantitative AptitudeAnalytical ReasoningData InterpretationEnglish Communication | 20 |
| 21 to 40 | Section II : Professional Abilities | <ul style="list-style-type: none">Project ManagementHealth, Safety & Risk ManagementEnvironmental LawsSocial Responsibility & EthicsFinance & AccountsLegal, Contracts & Arbitration | 20 |
| 41 to 50 | Section III (A) : Technical Abilities | Physics & Chemistry (10+2 level) | 10 |
| 51 to 100 | Section III (B) : Technical Abilities | Engineering Discipline | 50 |
| TOTAL | | | 100 |

NOTE:

- Exam Duration: 3 Hours
- Total 100 no. of Questions of 1 Mark each with Negative Marking of ½ Mark for every wrong answer
- Questions (Section wise) and respective Answer Options shuffling at Candidates' terminal

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|----------------|---|-----------------|-----------------|-----------------|
| Question No. 1 | Neha goes for a walk between 4 am and 5 am. After coming back, she found that the hour hand and the minute hand of her watch had exchanged their positions. How much time(approx.) did she spend on her walk? | | | |
| Answer Options | A) 55 min | B) 55:38 min | C) 55:54 min | D) 55:46 min |
| Right Answer | B | | | |

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|----------------|--|-------------|------------|------------|
| Question No. 2 | 4 red, 6 green and 5 white flowers are in a bag. 3 flowers are taken together. What is the probability of getting 1 white and 2 green flowers? | | | |
| Answer Options | A) 1/5 | B) 15/91 | C) 3/91 | D) 3/11 |
| Right Answer | B | | | |

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|----------------|--|---------------|---------------|---------------|
| Question No. 3 | Tony, Monu and James completed a work together in 36 days and received a total payment of Rs. 54000. Tony took half of the total money, Monu took one third and James took remaining. In how many days, Tony and James would have finished the work if Monu was not working? | | | |
| Answer Options | A) 72 days | B) 54 days | C) 96 days | D) 64 days |
| Right Answer | B | | | |

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|----------------|---|-----------------|-----------------|-----------------|
| Question No. 4 | A shopkeeper purchased 15 kg of variety A rice at Rs. X per kg and 10 kg of variety B rice at Rs. (X + 5) per kg. The shopkeeper sold the whole quantity of variety A rice at 10% profit and that of variety B rice at 20% profit. The total selling price of variety A rice was Rs. 30 more than that of variety B rice. Had the two varieties been mixed and sold at an overall profit of 20%, what would have been the selling price (per kg)? | | | |
| Answer Options | A) Rs. 26.40 | B) Rs. 23.20 | C) Rs. 24.20 | D) Rs. 25.00 |
| Right Answer | A | | | |

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|----------------|---|----------|----------|----------|
| Question No. 5 | A club has 256 members of whom 144 can play football, 123 can play tennis, and 132 can play cricket. Moreover, 58 members can play both football and tennis, 25 can play both cricket and tennis, while 63 can play both football and cricket. If every member can play at least one game, then the number of members who can play only tennis is | | | |
| Answer Options | A) 32 | B) 43 | C) 38 | D) 45 |
| Right Answer | B | | | |

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| Question No. 6 | Fill up the following series: 5, 25, 7, _____, 9, 19 | | | |
| Answer Options | A) 23 | B) 22 | C) 25 | D) 32 |
| Right Answer | A | | | |

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|----------------|---|----------------------|----------------------------------|----------------------------|
| Question No. 7 | <p>The question is followed by three statements I, II, and III. Read the question and the statements carefully and choose your answer according to which set of the statement(s) is/are sufficient to answer the question.</p> <p>What is the area of the rectangle?</p> <p>I. The ratio of length to breadth of the rectangle is 35 : 12. II. The perimeter of the rectangle is 188 cm. III. The length of diagonal of the rectangle is 74 cm</p> | | | |
| Answer Options | A) I and II only | B) I and III only | C) (I and II) or (II and III) | D) Any two of the three |
| Right Answer | D | | | |

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| Question No. 8 | <p>The question below consists of a question and three statements numbered I, II and III given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read all the statements and give answer:</p> <p>What is the sum of the age of Ram and Mohan?</p> <p>Statement I : The age of Ram is 6 years more than the age of Mohan. Statement II : 40% of the age of Mohan is equal to 30% of the age of Ram. Statement III : The ratio between half of the age of Ram and one third of the age of Mohan is 2 : 1.</p> | | | |
| Answer Options | A) Either statement III alone or statements I and II together are sufficient. | B) Only statement III is sufficient | C) Only statement I and II are sufficient | D) Only statement I, II, and III are sufficient |
| Right Answer | C | | | |

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|----------------|---|-------------------------|-------------|-------------------------|
| Question No. 9 | <p>Mohan is the Son of Arun's Father's sister. Prakash is the son of Reva, who is the mother of Vikas and Grandmother of Arun. Pranab is the father of Neela and the grandfather of Mohan. Reva is the wife of Pranab. How is the wife of Vikas related to the neela?</p> | | | |
| Answer Options | A) Sister | B) Sister - In - Law | C) Niece | D) None of The Above |
| Right Answer | B | | | |

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|-----------------|---|------------|-------------|------------|
| Question No. 10 | <p>In the following question, there is a certain relationship between two given words on one side of:: and one word is given on another side of:: while another word is to be found from the given alternatives having the same relationship with this word as the words of the given pair bear. Choose the correct alternative.</p> <p>_____ : trail :: grain : grail</p> | | | |
| Answer Options | A) train | B) path | C) wheat | D) holy |
| Right Answer | A | | | |

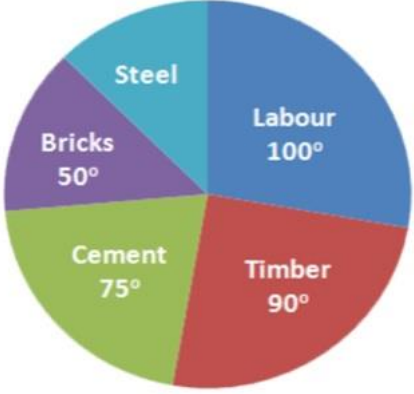
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|-----------------|--|------------|------------|------------|
| Question No. 11 | Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order. | | | |
| | A: Only natural dyes are used in Kalamkari and it involves several steps. B: There are two distinctive styles of Kalamkari in India. C: They are the Sri kalahasti style and the Machlipatnam style. D: Kalamkari is a type of hand-painted or block-printed cotton textile, produced in the Indian States of Andhra Pradesh and Telangana. | | | |
| Answer Options | A) CBDA | B) DABC | C) ACBD | D) DCBA |
| Right Answer | B | | | |

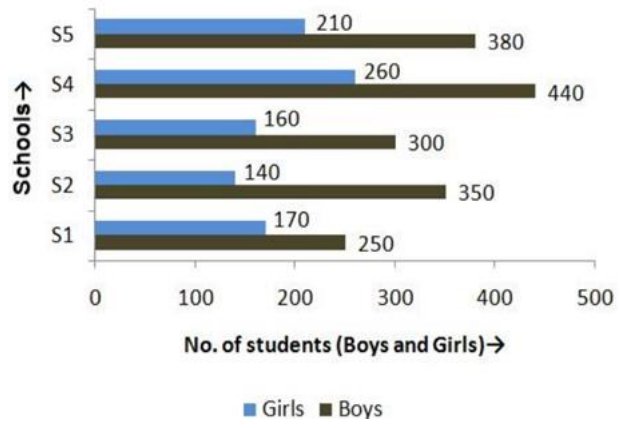
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| Question No. 12 | What is the antonym of MOROSE | | | |
| Answer Options | A) overawed | B) agitated | C) cherubic | D) cheerful |
| Right Answer | D | | | |

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| Question No. 13 | What is the synonym of ERRONEOUS | | | |
| Answer Options | A) Enormous | B) Wrong | C) Erased | D) Weak |
| Right Answer | B | | | |

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| Question No. 14 | A frustrated old man, Bandi thakur was never tired of (1)_____ the exploits of his ancestors, with a little (2) _____ he would lapse into a reminiscent mood, push back the loosely tied turban from his close-cropped grizzled hair and start a familiar story, improvising (3)_____ details which, to the mirth of his audience, always kept changing with every recounting. | | | |
| Answer Options | A) (1) criticizing, (2) prompting, (3) sincere | B) (1) extolling, (2) advising, (3) rational | C) (1) invoking, (2) arguing, (3) fanciful | D) (1) extolling, (2) prompting, (3) fanciful |
| Right Answer | D | | | |

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|-----------------|---|--|--|--|
| Question No. 15 | Even my goalies and the policemen, who have arrested me or (1)_____ me as a prisoner from place to place have been kind to me, and much of the (2) _____ of conflict and the sting of goal-life has been (3) _____ because of this human touch. | | | |
| Answer Options | A) (1) safeguarded, (2) kindness, (3) egged on | B) (1) escorted, (2) affinity, (3) toned down | C) (1) abandoned, (2) bitterness, (3) pumped up | D) (1) escorted, (2) bitterness, (3) toned down |
| Right Answer | D | | | |

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|-----------------|---|----------------|----------------|----------------|
| Question No. 16 | <p>The pie chart shows the total expense of Rs 450000 to construct a house.</p> <p>The cost of steel is</p>  | | | |
| Answer Options | A) Rs 55000 | B) Rs 56250 | C) Rs 60000 | D) Rs 62500 |
| Right Answer | B | | | |

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|-----------------|--|-----------|-----------|-----------|
| Question No. 17 | <p>The following bar graph shows the number of boys and girls of class X of 5 different schools.</p> <p>Find the difference between the number of boys and girls of schools S2 and S3 together</p>  | | | |
| Answer Options | A) 300 | B) 350 | C) 400 | D) 450 |
| Right Answer | B | | | |

| Question No. 18 | <p>Study the tables carefully and answer the question that follow: Number of candidates (in lakhs) appearing in an entrance examination from six different states and the ratio of male candidates and female candidates in the same</p> <p>The number of male candidates from Andhra Pradesh and Haryana together is what percent of the total number of female candidates from Bihar?</p> <table border="1"> <thead> <tr> <th rowspan="2">State</th> <th rowspan="2">Number of candidates</th> <th colspan="2">Ratio</th> </tr> <tr> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>Andhra Pradesh</td> <td>1.85</td> <td>3</td> <td>2</td> </tr> <tr> <td>Assam</td> <td>2.73</td> <td>7</td> <td>5</td> </tr> <tr> <td>Telangana</td> <td>1.25</td> <td>7</td> <td>3</td> </tr> <tr> <td>Odisha</td> <td>3.14</td> <td>5</td> <td>3</td> </tr> <tr> <td>Haryana</td> <td>1.08</td> <td>4</td> <td>5</td> </tr> <tr> <td>Bihar</td> <td>2.27</td> <td>1</td> <td>3</td> </tr> </tbody> </table> | | | | State | Number of candidates | Ratio | | Male | Female | Andhra Pradesh | 1.85 | 3 | 2 | Assam | 2.73 | 7 | 5 | Telangana | 1.25 | 7 | 3 | Odisha | 3.14 | 5 | 3 | Haryana | 1.08 | 4 | 5 | Bihar | 2.27 | 1 | 3 |
|-----------------|---|--------------|--------------|--------------|-------|----------------------|-------|--|------|--------|----------------|------|---|---|-------|------|---|---|-----------|------|---|---|--------|------|---|---|---------|------|---|---|-------|------|---|---|
| State | Number of candidates | Ratio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Male | Female | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Andhra Pradesh | 1.85 | 3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assam | 2.73 | 7 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Telangana | 1.25 | 7 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Odisha | 3.14 | 5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Haryana | 1.08 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bihar | 2.27 | 1 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Answer Options | A) 98.41% | B) 48.45% | C) 95.49% | D) 93.39% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Right Answer | D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NOTE | Question was displayed incorrectly at candidates' terminals. Hence grace mark has been given to all candidates, who attempted or not. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Question No. 19 | <p>Read the following information carefully and answer the given question.</p> <p>i. Rajesh, Raju and Pijush are intelligent. ii. Rajesh, Shib and Hari are hard-working. iii. Shib, Pijush and Hari are honest. iv. Rajesh, Raju and Hari are ambitious.</p> <p>Which of the following person is neither honest nor hard-working but is ambitious?</p> | | | |
| Answer Options | A) Shib | B) Pijush | C) Raju | D) Hari |
| Right Answer | C | | | |


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| Question No. 20 | <p>Read the following information carefully and answer the following question.</p> <p>'A + B' means 'A is the father of B'; 'A - B' means 'A is the wife of B'; 'A x B' means 'A is the brother of B'; 'A ÷ B' means 'A is the daughter of B'.</p> <p>If $P \div R + S + Q$, which of the following is true?</p> | | | |
| Answer Options | A) P is the daughter of Q | B) Q is the aunt of P | C) P is the aunt of Q | D) P is the mother of Q |
| Right Answer | C | | | |

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|-----------------|---|-----------------------|------------------|-------------------|
| Question No. 21 | A management point in a Work Breakdown Structure (WBS) used to consolidate and process work package data and forward the result to the project management is called _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Part number | Specification of Part | Name of the Part | Price of the Part |
| Right Answer | A | | | |

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|-----------------|---|-----------------|------|---------|
| Question No. 22 | Various activities of a project are shown on a Bar Chart by _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Vertical line | Horizontal line | Dots | Crosses |
| Right Answer | B | | | |

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|-----------------|---|-------|----------|-------------|
| Question No. 23 | The difference between the time avail to do a job and time required to do the job is known as _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Event | Float | Duration | Constraints |
| Right Answer | B | | | |

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|-----------------|--|------------|-----------|--------------------------------|
| Question No. 24 | Gantt Chart is commonly used for _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Routing | Scheduling | Follow up | Inspection and quality control |
| Right Answer | B | | | |

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|-----------------|---|-----------|-----------------|------------------|
| Question No. 25 | The following symbol is used when something in your workplace is  | | | |
| Answer Options | A) | B) | C) | D) |
| | Chemical Weapon | Biohazard | Toxic Substance | Radiation Danger |
| Right Answer | B | | | |

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|-----------------|---|-------|-----------------------|---------------------------------------|
| Question No. 26 | What is the leading cause of death on construction sites? | | | |
| Answer Options | A) | B) | C) | D) |
| | Struck by object | Falls | Caught-in or -between | Electrocutions Hazardous Materials |
| Right Answer | B | | | |

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|-----------------|--|-------------|-----------------|------------------------|
| Question No. 27 | What violations are most commonly cited by OSHA? | | | |
| Answer Options | A) | B) | C) | D) |
| | Hazard communications | Scaffolding | Fall protection | Respiratory protection |
| Right Answer | C | | | |

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|-----------------|--|-------------------|------|--------------|
| Question No. 28 | _____ is best suited to extinguishing oil or flammable liquid fire | | | |
| Answer Options | A) | B) | C) | D) |
| | Soda acid | Vaporizing liquid | Foam | Dry chemical |
| Right Answer | C | | | |

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|-----------------|--|--------|--------|---------|
| Question No. 29 | Out of the 37 countries, which country still not ratified the second commitment known as the Doha amendment to the Kyoto Protocol? | | | |
| Answer Options | A) | B) | C) | D) |
| | USA | Canada | Norway | Ukraine |
| Right Answer | A | | | |

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|-----------------|---|---|---|------------------|
| Question No. 30 | The Ministry also serves as the nodal agency in the country for the which of these organisations? | | | |
| Answer Options | A) | B) | C) | D) |
| | United Nations Environment Programme (UNEP) | South Asia Co-operative Environment Programme (SACEP) | International Centre for Integrated Mountain Development (ICIMOD) | All of the above |
| Right Answer | D | | | |

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|-----------------|---|--|---|------------------|
| Question No. 31 | There are many benefits to implementing an EMS. These include a potential for | | | |
| Answer Options | A) | B) | C) | D) |
| | Reduction in waste production | The avoidance in use, and costly disposal of, other hazardous or potentially polluting materials | A planned approach to compliance with regulations and the consequential reduced risk of prosecutions and fines. | All of the above |
| Right Answer | D | | | |

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|-----------------|--|----------------------------|-----------------------------|--------------------------|
| Question No. 32 | Which of the following does not contribute to the development of a manager's standard of ethics? | | | |
| Answer Options | A) | B) | C) | D) |
| | competitor behaviours | society's norms and values | individual life experiences | environmental situations |
| Right Answer | A | | | |

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|-----------------|--|-----------------|------------|------------------|
| Question No. 33 | Which is the approach to corporate planning? | | | |
| Answer Options | A) | B) | C) | D) |
| | Customers and workers satisfaction | Planning skills | Optimising | All of the above |
| Right Answer | D | | | |

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|-----------------|--|-----------------------|-----------------------|------------------------------|
| Question No. 34 | Which one of the following is not principle business ethics? | | | |
| Answer Options | A) | B) | C) | D) |
| | Principle of universality | Principle of humanity | Principle of autonomy | Principle of dissatisfaction |
| Right Answer | D | | | |

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|-----------------|--|---|--|--|
| Question No. 35 | Which of the following is a definition for variable costs? | | | |
| Answer Options | A) | B) | C) | D) |
| | Costs that remain the same whatever the level of output | Costs that contain a fixed and variable element | Costs that vary directly with the number of units produced | Costs that will remain fixed as output increases until the activity reaches a level where the costs have to increase sharply |
| Right Answer | C | | | |

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|-----------------|---|---|---|--------------------------------------|
| Question No. 36 | Which of the following is a definition of break-even point? | | | |
| Answer Options | A) | B) | C) | D) |
| | The difference between the selling price of a product and the variable costs incurred in producing that product | The fixed plus variable costs of the business | The situation where neither a profit nor a loss is made | The situation where a profit is made |
| Right Answer | C | | | |

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|-----------------|--|------------------------------|---|--|
| Question No. 37 | Which of the following is not a benefit of budgeting? | | | |
| Answer Options | A) | B) | C) | D) |
| | It promotes study, research, and a focus on the future | It is a source of motivation | It will prevent net losses from occurring | It is a mean of coordinating business activities |
| Right Answer | C | | | |

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|-----------------|---|---|--|--|
| Question No. 38 | What is the obligation of the peaceful settlement of dispute? | | | |
| Answer Options | A) | B) | C) | D) |
| | It is an obligation of result i.e. States are under a strict obligation to resolve the disputes at the earliest | It is an obligation of conduct i.e. States have an obligation to try to resolve the disputes via peaceful mean. That does not entail an obligation to resolve the dispute | It is an intention to act immediately as per norms of International Law and all States have a legal interest to safeguard its application in any dispute | It is an obligation which concerns solely International courts and tribunal. |
| Right Answer | B | | | |

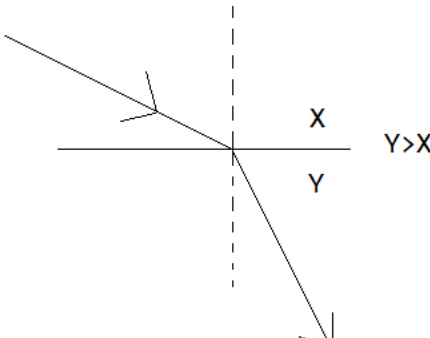
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|-----------------|--|--|---------------------------|--|
| Question No. 39 | What is the primary function of the Law of Tort? | | | |
| Answer Options | A) | B) | C) | D) |
| | Punishment of a wrong motivator | Clarification of the human rights of the parties | Compensating the claimant | Spreading of losses throughout the parties |
| Right Answer | C | | | |

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|-----------------|---|--|--|---|
| Question No. 40 | IDIC published a completely new suite of contracts in various coloured books which contain different conditions. What condition is mentioned in Red Book? | | | |
| Answer Options | A) | B) | C) | D) |
| | Conditions of contract for Construction project. | Conditions of contract for EPC/ Turnkey project. | Conditions of contract for Plant & Design. | Conditions of contract for DBO (Design, Build & Operate) project. |
| Right Answer | A | | | |

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|-----------------|--|--|---|--|
| Question No. 41 | The center of mass of the system consisting of Earth, the Sun, and the planet Mars is: | | | |
| Answer Options | A) | B) | C) | D) |
| | Closer to Earth than to either of the other bodies | Closer to the Sun than to either of the other bodies | Closer to Mars than to either of the other bodies | At the geometric center of the triangle formed by the three bodies |
| Right Answer | B | | | |

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|-----------------|--|-------|-------|----|
| Question No. 42 | At the same instant that a 0.50-kg ball is dropped from 25m above Earth, a second ball, with a mass of 0.25 kg, is thrown straight upward from Earth's surface with an initial speed of 15m/s. They move along nearby lines and pass without colliding. At the end of 2 sec the magnitude of the acceleration of the center of mass of the two-ball system is: | | | |
| Answer Options | A) | B) | C) | D) |
| | 0.25g | 0.50g | 0.75g | g |
| Right Answer | D | | | |

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|-----------------|--|--------------|------------|--------------|
| Question No. 43 | The rainbow seen after a rain shower is caused by: | | | |
| Answer Options | A) | B) | C) | D) |
| | diffraction | interference | refraction | polarization |
| Right Answer | C | | | |

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|-----------------|--|---|--|--|
| Question No. 44 | When light travels from medium X to medium Y as shown:  | | | |
| Answer Options | A) | B) | C) | D) |
| | both the speed and the frequency decrease | both the speed and the frequency increase | both the speed and the wavelength decrease | both the speed and the wavelength increase |
| Right Answer | C | | | |
| NOTE | Question was displayed incorrectly at candidates' terminals. Hence grace mark has been given to all candidates, who attempted or not. | | | |

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|-----------------|--|--|--------|---|
| Question No. 45 | An object rests on a horizontal frictionless surface. A horizontal force of magnitude F is applied. This force produces an acceleration: | | | |
| Answer Options | A) | B) | C) | D) |
| | only if F is larger than the weight of the object | only while the object suddenly changes from rest to motion | always | only if the inertia of the object decreases |
| Right Answer | C | | | |

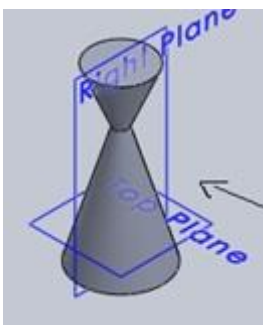
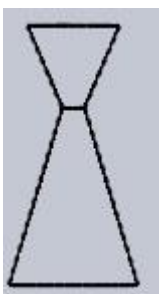
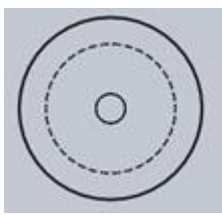
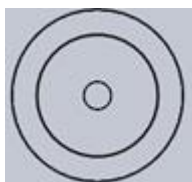
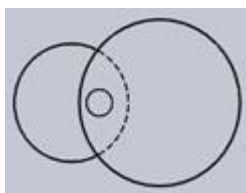
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|-----------------|---|---|-----------------------------------|-----------------------------------|
| Question No. 46 | Which statement is incorrect? | | | |
| Answer Options | A) | B) | C) | D) |
| | All the metals are good conductor of electricity. | All the metals are good conductor of heat | All the metals form positive ions | All the metals form acidic oxides |
| Right Answer | D | | | |

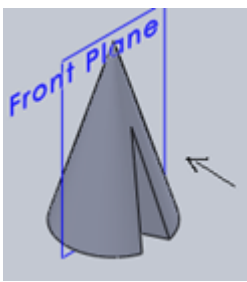
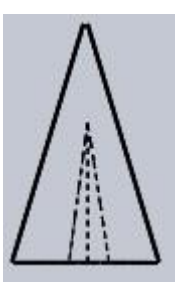
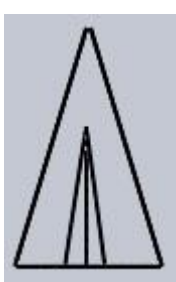
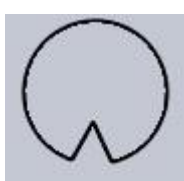
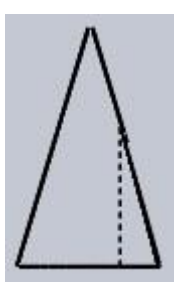
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| Question No. 47 | Based on the first law of thermodynamics, which one of the following is correct? | | | |
| Answer Options | A) | B) | C) | D) |
| | For an isothermal process, $q = +w$ | For an isochoric process, $\Delta U = -q$ | For an adiabatic process, $\Delta U = -w$ | For a cyclic process, $q = -w$ |
| Right Answer | D | | | |

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|-----------------|---|-----------------|------------------------------|------------------------|
| Question No. 48 | Among the electrolytes Na_2SO_4 , CaCl_2 , $\text{Al}_2(\text{SO}_4)_3$ and NH_4Cl , the most effective coagulating agent for Sb_2S_3 sol is | | | |
| Answer Options | A) | B) | C) | D) |
| | Na_2SO_4 | CaCl_2 | $\text{Al}_2(\text{SO}_4)_3$ | NH_4Cl |
| Right Answer | C | | | |

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|-----------------|--|----------|-----------|----------|
| Question No. 49 | Of the following which one is classified as polyester polymer? | | | |
| Answer Options | A) | B) | C) | D) |
| | Nylon-66 | Terylene | Backelite | Melamine |
| Right Answer | B | | | |

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|-----------------|--|-----------------|------------------|-----------------|
| Question No. 50 | In order to increase the volume of a gas by 10%, the pressure of the gas should be | | | |
| Answer Options | A) | B) | C) | D) |
| | increased by 10% | increased by 1% | decreased by 10% | decreased by 1% |
| Right Answer | C | | | |

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|------------------------|--|---|--|---|
| <p>Question No. 51</p> | <p>Identify the top view for the below-given cone.</p>  | | | |
| <p>Answer Options</p> | <p>A)</p>  | <p>B)</p>  | <p>C)</p>  | <p>D)</p>  |
| <p>Right Answer</p> | <p>C</p> | | | |

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| <p>Question No. 52</p> | <p>Identify the front view of the following cone.</p>  | | | |
| <p>Answer Options</p> | <p>A)</p>  | <p>B)</p>  | <p>C)</p>  | <p>D)</p>  |
| <p>Right Answer</p> | <p>B</p> | | | |

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|-----------------|---|------|----------|--------|
| Question No. 53 | Curve of any shape can be drawn in perspective by enclosing it in a _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | rectangle | cube | cylinder | square |
| Right Answer | A | | | |

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|-----------------|---|--------------|---------------------|-------------|
| Question No. 54 | A prism and cone got intersected at 90 degrees the line of intersection will be _____ and parallel to axis of _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | straight line, prism | curve, prism | straight line, cone | curve, cone |
| Right Answer | B | | | |

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|-----------------|--|-------------------------------------|-------------------------------------|---------------------|
| Question No. 55 | The plane surfaces intersect in a _____ the line of intersection between two curved surfaces is _____ and between a plane surface and curved surfaces is a _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | straight line, curve, curve | straight line, straight line, curve | straight line, curve, straight line | curve, curve, curve |
| Right Answer | A | | | |

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|-----------------|--|----------------------------|----------------------|------------------------------------|
| Question No. 56 | Which of the following parameters is NOT represented on Velocity-Load Factor(V-n) diagram of the aircraft? | | | |
| Answer Options | A) | B) | C) | D) |
| | Maximum climb speed | Positive limit load factor | Negative stall curve | Design diving speed or limit speed |
| Right Answer | A | | | |

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|-----------------|--|------------|------------|------------|
| Question No. 57 | An aircraft is undergoing a sustained level turning flight at a constant speed(V) of 300 m/s and its bank angle(ϕ) is 70 deg. What is the Turn Rate of the aircraft in deg/s? Assume acceleration due to gravity(g) = 9.81 m/s ² . | | | |
| Answer Options | A) | B) | C) | D) |
| | 4.25 deg/s | 4.55 deg/s | 4.95 deg/s | 5.15 deg/s |
| Right Answer | D | | | |

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|-----------------|---|----------------------|-------------------------|----------------------------|
| Question No. 58 | For an aircraft to possess positive longitudinal static stability, the position of its centre-of-gravity (cg) must be | | | |
| Answer Options | A) | B) | C) | D) |
| | Behind the Neutral Point | At the Neutral Point | Below the Neutral Point | Ahead of the Neutral Point |
| Right Answer | D | | | |

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|-----------------|---|--------------------|----------------|---------------|
| Question No. 59 | Which of the following configuration features of aircraft, DOES NOT contribute positively to its Lateral Stability? | | | |
| Answer Options | A) | B) | C) | D) |
| | Low Wing Position | High Wing Position | Wing Sweepback | Wing Dihedral |
| Right Answer | A | | | |

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|-----------------|--|-----------|-------------------------|--------------------------------|
| Question No. 60 | Which parameter remains nearly constant during Short Period motion of aircraft | | | |
| Answer Options | A) | B) | C) | D) |
| | Angle of attack (α) | Speed (V) | Pitch angle(θ) | Flight path angle (γ) |
| Right Answer | B | | | |

| | | | | |
|-----------------|--|--------|------|------|
| Question No. 61 | What provides damping in Phugoid motion of aircraft? | | | |
| Answer Options | A) | B) | C) | D) |
| | Thrust | Weight | Drag | Lift |
| Right Answer | C | | | |

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|-----------------|--|--------------------|--------------------|--------------------|
| Question No. 62 | Match the names of the following Stability & Control derivatives to their symbols. | | | |
| | 1) Stability Derivative A) $C_{m\delta e}$ 2) Control Derivative B) C_{l_p} 3) Damping Derivative C) $C_{h\alpha}$ 4) Hinge-Moment Derivative D) $C_{n\beta}$ | | | |
| Answer Options | A) | B) | C) | D) |
| | 1-C, 2-D, 3-A, 4-B | 1-D, 2-A, 3-B, 4-C | 1-B, 2-C, 3-D, 4-A | 1-C, 2-A, 3-B, 4-D |
| Right Answer | B | | | |

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|-----------------|---|------------|--------|-----------------|
| Question No. 63 | Which of the followings IS NOT a characteristic dynamic mode of lateral-directional motion of aircraft? | | | |
| Answer Options | A) | B) | C) | D) |
| | Rolling | Dutch roll | Spiral | Roll subsidence |
| Right Answer | A | | | |

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|-----------------|--|-------|-------|-------|
| Question No. 64 | An aircraft with reversible controls is flying where its total elevator Hinge Moment (H) is 100 N-m. The gearing ratio(G) for the elevator circuit is 3.5 rad/m. What is the Stick Force(F) being felt by the pilot? | | | |
| Answer Options | A) | B) | C) | D) |
| | 35 N | 350 N | 100 N | 175 N |
| Right Answer | B | | | |

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|-----------------|---|------------------|----------------------|------------------|
| Question No. 65 | For a spacecraft orbiting around Earth in elliptical orbit, which of the following quantities remains constant? | | | |
| Answer Options | A) | B) | C) | D) |
| | Angular Position | Angular Velocity | Angular Acceleration | Angular Momentum |
| Right Answer | D | | | |

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|-----------------|---|-----------|----------|----------|
| Question No. 66 | Escape Velocity from Earth is 11.2 km/s. What will be the escape velocity from a planet whose mass is 100 times more than Earth | | | |
| Answer Options | A) | B) | C) | D) |
| | 1120 km/s | 1.12 km/s | 112 km/s | 11.2 m/s |
| Right Answer | C | | | |

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|-----------------|--|----------|-----------|-----------|
| Question No. 67 | A satellite is revolving in a LEO orbit at an altitude of 400 km above Earth. Assuming radius of earth to be 6400 km, what must be the orbital velocity (in km/s) of the satellite? Round-off answer to one decimal place. | | | |
| Answer Options | A) | B) | C) | D) |
| | 8.2 km/s | 9.2 km/s | 10.2 km/s | 11.2 km/s |
| Right Answer | A | | | |

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|-----------------|--|----------------|-----------------|----------------|
| Question No. 68 | What approximately will be the Time Period of a satellite orbiting the earth at very close to the earth's surface? | | | |
| Answer Options | A) | B) | C) | D) |
| | About 3.5 hours | About 24 hours | About 1.5 hours | About 12 hours |
| Right Answer | C | | | |

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|-----------------|--|-----|-----|-----|
| Question No. 69 | Which among the followings is NOT a typical orbit around the Earth | | | |
| Answer Options | A) | B) | C) | D) |
| | GEO | LEO | MEO | CEO |
| Right Answer | D | | | |

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|-----------------|---|----------|----------|----------|
| Question No. 70 | A satellite is revolving around a Planet in a circular orbit at a distance of 7000 km from centre of the Planet and its Time Period is 2 hours. This satellite is to be transferred to a higher circular orbit which is at a distance of 63000 km from this planet's centre. What will be the Time Period of the satellite in the higher orbit? | | | |
| Answer Options | A) | B) | C) | D) |
| | 9 hours | 27 hours | 54 hours | 18 hours |
| Right Answer | C | | | |

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|-----------------|---|---|--|---|
| Question No. 71 | What is NOT true about the Hohmann transfer of orbits | | | |
| Answer Options | A) | B) | C) | D) |
| | Its an in-plane transfer between two coplanar circular orbits | It uses an intermediate elliptical transfer orbit | It requires single application of velocity change i.e. single burn | It is highly fuel-efficient but takes longer transfer times |
| Right Answer | C | | | |

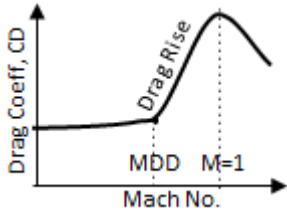
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| Question No. 72 | A simple out-of-plane orbit transfer i.e. change of inclination of the orbital plane without changing size or shape of the orbit, would essentially require | | | |
| Answer Options | A) | B) | C) | D) |
| | Velocity change tangentially in the same direction as initial velocity vector | Velocity change orthogonal to the initial velocity vector | Velocity change tangentially in the opposite direction to initial velocity vector | Velocity change at 45 deg to initial velocity vector |
| Right Answer | B | | | |

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|-----------------|--|----------------------|-----------------------|-----------------------|
| Question No. 73 | In which of the following orbits can a satellite cover and oversee the entire earth? | | | |
| Answer Options | A) | B) | C) | D) |
| | Polar Orbit | Geo-stationary orbit | Sun-synchronous orbit | Geo-synchronous orbit |
| Right Answer | A | | | |

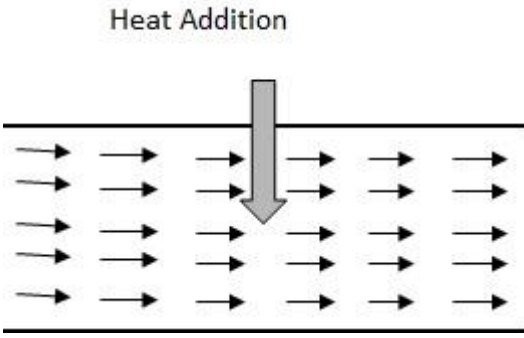
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|-----------------|--------------------------------------|------|--------|--------------------|
| Question No. 74 | Thin air foil theory CAN NOT predict | | | |
| Answer Options | A) | B) | C) | D) |
| | Drag | Lift | Moment | Centre of pressure |
| Right Answer | A | | | |

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|-----------------|--|--|--|--|
| Question No. 75 | Which of the following statements about Kutta Condition at trailing edge(T.E.) of air foil is NOT true? | | | |
| Answer Options | A) | B) | C) | D) |
| | The value of circulation generated around an air foil is such that the flow leaves air foil T.E. smoothly. | For finite angled as well as cusped T.E., the velocities on upper and lower surfaces of air foil at T.E. are infinite. | For a finite angled T.E., the upper and lower surface velocities are zero at the T.E. and the rear stagnation point lies on T.E. | For a cusped T.E., the upper and lower surface velocities are finite and equal at the T.E. |
| Right Answer | B | | | |

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|-----------------|---|-------------|-------------|-------------|
| Question No. 76 | Air is flowing past a wing of 20m span at a velocity(v) of 100 m/s. The total circulation generated around wing is equal to 10 m ² /s. The density of air is 1 kg/m ³ . Assuming the flow to be 2-D potential flow, what will be total lift generated on the wing as per Kutta-Joukowski theorem? | | | |
| Answer Options | A) 20 kN | B) 40 kN | C) 10 kN | D) 25 kN |
| Right Answer | A | | | |

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|-----------------|--|--------------------|----------------------|-----------------------|
| Question No. 77 | Which of the following parameters of wing configuration helps to increase the Drag Divergence Mach number(MDD) thereby delaying the sharp drag rise to higher Mach no.?  | | | |
| Answer Options | A) Taper ratio | B) Aspect ratio | C) Dihedral angle | D) Sweepback angle |
| Right Answer | D | | | |

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|-----------------|---|---------------------|---------------------|--------------------------|
| Question No. 78 | In a supersonic flow, across which shock wave the Static pressure, Density and Temperature decrease while Mach no. and Velocity Increase? | | | |
| Answer Options | A) Normal Shock | B) Oblique Shock | C) Expansion Fan | D) Detached bow shock |
| Right Answer | C | | | |

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|-----------------|---|---------------------|-----------------------|----------------------|
| Question No. 79 | A one-dimensional, steady, frictionless flow through a constant area tube with heat transfer is called  | | | |
| Answer Options | A) Fanno flow | B) Rayleigh flow | C) Isentropic flow | D) Adiabatic flow |
| Right Answer | B | | | |

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| Question No. 80 | A supersonic fighter aircraft is flying at Mach 1.5. What type of shock waves will occur at the leading edges of its wing? | | | |
| Answer Options | A) | B) | C) | D) |
| | Normal Shock | Expansion shock | Oblique shock | Detached bow shock |
| Right Answer | C | | | |

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|-----------------|--|--------|--------|--------|
| Question No. 81 | Consider a steady, isentropic flow of a perfect gas through a convergent-divergent nozzle. The flow is choked at the throat. The stagnation temperature at the throat is 600 °K. What will be the static temperature at the throat? Assume $\Gamma(\gamma) = 1.4$ for the gas. | | | |
| Answer Options | A) | B) | C) | D) |
| | 400 °K | 440 °K | 480 °K | 500 °K |
| Right Answer | D | | | |


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|-----------------|---|-------------------------------|--|--------------------|
| Question No. 82 | Which of the following tests is NOT performed on scaled models of aircraft in Wind Tunnel | | | |
| Answer Options | A) | B) | C) | D) |
| | Surface Velocities measurement | Surface Pressures measurement | Aerodynamic Forces & Moments measurement | Flow Visualisation |
| Right Answer | A | | | |

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|-----------------|--|--------------------|--------------------|--------------------|
| Question No. 83 | Match the followings based on Primary Loads borne by these aircraft structural elements: | | | |
| | 1) Wing Box A) Bending 2) Wing Spar B) Shear 3) Fuselage Stringers C) Axial 4) Fuselage Skin D) Torsion | | | |
| Answer Options | A) | B) | C) | D) |
| | 1-B, 2-A, 3-C, 4-D | 1-D, 2-A, 3-C, 4-B | 1-D, 2-C, 3-B, 4-A | 1-A, 2-B, 3-D, 4-C |
| Right Answer | B | | | |

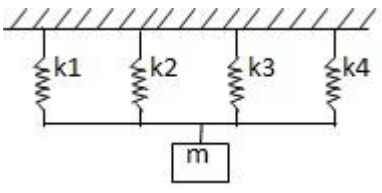
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|-----------------|--|----------|------|-----------------|
| Question No. 84 | Which of the following materials is NOT commonly used in aircraft structural construction? | | | |
| Answer Options | A) | B) | C) | D) |
| | Aluminium | Titanium | Zinc | Stainless Steel |
| Right Answer | C | | | |

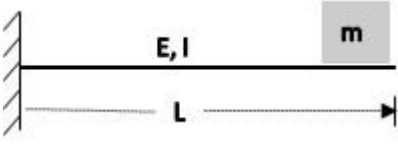
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| Question No. 85 | Fuselage of a modern airliner is basically a Thin-walled cylindrical structure. An aircraft is cruising at an altitude where the ambient pressure of outside air is 25 kPa. However, the cabin is pressurised and inside pressure is maintained at 75 kPa. The diameter of the fuselage is 4 m and its skin thickness(t) is 2.5 mm. The Hoop Stress (tangential stress) induced in the skin of the fuselage will be | | | |
| Answer Options | A) | B) | C) | D) |
| | 30 MPa | 35 MPa | 45 MPa | 40 MPa |
| Right Answer | D | | | |

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|-----------------|---|-----|-----|-----|
| Question No. 86 | How much is the Factor of Safety used in aircraft structural design and construction? | | | |
| Answer Options | A) | B) | C) | D) |
| | 2.5 | 1.3 | 1.2 | 1.5 |
| Right Answer | D | | | |

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|---|---|-----------------------------|---------------------------|-------------------------|
| Question No. 87 | A stable aircraft in a straight level flight is suddenly hit by a vertical gust following which it entered into an oscillation in pitch as shown in the figure here. This Oscillation (or vibration) of the aircraft is a | | | |
|  | | | | |
| Answer Options | A) | B) | C) | D) |
| | Free undamped SDOF motion | Forced undamped SDOF motion | Forced damped SDOF motion | Free damped SDOF motion |
| Right Answer | D | | | |

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|-----------------|---|---|---|---|
| Question No. 88 | Aero elasticity is the result of mutual interaction among | | | |
| Answer Options | A) | B) | C) | D) |
| | Aerodynamic, Viscous and Inertia forces | Gravitational, Aerodynamic and Elastic forces | Aerodynamic, Inertia and Elastic forces | Elastic, Gravitational and Viscous forces |
| Right Answer | C | | | |

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|-----------------|--|---------------|---------------|---------------|
| Question No. 89 | What is the natural frequency (in Hertz) of a spring-mass system shown in the figure. The stiffness of all 4 springs is equal and is 1000 N/m i.e. $k_1=k_2=k_3=k_4=1000$ N/m and mass(m) is 10 kg. Round-off the answer two decimal places. | | | |
| |  | | | |
| Answer Options | A) 3.18 Hz | B) 4.24 Hz | C) 5.19 Hz | D) 6.13 Hz |
| Right Answer | A | | | |

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|-----------------|--|---------------------------|---------------------------|---------------------------|
| Question No. 90 | A massless cantilever beam, as shown in figure, loaded with a mass m at the free end is given a momentary jerk downwards due to which the beam goes into transverse vibrations. The Length, Modulus of Elasticity and Moment of Inertia of the beam are L , E and I respectively. What is the natural frequency(ω_n) of the beam? | | | |
| |  | | | |
| Answer Options | A) $\sqrt{(3EI/mL^3)}$ | B) $\sqrt{(3EL^3/ml)}$ | C) $\sqrt{(2EI/mL^3)}$ | D) $\sqrt{(2EL^3/ml)}$ |
| Right Answer | A | | | |

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|-----------------|---|---------------|---------------|--------------|
| Question No. 91 | For a 2-D plane stress state of a structural element, Airy's Stress Function is given as $\phi = 20x^2 + 15xy - 20y^2$. What is the value of Shear Stress(τ_{xy})? Stresses are in MPa. | | | |
| Answer Options | A) 20 MPa | B) -15 MPa | C) -20 MPa | D) 15 MPa |
| Right Answer | B | | | |

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|-----------------|--|----------------|----------------|--------------|
| Question No. 92 | In which component of a Centrifugal Compressor, the Kinetic Energy of the working fluid is converted into Pressure energy? | | | |
| Answer Options | A) Inducer | B) Impeller | C) Diffuser | D) Volute |
| Right Answer | C | | | |

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|-----------------|---|--------------------------------|---------------------|---------------------|
| Question No. 93 | Which among the followings is NOT a Chemical type of Rocket Engine? | | | |
| Answer Options | A) Solid Propellant Rocket | B) Liquid Propellant Rocket | C) Arcjet Rocket | D) Hybrid Rocket |
| Right Answer | C | | | |

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|-----------------|---|-----------------------------|-----------------------------|-----------------------------|
| Question No. 94 | A rocket engine missile is flying with its exhaust velocity(V_e)=2 km/s. The flow is fully expanded i.e. exit pressure(p_e) = ambient pressure(p_a). What is the Specific Impulse(I_{sp}), both by per unit mass-flow-rate and per unit weight-flow-rate of the propellant? Acceleration due to gravity is 9.81 m/s ² . Round off answer to the nearest integer. | | | |
| Answer Options | A) 2000 N.s/kg and 204 s | B) 1000 N.s/kg and 102 s | C) 1500 N.s/kg and 153 s | D) 2500 N.s/kg and 255 s |
| Right Answer | A | | | |

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|-----------------|---|--|---|--|
| Question No. 95 | Which of the following statements is NOT TRUE about the Thrust of Rocket Engines? | | | |
| Answer Options | A) Rocket engine can produce thrust in vacuum | B) Rocket engine suffers large thrust loss due to momentum/ram drag | C) Rocket engine thrust is independent of flight speed | D) Rocket engine thrust increases slightly with increase of flight altitude |
| Right Answer | B | | | |

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|-----------------|--|--------------------------|--------------------------|--------------------------|
| Question No. 96 | Match the following thermodynamic processes: 1) Isobaric A) Constant Volume 2) Isentropic B) Constant Temperature 3) Isothermal C) Constant Entropy 4) Isochoric D) Constant Pressure | | | |
| Answer Options | A) 1-D, 2-B, 3-A, 4-C | B) 1-D, 2-C, 3-B, 4-A | C) 1-C, 2-B, 3-A, 4-D | D) 1-B, 2-D, 3-A, 4-C |
| Right Answer | B | | | |

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|-----------------|--|---|---|---|
| Question No. 97 | Arrange the following points of a Stress-Strain curve in the increasing order of strain i.e. from lesser strain to higher strain: Yield Point Proportionate Limit Elastic Limit Ultimate Limit | | | |
| Answer Options | A) Elastic Limit, Yield Point, Proportionate Limit, Ultimate Limit | B) Proportionate Limit, Elastic Limit, Yield Point, Ultimate Limit | C) Yield Point, Elastic Limit, Proportionate Limit, Ultimate Limit | D) Ultimate Limit, Yield Point, Elastic Limit, Proportionate Limit |
| Right Answer | B | | | |

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|-----------------|---|----------------------------|--------------------------------|--|
| Question No. 98 | Continuity Equation is based on principle of which law? | | | |
| Answer Options | A) Conservation of Energy | B) Conservation of Mass | C) Conservation of Momentum | D) Conservation of Angular Momentum |
| Right Answer | B | | | |

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|-----------------|--|--|--|-------------------------|
| Question No. 99 | What among the followings is NOT TRUE about a satellite in Earth's Geo-stationary orbit? | | | |
| Answer Options | A) | B) | C) | D) |
| | It is at an altitude of 36 km approx. | It has a time period of about 24 hours approx. | It is stationary at a fixed point in space | It has a circular orbit |
| Right Answer | C | | | |

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|------------------|--|--|--|--|
| Question No. 100 | In International Standard Atmosphere (ISA), what are the reference values of ambient pressure (P_o) and ambient temperature (T_o) at Sea Level | | | |
| Answer Options | A) | B) | C) | D) |
| | $P_o = 101325 \text{ Pa}$ $T_o = 273.15 \text{ }^\circ\text{K}$ | $P_o = 100325 \text{ Pa}$ $T_o = 273.15 \text{ }^\circ\text{K}$ | $P_o = 101325 \text{ Pa}$ $T_o = 288.15 \text{ }^\circ\text{K}$ | $P_o = 100325 \text{ Pa}$ $T_o = 288.15 \text{ }^\circ\text{K}$ |
| Right Answer | C | | | |