

# CII – iPATE 2.0 (2021)

Computer Based PAN India Examination

Category: GRADUATE ENGINEER (ENTRY LEVEL)

Engineering Discipline: MECHANICAL ENGINEERING

Questions & Answers

(Published dtd. 19.11.2021)

## Paper Structure

Question Nos.	Sections & Topics		Marks
1 to 20	Section I : Cognitive Abilities	<ul style="list-style-type: none"><li>• Quantitative Aptitude</li><li>• Analytical Reasoning</li><li>• Data Interpretation</li><li>• English Communication</li></ul>	20
21 to 40	Section II : Professional Abilities	<ul style="list-style-type: none"><li>• Project Management</li><li>• Health, Safety &amp; Risk Management</li><li>• Environmental Laws</li><li>• Social Responsibility &amp; Ethics</li><li>• Finance &amp; Accounts</li><li>• Legal, Contracts &amp; Arbitration</li></ul>	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
<b>TOTAL</b>			<b>100</b>

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	Discriminant of a second-degree polynomial with integer coefficients cannot be:			
Answer Options	A)	B)	C)	D)
	43	33	68	25
Right Answer	A			

Question No. 2	How many subsets A of {1, 2, 3, 4, 5, 6, 7, 8, 9, and 10} have the property that no two elements of A sum to 11?			
Answer Options	A)	B)	C)	D)
	1024	512	343	243
Right Answer	C			

Question No. 3	Virus and Aarti started a car journey from Chandigarh to Delhi, which are 288 km apart. Virus took 12 hours more than Aarti to complete the journey. Had Virus travelled at double his actual speed, he would have taken 4 hours less than Aarti to complete the journey. Find the respective speeds (in km/hr) at which Virus and Aarti travelled.			
Answer Options	A)	B)	C)	D)
	14.4 and 9	14.5 and 28.5	9 and 14.4	15 and 20
Right Answer	C			

Question No. 4	The height of a trapezoid whose diagonals are mutually perpendicular is equal to 4. Find the area of the trapezoid if it is known that the length of one of its diagonals is equal to 5.			
Answer Options	A)	B)	C)	D)
	50/3 square units	100/3 square units	16/6 square units	None of these
Right Answer	A			

Question No. 5	A polyhedron has faces that are all either triangles or squares. No two square-faces share an edge, and no two triangular-faces share an edge. What is the ratio of triangular-faces to the number of square-faces?			
Answer Options	A)	B)	C)	D)
	03:04	04:03	01:02	04:05
Right Answer	B			

Question No. 6	Your mind likes reading and it actually has a number of important health affects you can't get in any other way. Reading gives you a unique "pause button" for comprehension. Typically, when you read, you have more time to think. When you watch a film or listen to a tape, you don't press that pause button. Reading requires a great deal of concentration, which calls your intelligence to action. The author of this passage would agree that:			
Answer Options	A)	B)	C)	D)
	Reading is a good way to relax, since it doesn't require that much thinking.	Watching a movie has the same effect on the intelligence as reading.	Reading develops your intelligence.	Both A and C
Right Answer	C			

Question No. 7	Read the following information carefully and answer the question given below. P stands 5m west of R. T stands 5m south of Q. T stands 6m east of U. V stands 2m west of Q. A stands 2m south of U. V stands 3m north of R. If G stands 7m east of P, then in which direction does G stands with respect to T?			
Answer Options	A)	B)	C)	D)
	West	East	South	North
Right Answer	D			

Question No. 8	The French Revolution began in 1789 and ended in the late 1790s with the ascent of Napoleon Bonaparte. During this period, French citizens razed and redesigned their country's political landscape, uprooting centuries-old institutions such as absolute monarchy and the feudal system. Like the American Revolution before it, the French Revolution was influenced by Enlightenment ideals, particularly the concepts of popular sovereignty and inalienable rights. From this passage it can be concluded that:			
Answer Options	A)	B)	C)	D)
	The French revolution began before the Russian Revolution.	In the French Revolution their monarch was killed.	The American Revolution happened before the French Revolution.	Napoleon initiated the French Revolution.
Right Answer	C			

Question No. 9	A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting?			
Answer Options	A)	B)	C)	D)
	Between B and C	Between E and D	Between B and D	Between C and E
Right Answer	A			

Question No. 10	A, P, R, X, S and Z are sitting in a row. S and Z are in the centre. A and P are at the ends. R is sitting to the left of A. Who is to the right of P?			
Answer Options	A)	B)	C)	D)
	X	Z	S	A
Right Answer	A			

Question No. 11	In the following question choose the word which is the exact OPPOSITE of the given word. STRINGENT			
Answer Options	A)	B)	C)	D)
	Magnanimous	Vehement	General	Lenient
Right Answer	D			

Question No. 12	Some proverbs/idioms are given below together with their meanings. Choose the correct meaning of proverb/idiom. To catch a tartar			
Answer Options	A)	B)	C)	D)
	To trap wanted criminal with great difficulty	To catch a dangerous person	To meet with disaster	To deal with a person who is more than one's match
Right Answer	B			

Question No. 13	Which of the phrases A), B), C) and D) given below each sentence should replace the word/phrase printed in bold in the sentence to make it grammatically correct? If the sentence is correct as it is given and no correction is required, mark (E) as the answer. <b>Since the girl did not want to be disturbed while studying, she left the phone off hooks.</b>			
Answer Options	A)	B)	C)	D)
	of hook	for the hook	off hooking	off the hook
Right Answer	D			

Question No. 14	In the following question choose the word which is the exact OPPOSITE of the given word. FICKLE			
Answer Options	A)	B)	C)	D)
	Courageous	Sincere	Steadfast	Humble
Right Answer	C			

Question No. 15	<p>In question below, the passage consists of six sentences. The first and sixth sentence are given in the correct places. The middle four sentences in each have been removed and jumbled up. These are labelled as P, Q, R and S. Find out the proper order for the four sentences.</p> <p><b>S1:</b> In the middle of one side of the square sits the Chairman of the committee, the most important person in the room.</p> <p><b>P:</b> For a committee is not just a mere collection of individuals.</p> <p><b>Q:</b> On him rests much of the responsibility for the success or failure of the committee.</p> <p><b>R:</b> While this is happening, we have an opportunity to get the 'feel' of this committee.</p> <p><b>S:</b> As the meeting opens, he runs briskly through a number of formalities.</p> <p><b>S6:</b> From the moment its members meet, it begins to have a sort nebulous life of its own.</p> <p>The Proper sequence should be:</p>			
Answer Options	A)	B)	C)	D)
	RSQP	QSRP	SQPR	PQRS
Right Answer	B			

Question  
No. 16

**Question nos. 16 to 20:**

Following bar chart represents the number of people in 6 different villages (A, B, C, D, E and F) and the tabular column depicts the ratio of literate to illiterate people and percentage of male living in those villages.



If 40% of the female from village B is literate, then what is the percentage of male, who is illiterate from village B?

Answer  
Options

A)	B)	C)	D)
38%	35%	37%	cannot be determined

Right  
Answer

C

Question  
No. 17

What is the percentage of literate people in all the six villages together?

Answer  
Options

A)	B)	C)	D)
55%	53%	51%	cannot be determined

Right  
Answer

B

Question  
No. 18

What is the ratio between numbers of illiterate people from villages B, C & D to number of females from villages A, E & F?

Answer  
Options

A)	B)	C)	D)
320:527	527:330	330:527	527:320

Right  
Answer

C

Question  
No. 19

If 3% of female from village D & 5% of female from village E are literate then what is the total number of literate males from D & F together?

Answer  
Options

A)	B)	C)	D)
1823	1723	1623	cannot be determined

Right  
Answer

D

Question  
No. 20

The number of females from villages A & C is how much percentage more or less than number of females from villages D & F?

Answer  
Options

A)	B)	C)	D)
25.72%	25.76%	24.76%	24.72%

Right  
Answer

C

Question No. 21	A project plan results in a project schedule seems to be too long. If the project network diagram cannot change but extra personnel resources is available, what is the best thing to do?			
Answer Options	A)	B)	C)	D)
	Fast track the project	Level the resources	Crash the project	Any other option
Right Answer	C			

Question No. 22	Which of the following is not Project Management's goal			
Answer Options	A)	B)	C)	D)
	Keeping overall cost within the budget	Delivering the project/goods to the client at agreed time	Maintaining a satisfactory and well-functioning development	Avoiding customer/client complaints
Right Answer	D			

Question No. 23	You have recently been named as Project Manager of a new project under a Contract. The Project Management Unit (PMU) gave you the contract signed by the Customer and a Statement of Work and asked you to go on with initiation. Which document should you develop next?			
Answer Options	A)	B)	C)	D)
	Project Manager Plan	Milestone Schedule	Project Charter	Scope Statement
Right Answer	C			

Question No. 24	The analysis tool for a quality problem that involves selecting the problem, identifying major categories of potential causes and associating likely specific causes is			
Answer Options	A)	B)	C)	D)
	Pareto chart	Fishbone diagram	Scatter diagram	Check list
Right Answer	B			

Question No. 25	The Occupational Safety & Health Administration requires employers to have Hearing Conservation Plans if the average 8-hour noise exposure is more than			
Answer Options	A)	B)	C)	D)
	1000 dB	500 dB	105 dB	85 dB
Right Answer	D			

Question No. 26	Ammonia becomes an immediate danger to your life and health when it is present at the following level or greater			
Answer Options	A)	B)	C)	D)
	10 ppm	30 ppm	300 ppm	1000 ppm
Right Answer	C			

Question No. 27	Exposure to high levels of noise can lead to which of the following:			
Answer Options	A)	B)	C)	D)
	High blood pressure	Gastrointestinal problems	Chronic fatigue	All of the above
Right Answer	D			

Question No. 28	Which type of fire extinguishing system is most commonly used to protect areas containing valuable equipment such as data processing rooms, telecommunications switches, and process control rooms?			
Answer Options	A)	B)	C)	D)
	Fixed extinguishing systems	Portable extinguishing systems	Hose extinguishing systems	It's up to the discretion the employer
Right Answer	A			

Question No. 29	If you need to wear glasses with your eye or face protection, which of the following options is acceptable			
Answer Options	A)	B)	C)	D)
	Wearing prescription spectacles with side shields and protective lenses that meet safety requirements and also correct your vision	Wearing goggles that fit comfortably over your glasses	Wearing goggles that have corrective lenses mounted behind the protective lenses	All of the above
Right Answer	D			

Question No. 30	Under which Section of Environment Pollution Act, the CPCB can issue the directions directly to industries			
Answer Options	A)	B)	C)	D)
	Section 16	Section 18	Section 11	Section 5
Right Answer	D			

Question No. 31	Which of these divisions of Pollution Control Implementation deals with Air Polluting Industries			
Answer Options	A)	B)	C)	D)
	PCI - I	PCI - II	PCI - III	SSI & Law
Right Answer	B			

Question No. 32	The Kyoto Protocol is an international treaty which extends the United Nations Framework Convention on Climate Change (UNFCCC). In which year the convention held?			
Answer Options	A)	B)	C)	D)
	1987	1995	1992	1997
Right Answer	C			

Question No. 33	What is the harm from manipulation of Earth's Ozone layer?			
Answer Options	A) The average temperature of Earth's surface will increase gradually	B) The Oxygen content of the atmosphere will decrease	C) Increased amount of Ultraviolet radiation will reach earth's surface	D) Sea level will rise as the polar ice caps will gradually melt
Right Answer	C			

Question No. 34	Which of the following would not represent the cash outflows for the business?			
Answer Options	A) Purchase of building for cash	B) The sale of land for cash	C) Retirement of long-term debt	D) The payment of cash for dividends
Right Answer	B			

Question No. 35	Which one of the following tangible fixed assets would not normally be depreciated?			
Answer Options	A) Buildings	B) Machinery	C) Land	D) Equipment
Right Answer	C			

Question No. 36	A Profit is earned if?			
Answer Options	A) Assets exceed Expenditure	B) Income exceeds Expenditure	C) Cash Inflow exceeds Cash Outflow	D) Income exceeds Liabilities
Right Answer	B			

Question No. 37	Which of the following budgets is normally prepared first?			
Answer Options	A) Cash budget	B) Sales budget	C) Merchandise purchases budget	D) Selling expense budget
Right Answer	B			

Question No. 38	What is the correct sequence in the formation of a contract?			
Answer Options	A) Offer, acceptance, agreement, consideration.	B) Agreement, consideration, offer, acceptance.	C) Offer, agreement, consideration, acceptance.	D) Offer, acceptance, consideration, agreement.
Right Answer	D			



Question No. 39	Which of the following answers is most accurate description of arbitration?			
Answer Options	A)	B)	C)	D)
	An informal meeting between the parties involving a discussion to sort out the dispute	An adjudicative process where the parties submit their disputes for a binding decision to an impartial tribunal	A meeting between the parties where an impartial third party gives decision	An impartial umpire selected to decide after hearing the dispute from parties
Right Answer	B			

Question No. 40	Which of the following answers is not type of alternative dispute resolution?			
Answer Options	A)	B)	C)	D)
	Arbitration	Court proceedings	Conciliation	Mediation
Right Answer	B			

Question No. 41	The equation of state for n moles of an ideal gas is $PV = nRT$ , where R is the universal gas constant and all other quantities have their usual meanings. What are the dimensions of R?			
Answer Options	A)	B)	C)	D)
	$M^0L^{-2}K^{-1}mol^{-1}$	$M^0L^2T^{-2}K^{-1}mol^{-1}$	$ML^2T^{-2}K^{-1}mol^{-1}$	$ML^{-2}T^{-2}K^{-1}mol^{-1}$
Right Answer	C			

Question No. 42	A cylindrical tube open at both ends has fundamental frequency n. If one of the ends is closed, the fundamental frequency will become			
Answer Options	A)	B)	C)	D)
	$n/2$	$2n$	$4n$	$n$
Right Answer	A			

Question No. 43	The speed of sound in a gas is V and the root mean square speed of the gas molecules is $V_{rms}$ . If the ratio of the specific heats of the gas is 1.5, then the ratio of V: $V_{rms}$ will be			
Answer Options	A)	B)	C)	D)
	1:2	1:3	$1:\sqrt{2}$	$1:\sqrt{3}$
Right Answer	C			

Question No. 44	Which of the following phenomena gives evidence of the molecular structure of the matter?			
Answer Options	A)	B)	C)	D)
	Brownian motion	Diffusion	Evaporation	All of these
Right Answer	D			

Question No. 45	Starting with the same initial conditions, an ideal gas expands from volume $V_1$ to $V_2$ in three different ways. The work done by the gas is $W_1$ if the process is purely isobaric, $W_2$ if the process is purely isochoric and $W_3$ if the process is purely adiabatic. Then			
Answer Options	A) $W_1 > W_2 > W_3$	B) $W_2 > W_1 > W_3$	C) $W_1 > W_3 > W_2$	D) $W_3 > W_1 > W_2$
Right Answer	A			

Question No. 46	A vessel contains a mixture of 1 mole of oxygen and two moles of nitrogen at 300K. The ratio of the rotational kinetic energy per $O_2$ molecule to that per $N_2$ molecule is			
Answer Options	A) 1:1	B) 1:2	C) 2:1	D) Depends on the moment of inertia of the two molecules
Right Answer	A			

Question No. 47	In a test experiment on a model aeroplane in a wind tunnel, the flow speeds on the lower and upper surfaces of the wing are $v$ and $\sqrt{2}v$ respectively. If the density of air is $\rho$ and the surface area of the wing is $A$ , the dynamic lift on the wing is given by			
Answer Options	A) $(\rho v^2 A)/\sqrt{2}$	B) $(\rho v^2 A)/2$	C) $2\rho v^2 A$	D) $\sqrt{2}\rho v^2 A$
Right Answer	B			

Question No. 48	A boy whirls a stone in a horizontal circle 2m above the ground by means of a string 1.25m long. The string breaks and the stone flies off horizontally, striking the ground 10m away. What is the magnitude of the centripetal acceleration during circular motion? (Take $g=10\text{m/s}^2$ )			
Answer Options	A) $400\text{m/s}^2$	B) $300\text{m/s}^2$	C) $200\text{m/s}^2$	D) $100\text{m/s}^2$
Right Answer	C			

Question No. 49	Radium (with Atomic no. = 87, Mass No. = 221) undergoes radioactive decay with a half-life of 4 days. The probability that a Ra nucleus will disintegrate in 8 days is			
Answer Options	A) 1/4	B) 3/4	C) 1/2	D) 1
Right Answer	B			

Question No. 50	A tunnel is dug along the diameter of the earth. An object is held in the tunnel at a distance $x$ from the centre of the earth. The magnitude of the gravitational force on the object is proportional to			
Answer Options	A) $1/x$	B) $1/x^2$	C) $x$	D) $x^2$
Right Answer	C			

Question No. 51	What are the dimensions of kinematic viscosity of a fluid?			
Answer Options	A)	B)	C)	D)
	$L^2T^{-2}$	$TL^{-2}$	$L^1T^{-2}$	$L^2T^{-1}$
Right Answer	D			

Question No. 52	The Poisson's ratio for a perfectly incompressible linear elastic material is			
Answer Options	A)	B)	C)	D)
	0	1	0.5	infinity
Right Answer	C			

Question No. 53	If the surface tension of water-air interface is 0.075 N/m, the gauge pressure inside a rain drop of 1 mm diameter will be _____ N/m <sup>2</sup>			
Answer Options	A)	B)	C)	D)
	100	300	150	200
Right Answer	B			

Question No. 54	Duralumin contains			
Answer Options	A)	B)	C)	D)
	3.5% to 4.5% copper, 0.4% to 0.7% magnesium, 0.4% to 0.7% manganese and rest aluminium	3.5% to 4.5% copper, 1.2% to 1.7% manganese, 1.8% to 2.3% nickel, 0.6% each of silicon, magnesium and iron, and rest aluminium	4% to 4.5% magnesium, 3% to 4% copper and rest aluminium	5% to 6% tin, 2% to 3% copper and rest aluminium
Right Answer	A			

Question No. 55	A heat pump absorbs 15kW of heat from outside environment at 250 K while absorbing 30kW of work. It delivers the heat to a room that must be kept warm at 300K. The Coefficient of Performance (COP) of the heat pump is _____.			
Answer Options	A)	B)	C)	D)
	1.5	1.8	1.2	1.6
Right Answer	A			

Question No. 56	Which one of the following is NOT a rotating machine?			
Answer Options	A)	B)	C)	D)
	Gear pump	Centrifugal pump	Vane Pump	Jet pump
Right Answer	D			

Question No. 57	Which of the following assumptions are made for deriving Bernoulli's equation? 1. Flow is steady and incompressible, 2. Flow is unsteady and compressible, 3. Effect of friction is neglected and flow is along a stream line, 4. Effect of friction is taken into consideration and flow is along a stream line.  Select the correct answer using the codes given below:			
Answer Options	A) 1 & 3	B) 2 & 4	C) 1, 2 & 3	D) 1, 2 & 4
Right Answer	A			

Question No. 58	Flow takes place and Reynolds Number of 1600 in two different pipes with relative roughness of 0.001 and 0.002. The friction factor			
Answer Options	A) Will be the same in both the pipes.	B) Will be higher in the case of pipe with relative roughness of 0.001.	C) In the two pipes cannot be compared on the basis of data given	D) Will be higher in the case of pipe having relative roughness of 0.002.
Right Answer	A			

Question No. 59	Saturated steam at 100°C condenses on the outside of a tube. Cold fluid enters the tube at 30°C and exists at 65°C. The value of the Log Mean Temperature Difference (LMTD) is _____°C.			
Answer Options	A) 25.25	B) 51.32	C) 100.98	D) 50.49
Right Answer	D			

Question No. 60	In the case of a centrifugal pump, cavitation will occur if			
Answer Options	A) It operates above the minimum net positive suction head	B) The pressure at the inlet of the pump is equal to the atmospheric pressure	C) It operates below the minimum net positive suction head	D) The pressure at the inlet of the pump is above the atmospheric pressure
Right Answer	C			

Question No. 61	In a steam turbine with steam flow rate of 1 kg/s, inlet velocity of steam of 100 m/s, exit velocity of steam of 150 m/s, enthalpy at inlet of 2800 kJ/kg, enthalpy at outlet of 1600 kJ/kg, the power available from the turbine will be nearly			
Answer Options	A) 1481.6 kW	B) 1193.8 kW	C) 1575.5 kW	D) 1685.3 kW
Right Answer	B			

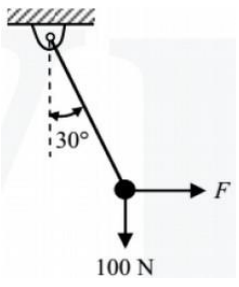
Question No. 62	In centrifugal compressors, there exists a loss of energy due to the mismatch of direction of relative velocity of fluid at inlet with inlet blade angle. This loss is known as			
Answer Options	A) Frictional loss	B) Clearance loss	C) Incedence loss	D) Leakage loss
Right Answer	C			

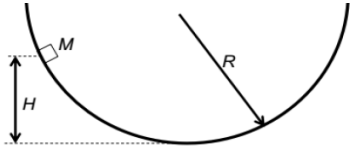
Question No. 63	In order to substantially reduce leakage of heat from atmosphere into cold refrigerant flowing in small diameter copper tubes in a refrigerant system, the radial thickness of insulation, cylindrically wrapped around the tubes, must be:			
Answer Options	A)	B)	C)	D)
	Slightly higher than critical radius of insulation	Equal to the critical radius of insulation	Slightly lower than critical radius of insulation	Considerably higher than critical radius of insulation
Right Answer	D			

Question No. 64	Which one of the following modes of heat transfer would take place predominantly, from boiler furnace to water wall?			
Answer Options	A)	B)	C)	D)
	Conduction	Convection	Conduction and convection	Radiation
Right Answer	D			

Question No. 65	Air can be best heated by steam in a heat exchanger of			
Answer Options	A)	B)	C)	D)
	Double pipe type with fins on air side	Plate type	Double pipe type with fins on steam side	Shell and tube type
Right Answer	A			

Question No. 66	The theory of failure used in designing the ductile materials in a most accurate way is by (1) maximum principal stress theory, (2) distortion energy theory, (3) maximum strain theory			
Answer Options	A)	B)	C)	D)
	1	2	3	1, 2 & 3
Right Answer	B			

Question No. 67	A rigid ball of weight 100 N is suspended with the help of a string. The ball is pulled by a horizontal force $F$ such that the string makes an angle of $30^\circ$ with the vertical. The magnitude of force $F$ (in N) is			
				
Answer Options	A)	B)	C)	D)
	75.37N	57.73N	115.46N	63.37N
Right Answer	B			

Question No. 68	A point mass $M$ is released from rest and slides down a spherical bowl (of radius $R$ ) from a height $H$ as shown in the figure below. The surface of the bowl is smooth (no friction). The velocity of the mass at the bottom of the bowl is			
				
Answer Options	A) $\sqrt{2gR}$	B) $\sqrt{gH}$	C) $\sqrt{gR}$	D) $\sqrt{2gH}$
Right Answer	D			

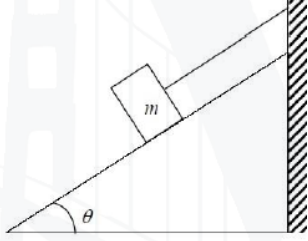
Question No. 69	If the temperature of a solid-state changes from $27^\circ\text{C}$ to $627^\circ\text{C}$ , then emissive power changes which rate			
Answer Options	A) 1:9	B) 1:27	C) 1:81	D) 1:3
Right Answer	C			

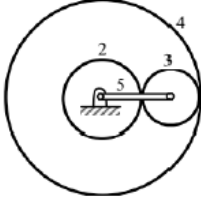
Question No. 70	What is the value of the radius of gyration of disc type flywheel as compared to rim type flywheel for the same diameter?			
Answer Options	A) 2 times	B) $1/\sqrt{2}$ times	C) 4 times	D) $1/2$ times
Right Answer	B			

Question No. 71	Under optimal conditions of the process the temperatures experienced by a copper work piece in fusion welding, brazing and soldering are represented by			
Answer Options	A) $T_{\text{brazing}} > T_{\text{welding}} > T_{\text{soldering}}$	B) $T_{\text{soldering}} > T_{\text{welding}} > T_{\text{brazing}}$	C) $T_{\text{brazing}} > T_{\text{soldering}} > T_{\text{welding}}$	D) $T_{\text{welding}} > T_{\text{brazing}} > T_{\text{soldering}}$
Right Answer	D			

Question No. 72	Ring rolling is used:			
Answer Options	A) To produce a seamless tube	B) To decrease the thickness and increase diameter	C) To produce large cylinder	D) To increase the thickness of a ring
Right Answer	B			

Question No. 73	In drop forging, forging is done by dropping			
Answer Options	A) The hammer at high velocity.	B) The work piece at high velocity	C) A weight on hammer to produce the requisite impact	D) The die with hammer at high velocity
Right Answer	D			

Question No. 74	<p>A block of mass "m" rests on an inclined plane and is attached by a string to the wall as shown in the figure. The coefficient of static friction between the plane and the block is 0.25. The string can withstand a maximum force of 20 N. The maximum value of the mass (m) for which the string will not break and the block will be in static equilibrium is----- kg. (Take <math>\cos\theta = 0.8</math> and <math>\sin\theta = 0.6</math>. Acceleration due to gravity <math>g = 10 \text{ m/s}^2</math>)</p>			
				
Answer Options	A) 10	B) 5	C) 8	D) 7
Right Answer	B			

Question No. 75	<p>In the gear train shown, gear 3 is carried on arm 5. Gear 3 meshes with gear 2 and gear 4. The number of teeth on gear 2, 3, and 4 are 60, 20, and 100, respectively. If gear 2 is fixed and gear 4 rotates with an angular velocity of 100 rpm in the counterclockwise direction, the angular speed of arm 5 (in rpm) is</p>			
				
Answer Options	A) 166.7 counterclockwise	B) 62.5 counterclockwise	C) 166.7 clockwise	D) 62.5 clockwise
Right Answer	B			

Question No. 76	Sensitiveness of a governor is defined as the ratio of the			
Answer Options	A) maximum equilibrium speed to the minimum equilibrium speed	B) difference between maximum and minimum equilibrium speeds to the maximum equilibrium speed	C) minimum difference in speeds to the minimum equilibrium speed	D) difference between maximum and minimum equilibrium speeds to the mean equilibrium speed
Right Answer	D			

Question No. 77	<p>A 1.5 kW motor is running at 1440 rev/min. It is to be connected to a stirrer running at 36 rev /min. The gearing arrangement suitable for this application is</p>			
Answer Options	A) Differential gear	B) Helical gear	C) Spur gear	D) Worm gear
Right Answer	D			

Question No. 78	Identify the process for which the two integrals " $\int p dv$ " and " $-\int v dp$ " evaluated between any two given states produce the same value			
Answer Options	A) isentropic	B) isothermal	C) isenthalpic	D) polytropic
Right Answer	B			

Question No. 79	If the annular wheel of an epicyclic gear train has 100 teeth and the planet wheel has 20 teeth, the number of teeth on the sun wheel is			
Answer Options	A) 20	B) 40	C) 60	D) 80
Right Answer	C			

Question No. 80	If $\sigma_1$ and $\sigma_3$ are the algebraically largest and smallest principal stresses respectively, the value of the maximum shear stress is			
Answer Options	A) $0.5 (\sigma_1 + \sigma_3)$	B) $0.5 (\sigma_1 - \sigma_3)$	C) $0.5 (\sigma_1 \sigma_3)$	D) None of these
Right Answer	D			

Question No. 81	Dryness fraction of steam is the mass ratio of			
Answer Options	A) wet steam to dry steam	B) dry steam to total steam	C) water particles to total steam	D) dry steam to water particles in steam
Right Answer	B			

Question No. 82	Match the following: P. Feeler gauge Q. Fillet gauge R. Snap gauge S. Cylindrical plug gauge I. Radius of an object II. Diameter within limits by comparison III. Clearance or gap between components IV. Inside diameter of straight hole			
Answer Options	A) P-III, Q-I, R-II, S-IV	B) P-III, Q-II, R-I, S-IV	C) P-IV, Q-II, R-I, S-III	D) P-IV, Q-I, R-II, S-III
Right Answer	A			

Question No. 83	Which of the following statement is correct as regard to the difference between a machine and a structure?			
Answer Options	A) The parts of a machine move relative to one another, whereas the members of a structure do not move relative to one another	B) The links of a machine may transmit both power and motion, whereas the members of a structure transmit forces only	C) A machine transforms the available energy into some useful work, whereas in a structure no energy is transformed into useful work	D) All of the above
Right Answer	D			



Question No. 84	The percentage of carbon in low carbon steel is			
Answer Options	A)	B)	C)	D)
	0.0005	0.0015	0.003	0.005
Right Answer	B			

Question No. 85	The elastic stress strain behaviour of rubber is			
Answer Options	A)	B)	C)	D)
	Linear	Nonlinear	Plastic	No fixed relationship
Right Answer	B			

Question No. 86	Moment of inertia of a hollow circular section, as shown in the below figure about X-axis, is			
Answer Options	A)	B)	C)	D)
	$\pi/16 (D^2 - d^2)$	$\pi/16 (D^3 - d^3)$	$\pi/32 (D^4 - d^4)$	$\pi/64 (D^4 - d^4)$
Right Answer	D			

Question No. 87	A flow in which the quantity of liquid flowing per second is constant, is called _____ flow.			
Answer Options	A)	B)	C)	D)
	Steady	Streamline	Turbulent	Unsteady
Right Answer	A			

Question No. 88	The coefficient of friction between the belt and pulley depends upon the			
Answer Options	A)	B)	C)	D)
	Material of belt and pulley	Slip of belt	Speed of belt	All of these
Right Answer	D			

Question No. 89	The condition that causes vapour locking in a brake system is			
Answer Options	A)	B)	C)	D)
	Overheating of the fluid due to frequent brake application	Overcooling of the brakes during high speed driving	Keeping the vehicle without use for an extended period	An excessively high engine speed on a downhill road
Right Answer	A			

Question No. 90	In sheet metal work, the cutting force on the tool can be reduced by			
Answer Options	A)	B)	C)	D)
	Grinding the cutting edges sharp	Increasing the hardness of tool	Providing shear on tool	Increasing the hardness of die
Right Answer	A			

Question No. 91	The following element can't impart high strength at elevated temperature			
Answer Options	A)	B)	C)	D)
	Manganese	Magnesium	Nickel	Silicon
Right Answer	B			

Question No. 92	EDM machining is applied for			
Answer Options	A)	B)	C)	D)
	Shaping carbide dies and punches having complicated profiles	Making large number of small holes in sieves and fuel nozzles	Embossing and engraving on harder materials	All of these
Right Answer	D			

Question No. 93	The cutting speed for drilling aluminium, brass and bronze with high speed steel drills varies from			
Answer Options	A)	B)	C)	D)
	10 to 20 m/min	18 to 30 m/min	24 to 45 m/min	60 to 90 m/min
Right Answer	D			

Question No. 94	Surface grinding is done to produce			
Answer Options	A)	B)	C)	D)
	Tapered surface	Flat surface	Internal cylindrical holes	All of these
Right Answer	B			

Question No. 95	Tool life is measured by the			
Answer Options	A)	B)	C)	D)
	Number of pieces machined between tool sharpenings	Time the tool is in contact with the job	Volume of material removed between tool sharpenings	All of the above
Right Answer	D			

Question No. 96	Discontinuous chips are formed during machining of			
Answer Options	A)	B)	C)	D)
	Brittle metals	Ductile metals	Hard metals	Soft metals
Right Answer	A			

Question No. 97	The expression $Q = \rho AT^4$ is called			
Answer Options	A)	B)	C)	D)
	Fourier equation	Stefan-Boltzmann equation	Newton Reichmann equation	Joseph-Stefan equation
Right Answer	B			

Question No. 98	The highest thermal diffusivity is of			
Answer Options	A)	B)	C)	D)
	Iron	Lead	Concrete	Wood
Right Answer	B			

Question No. 99	A power plant giving least running cost of production of electrical power is			
Answer Options	A)	B)	C)	D)
	Steam power plant	Gas turbine power plant	Hydro-electric power plant	Nuclear power plant
Right Answer	D			

Question No. 100	Fast breeder reactor uses			
Answer Options	A)	B)	C)	D)
	Boiler	Direct cycle of coolant system	Double circuit system of coolant cycle	Multi passes system
Right Answer	C			