

CII – iPATE 2.0 (2021)

Computer Based PAN India Examination

Category: GRADUATE ENGINEER (ENTRY LEVEL)

Engineering Discipline: METALLURGICAL ENGINEERING

Questions & Answers

(Reviewed, Revised & Published dtd. 26.11.2021)

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	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	Viru and Aarti started a car journey from Chandigarh to Delhi, which are 288 km apart. Viru took 12 hours more than Aarti to complete the journey. Had Viru 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 Viru 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	D			

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. Since the girl did not want to be disturbed while studying, she left the phone off hooks.			
Answer Options	A)	B)	C)	D)
	of hook	for the hook	off hooking	off the hook
Right Answer	D			

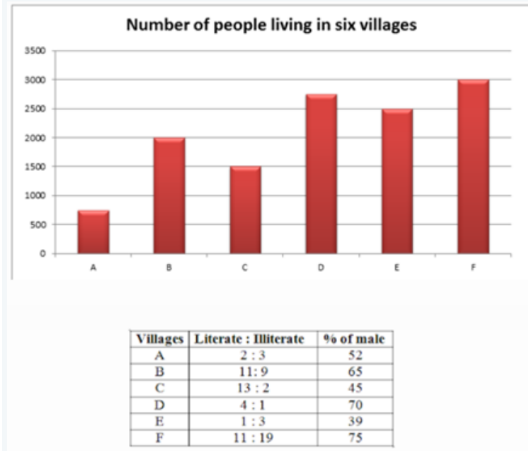
Question No. 14	In the following question choose the word which is the exact OPPOSITE of the given word. FICKLE			
Answer Options	A)	B)	C)	D)
	Courageous	Sincere	Steadfast	Humble
Right Answer	C			

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>S1: In the middle of one side of the square sits the Chairman of the committee, the most important person in the room.</p> <p>P: For a committee is not just a mere collection of individuals.</p> <p>Q: On him rests much of the responsibility for the success or failure of the committee.</p> <p>R: While this is happening, we have an opportunity to get the 'feel' of this committee.</p> <p>S: As the meeting opens, he runs briskly through a number of formalities.</p> <p>S6: 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) 38%	B) 35%	C) 37%	D) 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) 55%	B) 53%	C) 51%	D) 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) 320:527	B) 527:330	C) 330:527	D) 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) 1823	B) 1723	C) 1623	D) 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) 25.72%	B) 25.76%	C) 24.76%	D) 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)	B)	C)	D)
	The average temperature of Earth's surface will increase gradually	The Oxygen content of the atmosphere will decrease	Increased amount of Ultraviolet radiation will reach earth's surface	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)	B)	C)	D)
	Purchase of building for cash	The sale of land for cash	Retirement of long-term debt	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)	B)	C)	D)
	Buildings	Machinery	Land	Equipment
Right Answer	C			

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

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

Question No. 38	What is the correct sequence in the formation of a contract?			
Answer Options	A)	B)	C)	D)
	Offer, acceptance, agreement, consideration.	Agreement, consideration, offer, acceptance.	Offer, agreement, consideration, acceptance.	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)
	$M^0L^2T^{-2}K^{-1}mol^{-1}$	$M^0L^2T^{-2}K^{-1}mol^{-1}$	$ML^2T^{-2}K^{-1}mol^{-1}$	$ML^{-2}T^{-2}K^{-1}mol^{-1}$
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)	B)	C)	D)
	$W_1 > W_2 > W_3$	$W_2 > W_1 > W_3$	$W_1 > W_3 > W_2$	$W_3 > W_1 > W_2$
Right Answer	C			

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)	B)	C)	D)
	1:1	1:2	2:1	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 ρ and the surface area of the wing is A , the dynamic lift on the wing is given by			
Answer Options	A)	B)	C)	D)
	$(\rho v^2 A)/\sqrt{2}$	$(\rho v^2 A)/2$	$2\rho v^2 A$	$\sqrt{2}\rho v^2 A$
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)	B)	C)	D)
	400m/s^2	300m/s^2	200m/s^2	100m/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)	B)	C)	D)
	1/4	3/4	1/2	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)	B)	C)	D)
	$1/x$	$1/x^2$	x	x^2
Right Answer	C			

Question No. 51	The basic input materials for LD / BOF steel making process are:			
Answer Options	A)	B)	C)	D)
	Blast furnace hot metal	Blast furnace hot metal, scrap, Direct Reduced Iron (DRI)	Blast furnace hot metal, scrap, Direct Reduced Iron (DRI), iron ore, calcined lime and calcined dolomite	None of these
Right Answer	C			

Question No. 52	What is the source of energy in LD / BOF steel making process?			
Answer Options	A)	B)	C)	D)
	Through supply of electrical energy	Through blowing / lancing of high purity oxygen and the subsequent exothermic reactions due to oxidation of elements in hot metal	Through solid fuel	Both A & C
Right Answer	B			

Question No. 53	In view of the present-day demand for extra low sulphur steel, particularly for flat products (e.g. deep drawing and extra deep drawing grades) what measures are being taken by the steel makers?			
Answer Options	A)	B)	C)	D)
	External de-sulphurisation of blast furnace hot metal	De-sulphurisation inside LD/ BOF only	De-sulphurisation in Ladle Furnace by addition of synthetic slag	Both A & C
Right Answer	D			

Question No. 54	What are the slag forming materials (fluxes), used in LD/ BOF			
Answer Options	A)	B)	C)	D)
	Only calcined lime	Only calcined dolomite	Calcined lime and calcined dolomite	None of these
Right Answer	C			

Question No. 55	What is the normal basicity of LD/ BOF slag, i.e. CaO / SiO ₂ ratio, before tapping:			
Answer Options	A)	B)	C)	D)
	1.6 to 2.0	2.0 to 2.2	2.8 to 3.2	4.0 to 5.0
Right Answer	C			

Question No. 56	De-oxidizers are added in the blown metal:			
Answer Options	A)	B)	C)	D)
	In the BOF itself before tapping	In the ladle during tapping and finally in ladle furnace	Before casting	After casting
Right Answer	B			

Question No. 57	Blown metal in LD/ Basic Oxygen Furnace (BOF) is tapped at a range of tapping temperature:			
Answer Options	A)	B)	C)	D)
	1800°C to 1850°C	1520°C to 1550°C	1620°C to 1660°C	1700°C to 1750°C
Right Answer	C			

Question No. 58	Conditions of de-phosphorization in BOF steel making:			
Answer Options	A)	B)	C)	D)
	Basic slag	Basic, thin and oxidizing slag	Reducing slag	Acidic slag
Right Answer	B			

Question No. 59	Calcined dolomite is primarily added as a flux during LD/ BOF steelmaking:			
Answer Options	A)	B)	C)	D)
	To increase the slag basicity	To reduce the quantity of slag	To help protect the lining and to improve the lining life	To reduce the slag basicity
Right Answer	C			

Question No. 60	In Basic Oxygen Furnace, under appropriate conditions, which of the following statement(s) is (are) "incorrect / wrong"?			
Answer Options	A)	B)	C)	D)
	Carbon can be removed in preference to Phosphorous and Sulphur	Phosphorous can be removed in preference to Carbon and Sulphur	Sulphur can be removed in preference to Carbon and Phosphorous.	All are wrong
Right Answer	C			

Question No. 61	Primary advantages of combined blowing in BOF are:			
Answer Options	A)	B)	C)	D)
	Decreasing over oxidation of molten steel and slag	Increase of metallic yield and reduction of slag volume	Both A & B	None of these
Right Answer	C			

Question No. 62	Liquid steel, tapped from BOF or EAF is further processed in a unit, called Ladle Furnace for:			
Answer Options	A)	B)	C)	D)
	Correction and homogenisation of steel composition and temperature	De-sulphurisation (through addition of synthetic slag) and re-carburisation	Alloy additions for adjustment of final composition	All the above
Right Answer	D			

Question No. 63	Ideal charge material mix for Electric Arc Furnace:			
Answer Options	A)	B)	C)	D)
	Only scrap	Scrap and Direct Reduced Iron (DRI)	Scrap, Direct Reduced Iron (DRI) and blast furnace hot metal	Only blast furnace hot metal
Right Answer	C			

Question No. 64	What is the optimum % of hot metal, which is recommended to be used at present, in EAF:			
Answer Options	A)	B)	C)	D)
	80%	70%	45% to 50%	35% to 40%
Right Answer	C			

Question No. 65	Foamy slag practice is adopted in EAF operation primarily due to:			
Answer Options	A)	B)	C)	D)
	It provides stable arcing and considerably protects side wall refractories from the radiation from the arc	It improves the thermal efficiency of melting, as-well-as, lowers the refractory and electrode consumption	Both of the above	None of these
Right Answer	C			

Question No. 66	Argon rinsing of liquid steel in ladle is carried out at present:			
Answer Options	A)	B)	C)	D)
	Through a top lance	Through a porous plug, fitted at the bottom of the ladle	Through side wall of the ladle	None of these
Right Answer	B			

Question No. 67	De-sulphurisation in Ladle Furnace is carried out through addition of:			
Answer Options	A)	B)	C)	D)
	Oxidising slag, carried over from BOF	Reducing slag	Injection of inert gas	None of above
Right Answer	B			

Question No. 68	Production of high alloy and stainless steel is carried out through:			
Answer Options	A)	B)	C)	D)
	BOF process	EAF process	Both A & B	None of these
Right Answer	B			

Question No. 69	VOD is preferred to AOD process for production of extra low carbon stainless steel, because:			
Answer Options	A)	B)	C)	D)
	P _{co} (partial pressure of CO) can be lowered to a much lower level in the VOD than in the AOD	AOD doesn't have facility for adequate stirring.	Free-board needed for such operation is not available in AOD	All of the above
Right Answer	A			

Question No. 70	Ultra-High Power (UHP) EAFs are provided with transformer rating:			
Answer Options	A)	B)	C)	D)
	Up to 500 kVA / t of metallic charge	Up to 700 kVA / t of metallic charge	Up to 1,000 kVA / t of metallic charge	Up to 12,000 kVA/ t of metallic charge
Right Answer	C			

Question No. 71	What are the types of continuous casting machines?			
Answer Options	A)	B)	C)	D)
	Billet, Bloom & Slab caster	Combi caster (Bloom-cum - round caster / Bloom-cum - beam blank caster)	Both A & B	None of these
Right Answer	C			

Question No. 72	Essential components of a continuous casting machine are:			
Answer Options	A)	B)	C)	D)
	Ladle turret, tundish, mould, rolls, strand cut-off system	Ladle turret, tundish, submerged entry nozzles (for high quality steels), moulds, mould oscillation system, mould level controller, secondary cooling water - air mist system, withdrawal and straightening unit, strand cut-off system	Ladle turret, tundish, mould, withdrawal and straightening unit, strand cut-off system	None of these
Right Answer	B			

Question No. 73	Tundish superheat is calculated (depending on the grade of steel) by:			
Answer Options	A)	B)	C)	D)
	Liquidous temperature for the grade of steel being cast + (40°C to 45°C)	Liquidous temperature for the grade of steel being cast + (5°C to 10°C)	Liquidous temperature for the grade of steel being cast + (10°C to 25°C)	Liquidous temperature for the grade of steel being cast + (35°C to 45°C)
Right Answer	C			

Question No. 74	To reduce the susceptibility of hot cracking of the solidifying strand, Mn/S ratio is to be maintained:			
Answer Options	A)	B)	C)	D)
	5:1	20:1	10:1	15:1
Right Answer	B			

Question No. 75	In which type of caster, the casting speed (m/min.) is highest:			
Answer Options	A)	B)	C)	D)
	Slab caster	Billet caster	Bloom caster	None of these
Right Answer	B			

Question No. 76	_____ of a continuous casting machine is defined as the distance from the liquid steel meniscus (the curved upper surface of liquid steel in a mould) to the point, at which, the strand becomes completely solid.			
Answer Options	A)	B)	C)	D)
	Mechanical length	Metallurgical length	Physical length	None of these
Right Answer	B			

Question No. 77	In order to check the internal soundness and quality of cast products, i.e. non-metallic inclusions (oxides), internal cracks, blow holes and sulphide inclusions, it is necessary to carry out:			
Answer Options	A)	B)	C)	D)
	Macro examination of prepared surfaces of continuously cast products	Microscopic examination	Sulphur printing examination	Both A & C
Right Answer	D			

Question No. 78	Electromagnetic stirring of liquid steel inside the mould is carried out:			
Answer Options	A)	B)	C)	D)
	In order to improve the surface quality (no surface shrinkage cavities or inclusions close to the surface).	In order to obtain a globular - non-directional - solidification microstructure with no segregation zones in the centre of the strand	In order to prevent formation of oxides and sulphides	Both A & B
Right Answer	D			

Question No. 79	The principal function of the RH degassing process of steel treatment is:			
Answer Options	A)	B)	C)	D)
	To improve ferro-alloy recovery.	To reduce Sulphur content in steel	To reduce Hydrogen and Carbon content in steel, depending on the grade of steel	Optimization of plant layouts
Right Answer	C			

Question No. 80	During continuous casting of steel, the mould is subjected to vertical oscillations, primarily in order to:			
Answer Options	A)	B)	C)	D)
	Allow easy flotation of inclusions	Ensure good casting homogeneity	Prevent sticking of the solidifying liquid steel to the mould.	All of these
Right Answer	C			

Question No. 81	Lead is added to 60-40 brass primarily to improve:			
Answer Options	A)	B)	C)	D)
	machinability	corrosion resistance	strength	Fluidity
Right Answer	A			

Question No. 82	Which of the following is an example of electron acceptor impurities in semiconductor?			
Answer Options	A)	B)	C)	D)
	Carbon in Silicon.	Boron in Germanium.	Arsenic in Silicon.	Phosphorus in Silicon
Right Answer	B			

Question No. 83	Scanning electron microscopy is convenient technique to observe a fibrous fracture surface because:			
Answer Options	A)	B)	C)	D)
	It offers higher magnification than light microscope.	Its depth of focus helps in obtaining greater details	It offers observation under vacuum	None of these
Right Answer	B			

Question No. 84	Maraging steels derive their strength from which of the following mechanisms?			
Answer Options	A)	B)	C)	D)
	From precipitation of intermetallic compounds, resulting in fine dispersions of inter-metallics of Fe, Ni, Ti etc.	Fine, highly dislocated and strong martensite	Fine dispersions of alloy carbides in a ferrite matrix.	Both B & C
Right Answer	A			

Question No. 85	Alloy powders, manufactured by which of the following processes have spherical shapes?			
Answer Options	A)	B)	C)	D)
	Electrochemical deposition	Gaseous reduction.	Atomisation	None of these
Right Answer	C			

Question No. 86	As compared to the nucleation-rate maximum, the growth-rate maximum is at:			
Answer Options	A)	B)	C)	D)
	A higher temperature	A lower temperature	The temperature of maximum transformation rate	None of these
Right Answer	A			

Question No. 87	Fine grain sizes are obtained by:			
Answer Options	A)	B)	C)	D)
	Increasing nucleation rate	Decreasing growth rate	fast cooling.	All of these
Right Answer	D			

Question No. 88	During pearlitic transformation			
Answer Options	A)	B)	C)	D)
	New phases are formed	Composition of phases change	There is no diffusion.	Both A & B
Right Answer	D			

Question No. 89	The hardness of martensite in a steel is a function of:			
Answer Options	A)	B)	C)	D)
	Carbon content	Cooling rate	Location of nose of TTT curve	None of these
Right Answer	A			

Question No. 90	For a given chemistry of steel, M _f (martensite finish) temperature is not a fixed temperature. It can be lowered by:			
Answer Options	A)	B)	C)	D)
	Lowering cooling rate and raising Carbon content	Raising cooling rate and raising Carbon content	Raising cooling rate and lowering Carbon content	None of these
Right Answer	A			

Question No. 91	Feathery structure in heat treated steel, confirms the presence of:			
Answer Options	A)	B)	C)	D)
	Lower bainite	Upper bainite	Tempered martensite	None of these
Right Answer	B			

Question No. 92	The basic step in any Heat Treatment process is the formation of:			
Answer Options	A)	B)	C)	D)
	Ferrite	Pearlite.	Austenite	Martensite.
Right Answer	C			

Question No. 93	Normalising is a process of heat treatment, in which, the product is heated to austenitizing temperature to obtain a fully austenitic structure and then:			
Answer Options	A)	B)	C)	D)
	Quenched by oil	Cooled in a furnace	Cooled in atmospheric air	None of the these
Right Answer	C			

Question No. 94	In general, at a given temperature, alloying elements in steels diffuse _____ in comparison to Carbon			
Answer Options	A)	B)	C)	D)
	Slowly	Very slowly	Quickly	Instantaneously
Right Answer	B			

Question No. 95	The r-value of sheet metal is:			
Answer Options	A)	B)	C)	D)
	The "plastic strain ratio" of sheet metal intended for deep-drawing applications, is a measure of the resistance to thinning or thickening when subjected to either tensile or compressive forces in the plane of the sheet.	It is the ability to maintain thickness, as the material is drawn. r value is particularly essential for extra low carbon steel sheets.	The r-value is an index, which shows the extent, the material can resist thinning deformation in thickness direction.	All of the above
Right Answer	D			

Question No. 96	The fundamental difference between conventionally hot-rolled and controlled -rolled steels are:			
Answer Options	A)	B)	C)	D)
	The nucleation of ferrite occurs exclusively at austenite grain boundaries in the former, while it occurs in the grain interior, as well as, at grain boundaries in the latter	It leads to a more refined grain structure, compared to a conventionally rolled steel	In controlled-rolled steel, a crystallographic texture develops, which causes planar anisotropies in mechanical properties and embrittlement in the through -thickness direction.	All of the above
Right Answer	D			

Question No. 97	In Hadfield Steel, the major element, which increases wear resistance and it's content is:			
Answer Options	A)	B)	C)	D)
	Chromium (16% to 19%)	Tungsten (17% to 20%)	Manganese (12% to 14%)	None of the above
Right Answer	C			

Question No. 98	The reaction, which, on heating one solid phase, yields another solid phase plus one liquid phase, is called:			
Answer Options	A)	B)	C)	D)
	Eutectic	Eutectoid	Peritectic	Peritectoid.
Right Answer	C			

Question No. 99	The phase boundary between alpha and (alpha + beta) region is called:			
Answer Options	A)	B)	C)	D)
	Liquidus	Solidus	Solvus	None of these.
Right Answer	C			

Question No. 100	Re-crystallization rate increases with:			
Answer Options	A)	B)	C)	D)
	Higher working temperature & Higher annealing temperature	Decreasing initial grain size	Increasing amount of cold work.	Both B & C
Right Answer	D			