

CII – iPATE 1.0 (2020)

Computer Based PAN India Examination

Category: GRADUATE ENGINEER (ENTRY LEVEL)

Engineering Discipline: AEROSPACE ENGINEERING

Questions & Answers

(Reviewed, Revised & Published dtd. 20.01.2021)

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 shuffled at Candidates' terminal

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)	B)	C)	D)
	55 min	55:38 min	55:54 min	55:46 min
Right Answer	B			

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)	B)	C)	D)
	1/5	15/91	3/91	3/11
Right Answer	B			

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)	B)	C)	D)
	72 days	54 days	96 days	64 days
Right Answer	B			

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)	B)	C)	D)
	Rs. 26.40	Rs. 23.20	Rs. 24.20	Rs. 25.00
Right Answer	A			

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)	B)	C)	D)
	32	43	38	45
Right Answer	B			

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

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)	B)	C)	D)
	I and II only	I and III only	(I and II) or (II and III)	Any two of the three
Right Answer	D			

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)	B)	C)	D)
	Either statement III alone or statements I and II together are sufficient.	Only statement III is sufficient	Only statement I and II are sufficient	Only statement I, II, and III are sufficient
Right Answer	C			

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)	B)	C)	D)
	Sister	Sister - In - Law	Niece	None of The Above
Right Answer	B			

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)	B)	C)	D)
	train	path	wheat	holy
Right Answer	A			

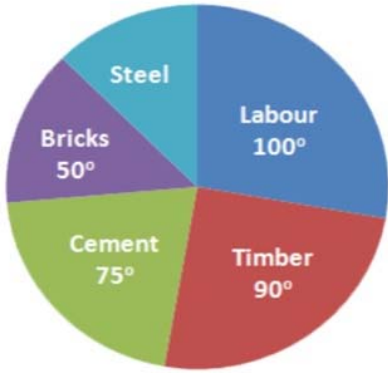
Question No. 11	Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order.			
	A: Only natural dyes are used in Kalamkari and it involves several steps. B: There are two distinctive styles of Kalamkari in India. C: They are the Sri kalahasti style and 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			

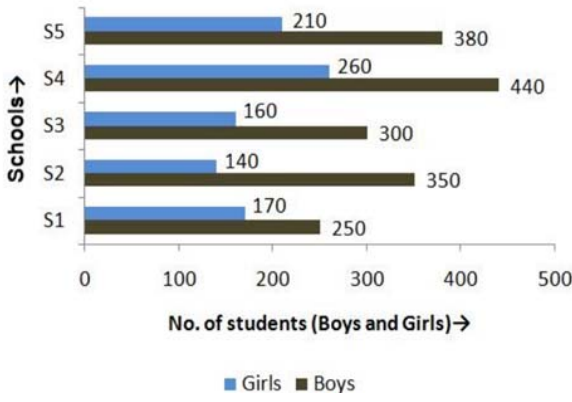
Question No. 12	What is the antonym of MOROSE			
Answer Options	A) overawed	B) agitated	C) cherubic	D) cheerful
Right Answer	D			

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

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			

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			

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			

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	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																																	
	The number of male candidates from Andhra Pradesh and Haryana together is what percent of the total number of female candidates from Bihar?																																	
	<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
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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 '1' mark has been given to all candidates, who attempted or not.																																	

Question No. 19	Read the following information carefully and answer the given question.			
	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.			
	Which of the following person is neither honest nor hard-working but is ambitious?			
Answer Options	A) Shib	B) Pijush	C) Raju	D) Hari
Right Answer	C			


Question No. 20	Read the following information carefully and answer the following question.			
	'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'.			
	If $P \div R + S + Q$, which of the following is true?			
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			

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)
	Control account	Chart of the account	Control limit	Account limit
Right Answer	A			
NOTE	Question was displayed incorrectly at candidates' terminals. Hence '1' mark has been given to all candidates, who attempted or not.			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

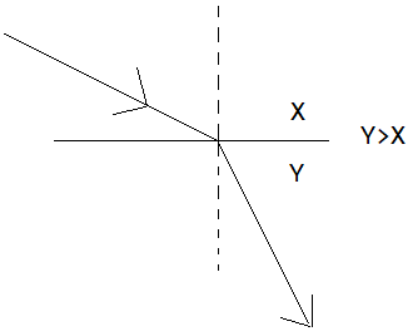
Question No. 39	What is the primary function of the Law of Tort?			
Answer Options	A)	B)	C)	D)
	Punishment of a wrong motivator	Clarification of the human rights of the parties	Compensating the claimant	Spreading of losses throughout the parties
Right Answer	C			

Question No. 40	FIDIC 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			
NOTE	Question was displayed incorrectly at candidates' terminals. Hence '1' mark has been given to all candidates, who attempted or not.			

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			

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			

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			

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 '1' mark has been given to all candidates, who attempted or not.			

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			

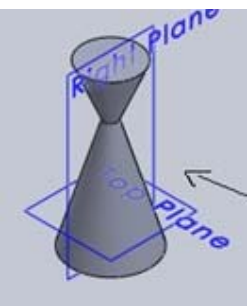

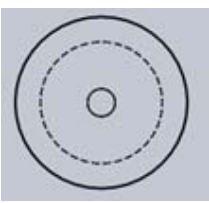
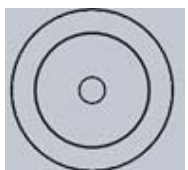
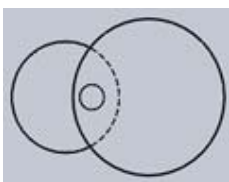
Question No. 46	Which statement is incorrect?			
Answer Options	A)	B)	C)	D)
	All the metals are good conductor of electricity.	All the metals are good conductor of heat	All the metals form positive ions	All the metals form acidic oxides
Right Answer	D			

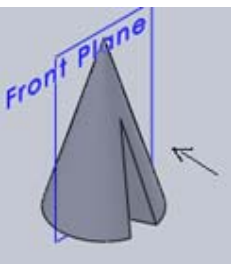
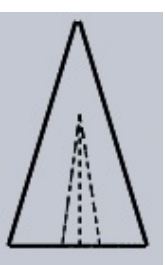
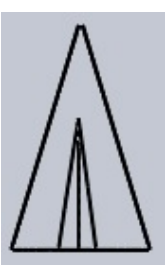

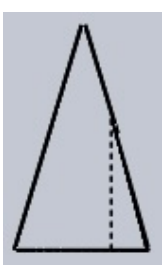
Question No. 47	Based on the first law of thermodynamics, which one of the following is correct?			
Answer Options	A)	B)	C)	D)
	For an isothermal process, $q = +w$	For an isochoric process, $\Delta U = -q$	For an adiabatic process, $\Delta U = -w$	For a cyclic process, $q = -w$
Right Answer	D			

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			

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			

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			

<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>			

<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>			

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			

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			

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			

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			

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			

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			

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			

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			

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_{lp} 3) Damping Derivative C) C_{ha} 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			

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			

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			

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			

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			

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)
	7.7 km/s	9.2 km/s	10.2 km/s	11.2 km/s
Right Answer	A			
NOTE	Question was displayed incorrectly at candidates' terminals. Hence '1' mark has been given to all candidates, who attempted or not.			

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			

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			

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			

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			

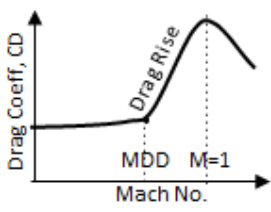
Question No. 72	A simple out-of-plane orbit transfer i.e. change of inclination of the orbital plane without changing size or shape of the orbit, would essentially require			
Answer Options	A)	B)	C)	D)
	Velocity change tangentially in the same direction as initial velocity vector	Velocity change orthogonal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

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			

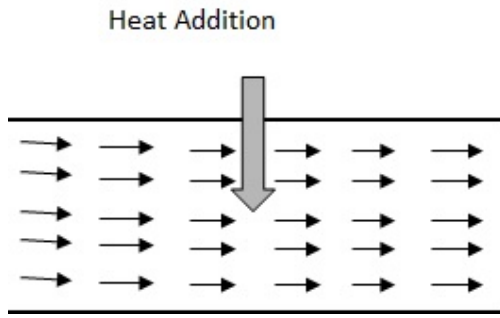
Question No. 74	Thin air foil theory CAN NOT predict			
Answer Options	A)	B)	C)	D)
	Drag	Lift	Moment	Centre of pressure
Right Answer	A			

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			

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 $10 \text{ m}^2/\text{s}$. The density of air is $1 \text{ kg}/\text{m}^3$. 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)	B)	C)	D)
	20 kN	40 kN	10 kN	25 kN
Right Answer	A			

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)	B)	C)	D)
	Taper ratio	Aspect ratio	Dihedral angle	Sweepback angle
Right Answer	D			

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)	B)	C)	D)
	Normal Shock	Oblique Shock	Expansion Fan	Detached bow shock
Right Answer	C			

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

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			

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 $\gamma = 1.4$ for the gas.			
Answer Options	A)	B)	C)	D)
	400 °K	440 °K	480 °K	500 °K
Right Answer	D			


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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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			

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)	B)	C)	D)
	2000 N.s/kg and 204 s	1000 N.s/kg and 102 s	1500 N.s/kg and 153 s	2500 N.s/kg and 255 s
Right Answer	A			

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

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)	B)	C)	D)
	1-D, 2-B, 3-A, 4-C	1-D, 2-C, 3-B, 4-A	1-C, 2-B, 3-A, 4-D	1-B, 2-D, 3-A, 4-C
Right Answer	B			

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)	B)	C)	D)
	Elastic Limit, Yield Point, Proportionate Limit, Ultimate Limit	Proportionate Limit, Elastic Limit, Yield Point, Ultimate Limit	Yield Point, Elastic Limit, Proportionate Limit, Ultimate Limit	Ultimate Limit, Yield Point, Elastic Limit, Proportionate Limit
Right Answer	B			

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

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 36,000 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			
NOTE	Question was displayed incorrectly at candidates' terminals. Hence '1' mark has been given to all candidates, who attempted or not.			

Question No. 100	In International Standard Atmosphere (ISA), what are the reference values of ambient pressure (P_0) and ambient temperature (T_0) at Sea Level			
Answer Options	A)	B)	C)	D)
	$P_0 = 101325 \text{ Pa}$ $T_0 = 273.15 \text{ }^\circ\text{K}$	$P_0 = 100325 \text{ Pa}$ $T_0 = 273.15 \text{ }^\circ\text{K}$	$P_0 = 101325 \text{ Pa}$ $T_0 = 288.15 \text{ }^\circ\text{K}$	$P_0 = 100325 \text{ Pa}$ $T_0 = 288.15 \text{ }^\circ\text{K}$
Right Answer	C			