

CII – iPATE 2.0 (2021)

Computer Based PAN India Examination

Category: GRADUATE ENGINEER (ENTRY LEVEL)

Engineering Discipline: CHEMICAL 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

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|----------------|---|----|----|----|
| 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 | | | |

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|----------------|--|-----|-----|-----|
| 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 | | | |

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|----------------|---|---------------|------------|-----------|
| 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 | | | |

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|----------------|--|--------------------|-------------------|---------------|
| 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 | | | |

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|----------------|---|-------|-------|-------|
| 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 | | | |

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|----------------|---|--|-------------------------------------|--------------|
| 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 | | | |

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|----------------|--|------|-------|-------|
| 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 | | | |

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|----------------|--|--|--|---|
| 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 | | | |

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|----------------|---|-----------------|-----------------|-----------------|
| 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 | | | |

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|-----------------|--|----|----|----|
| 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 | | | |

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|-----------------|---|----------|---------|---------|
| 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 | | | |

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|-----------------|--|-----------------------------|-----------------------|--|
| 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 | | | |

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|-----------------|--|--------------|-------------|--------------|
| 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 | | | |

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|-----------------|--|---------|-----------|--------|
| 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 | | | |

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|-----------------|--|------|------|------|
| 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) | 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 | | | |

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|-----------------|---|---|---|-------------------------------------|
| 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 | | | |

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|-----------------|---|--------------------|-----------------|-----------------|
| 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 | | | |

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|-----------------|---|------------------|-----------------|------------|
| 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 | | | |

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|-----------------|---|--------|--------|-------|
| 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 | | | |

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|-----------------|--|--------|---------|----------|
| 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 | | | |

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|-----------------|--|---------------------------|-----------------|------------------|
| 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 | | | |

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|-----------------|---|--------------------------------|----------------------------|--|
| 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 | | | |

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|-----------------|--|--|--|------------------|
| 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 | | | |

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|-----------------|--|------------|------------|-----------|
| 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 | | | |

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|-----------------|--|----------|-----------|-----------|
| 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 | | | |

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|-----------------|--|------|------|------|
| 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 | | | |

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|-----------------|--|--|--|---|
| 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 | | | |

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|-----------------|--|---------------------------|------------------------------|-----------------------------------|
| 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 | | | |

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|-----------------|---|-----------|------|-----------|
| 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 | | | |

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|-----------------|---------------------------|----------------------------|----------------------------------|----------------------------|
| 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 | | | |

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|-----------------|--|--------------|------------------------------|------------------------|
| 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 | | | |

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|-----------------|--|--|--|--|
| 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 | | | |

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|-----------------|--|---|---|---|
| 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 | | | |

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|-----------------|---|-------------------|--------------|-----------|
| 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 | | | |

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|-----------------|---|------------------------------|----------------------------|-------------------------------|
| 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 | | | |

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|-----------------|---|------|------|-----|
| 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 | | | |

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|-----------------|--|-----|--------------|--------------|
| 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 | | | |

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|-----------------|---|-----------|-------------|--------------|
| 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 | | | |

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|-----------------|--|-------------------|-------------------|-------------------|
| 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 | | | |

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|-----------------|--|-----|-----|---|
| 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 | | | |

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|-----------------|--|------------------|---------------|----------------------|
| 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 | | | |

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|-----------------|---|-------------------|-------------------|-------------------|
| 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 | | | |

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|-----------------|--|-----|-----|----|
| 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 | | | |

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|-----------------|--|---------|-----|-------|
| 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 | | | |

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|-----------------|---|-----------------|-----------------|-----------------|
| Question No. 51 | A sample of Natural gas contains 82% Methane and 18% Ethane by volume. The density of the mixture at 18 °C and 750 mm Hg pressure is: | | | |
| Answer Options | A) 0.685 g/L | B) 0.765 g/L | C) 0.855 g/L | D) 0.775 g/L |
| Right Answer | B | | | |

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|-----------------|---|--|-------------------------------|---------------------|
| Question No. 52 | In a chemical process, a bypass stream is preferred because it: | | | |
| Answer Options | A) facilitates better control of the process | B) increase the yield of the products | C) improves the conversion | D) none of these |
| Right Answer | A | | | |

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|-----------------|---|---------------------|-----------------------|---|
| Question No. 53 | In any chemical industry, one reaction takes place in a metallic vessel. Which of the following type of system it is? | | | |
| Answer Options | A) Open system | B) Closed system | C) Isolated system | D) Information insufficient. It may be any of Open, Closed or Isolated system. |
| Right Answer | D | | | |

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|-----------------|---|----------------------|--------------------|---------------------------------------|
| Question No. 54 | In a closed cycle gas turbine, the gas in the cooling chamber is cooled at: | | | |
| Answer Options | A) Fixed temperature | B) Fixed pressure | C) Fixed volume | D) by slowly reducing the pressure |
| Right Answer | B | | | |

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|-----------------|--|---|--|---|
| Question No. 55 | What is heat pump? | | | |
| Answer Options | A) A device which is able to pump hot liquid --- whatever higher temperature of the liquid may be | B) A device which, working in a cycle, transfers heat from higher temperature to lower temperature | C) A device which pumps out hot liquid from one vessel to another vessel to make the temperature of both the vessels in equilibrium | D) A device which, working in a cycle, transfers heat from lower temperature to higher temperature |
| Right Answer | D | | | |

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|-----------------|---|--|--|---|
| Question No. 56 | The respective meaning of Isobaric process and Isochoric process: | | | |
| Answer Options | A) | B) | C) | D) |
| | constant entropy process and constant pressure process respectively | constant volume process and constant pressure process respectively | constant pressure process and constant volume process respectively | constant entropy process and constant volume process respectively |
| Right Answer | C | | | |

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|-----------------|---|---------------------------------|---------------------------------|---------------------------------|
| Question No. 57 | A distillation column separates 20,000 kg/hr of a 50% Benzene - 50% Toluene mixture. The product D recovered from the condenser at the top of the column contains 95% Benzene and the bottom product W from the Column contains 96% of Toluene. The value of D and W are: (All % are in weight %) | | | |
| Answer Options | A) | B) | C) | D) |
| | D: 9900 Kg /hr; W = 10100 kg/hr | D: 9000 Kg /hr; W = 11000 kg/hr | D: 9500 Kg /hr; W = 10500 kg/hr | D: 10100 Kg /hr; W = 9900 kg/hr |
| Right Answer | D | | | |

| | | | | |
|-----------------|---|---|--|---|
| Question No. 58 | A refrigerator has been kept in a closed room and the refrigerator is operating. On opening the door of it for some time, the temperature of the room will: | | | |
| Answer Options | A) | B) | C) | D) |
| | decrease, as the refrigerator will decrease the room temperature | remain same due to both cooling and heating process | increase, as the refrigerator will generate heat | depends on the season whether it's winter or summer or any other season |
| Right Answer | C | | | |

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|-----------------|---------------------------------------|---------------------|-------------|---------------------|
| Question No. 59 | Centrifugal pump is also called _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Reciprocating pump | High discharge pump | Rotary pump | None of the options |
| Right Answer | B | | | |

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|-----------------|---|---|------------------------------------|---------------------|
| Question No. 60 | To prevent cavitation in a pump, we need to _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | increase the liquid height above the suction line | decrease the liquid height above the suction line | decrease the suction line pressure | None of the options |
| Right Answer | A | | | |

| | | | | |
|-----------------|---|-------------------------------|--------------------------|-------------------------------|
| Question No. 61 | The incompressible flow is that type of flow in which _____ (write the best suitable answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | the flow can't be compressed | the fluid can't be compressed | the fluid density varies | the fluid density is constant |
| Right Answer | D | | | |

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|-----------------|---|----------------|---------------|---------------|
| Question No. 62 | Bernoulli's equation relates the total head with Velocity head, Static head and _____ (write the best answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | Surface tension & friction factor | Viscosity head | Pressure head | Liquid height |
| Right Answer | C | | | |

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|-----------------|--|---|--|---|
| Question No. 63 | There are two related measures of fluid viscosity: dynamic (or absolute) and kinematic. Kinematic viscosity is a measure of a fluid's internal resistance to flow under gravitational forces and is the ratio of | | | |
| Answer Options | A) | B) | C) | D) |
| | the dynamic viscosity and density of fluid. | the density of fluid and the dynamic viscosity. | the viscosity and kinetic velocity of the fluid. | the viscosity and kinetic temperature of the fluid. |
| Right Answer | A | | | |

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|-----------------|--|------------|-----------|-------------------------|
| Question No. 64 | The overall heat transfer coefficient, or U-value, refers to how well heat is transferred through over a series of resistant mediums. The concept is used in case of heat transfer by: | | | |
| Answer Options | A) | B) | C) | D) |
| | Conduction | Convection | Radiation | Conduction & Convection |
| Right Answer | D | | | |

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|-----------------|--|-----|-----|-----|
| Question No. 65 | Two spherical balls of same material have diameter ratio 2:1. If both the balls are heated at the same rate and then allowed to cool down by radiation, ratio of rate of cooling by bigger ball compared to smaller ball will be - | | | |
| Answer Options | A) | B) | C) | D) |
| | 4:1 | 2:1 | 1:2 | 1:4 |
| Right Answer | A | | | |

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|-----------------|---|---------------------|---------------------------|-----------------------------|
| Question No. 66 | There are different factors affecting evaporation process. Which of the following factors does not affect rate of this process? | | | |
| Answer Options | A) | B) | C) | D) |
| | Surface area of the liquid | Depth of the liquid | Temperature of the liquid | Humidity of surrounding air |
| Right Answer | B | | | |

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| Question No. 67 | From an evaporator 60,000 kgs of water got evaporated while concentrating an aqueous solution from 10% to 40%. What is the amount (in kg) of solid present in the solution? | | | |
| Answer Options | A) 10000 | B) 3000 | C) 8000 | D) 2000 |
| Right Answer | C | | | |

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|-----------------|--|-------------------------------|-------------------------------|--------------------|
| Question No. 68 | Thermal diffusivity is the thermal conductivity divided by density and specific heat capacity at constant pressure. It is: | | | |
| Answer Options | A) Physical property of a substance | B) Dimensionless parameter | C) Function of temperature | D) All of these |
| Right Answer | A | | | |

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|-----------------|--|--|---|--------------------|
| Question No. 69 | The amount of heat flow through Conduction is: | | | |
| Answer Options | A) Dependent of the material of the body | B) Inversely proportional to the surface area of the body | C) Inversely proportional to the temperature difference of the two faces of the body | D) All of these |
| Right Answer | A | | | |

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|-----------------|---|---|--|---------------------------------|
| Question No. 70 | Vacuum drying is the mass transfer operation in which the moisture present is removed by means of creating a vacuum to: | | | |
| Answer Options | A) increase drying temperature. | B) dry materials having high bound moisture content. | C) dry those materials which have very high unbound moisture content. | D) reduce drying temperature |
| Right Answer | D | | | |

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|-----------------|---|----------------------|------------------------|--------------------|
| Question No. 71 | Total reflux in a distillation operation is the operating condition where vapor and liquid are passing each other in the column but no product is removed. This operating condition requires minimum: | | | |
| Answer Options | A) reboiler load | B) condenser load | C) number of plates | D) All of these |
| Right Answer | C | | | |

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|-----------------|---|-----------|-----------|---------------------------------|
| Question No. 72 | The boiling point of a pure substance is the temperature at which the substance transitions from a liquid to the gaseous phase. At this point, the vapor pressure of the liquid is equal to the applied pressure on the liquid. With increase of total pressure of the system, the boiling points of pure components of a binary system - | | | |
| Answer Options | A) | B) | C) | D) |
| | No change | increases | decreases | first increases, then decreases |
| Right Answer | B | | | |

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|-----------------|--|----------------|-----------------|--------------------|
| Question No. 73 | Which of the following is not directly related to mass transfer? | | | |
| Answer Options | A) | B) | C) | D) |
| | Nusselt number | Schmidt number | Sherwood number | Lewis relationship |
| Right Answer | A | | | |

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|-----------------|---|----------------------|---------------------------|---------------------|
| Question No. 74 | In standard absorption columns, a gas mixture travels up through the absorption tower and the solute is transferred to the liquid phase and thus gradually removed from the gas. High-pressure drop in Absorber results in: (write the best answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | Decreased efficiency | Increased efficiency | Better gas liquid contact | High operating cost |
| Right Answer | D | | | |

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|-----------------|---|-----------|-----------|--|
| Question No. 75 | At fixed pressure, solubility of gas in liquid _____ with increase in temperature (write the best answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | Remains same | Decreases | Increases | increase or decrease depends on the system |
| Right Answer | B | | | |

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|-----------------|---|---------------------------|----------------------|----------------------|
| Question No. 76 | Zero-order reaction is a chemical reaction wherein the rate does not vary with the increase or decrease in the concentration of the reactants. For such reaction, the concentration of product increases with - | | | |
| Answer Options | A) | B) | C) | D) |
| | Increase in initial concentration | Increase in reaction time | Increase in pressure | Decrease in pressure |
| Right Answer | B | | | |

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|-----------------|---|-----------------------------|-----------------------|---------------------------|
| Question No. 77 | An irreversible first order reaction is being carried out in a CSTR (Constant Stirred Tank Reactor) and PFR (Plug Flow Reactor) of same volume. The liquid flow rates are same. The relative conversion will: | | | |
| Answer Options | A) | B) | C) | D) |
| | Be more in PFR than in CSTR | Be more in CSTR than in PFR | Be same in both cases | Depend on the temperature |
| Right Answer | A | | | |

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|-----------------|---|--|--|--|
| Question No. 78 | In chemical reaction, a catalyst can ____ (write the most suitable single answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | Alters the value of equilibrium constant in a reversible chemical reaction | Increases the speed of a chemical reaction | Decreases the speed of a chemical reaction | Can either increase or decrease the speed of a chemical reaction |
| Right Answer | D | | | |

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|-----------------|--|-----|-----------------|----------|
| Question No. 79 | In a Plug flow reactor, the eddy diffusivity is equal to: ____ (write the most suitable single answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | Zero | One | between 0 and 1 | Infinity |
| Right Answer | A | | | |

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|-----------------|--|---|-------------------|---|
| Question No. 80 | The units of the rate constant, k, depend on the overall reaction order. This unit for a nth order reaction is: ____ (write the most suitable single answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | $(\text{time})^{-1}(\text{concentration})^{n-1}$ | $(\text{time})^{n-1}(\text{concentration})$ | $1/(\text{time})$ | $1 / (\text{time})(\text{concentration})^{n-1}$ |
| Right Answer | D | | | |

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|-----------------|--|---------------|------------------------|-------------------------|
| Question No. 81 | For a first order reaction $A \rightarrow B$ the rate constant is $x \text{ min}^{-1}$. If the initial concentration of A is 0.01M, the concentration of A after one hour is given by the expression. | | | |
| Answer Options | A) | B) | C) | D) |
| | $0.01 \times (1 - e^{-60x})$ | $0.01 e^{-x}$ | $0.01 \times e^{-60x}$ | $0.001 \times e^{-60x}$ |
| Right Answer | C | | | |

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|-----------------|---|--|--|---|
| Question No. 82 | Space velocity 3 hr^{-1} means _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Three reactor volumes of feed (at specified conditions) are being fed into the reactor per hour | After every 3 hours, reactor is being filled with the feed | Cent per cent conversion can be achieved in at least 3 hours | A fixed conversion of a given batch of feed takes 3 hours |
| Right Answer | A | | | |

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|-----------------|---|-------------------------|--|----------|
| Question No. 83 | The speed or rate of a chemical reaction is the change in concentration of a reactant or product per unit time. It is not influenced by _____ (write the most suitable single answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | Temperature | Reactants concentration | Number of molecules of reactants taking part in a reaction | Catalyst |
| Right Answer | C | | | |

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|-----------------|--|----------|----------------|--------------------------------------|
| Question No. 84 | The best way of exothermic reaction is carried out in _____. (write the most suitable single answer) | | | |
| Answer Options | A) | B) | C) | D) |
| | CSTR followed by a plug flow reactor | One CSTR | CSTR in series | A plug flow reactor followed by CSTR |
| Right Answer | A | | | |

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|-----------------|---|---------------------------|--|---|
| Question No. 85 | An orifice meter is an equipment used to measure the flow rate of a gas or a fluid. The flow rate is _____ to the differential pressure | | | |
| Answer Options | A) | B) | C) | D) |
| | Directly proportional to | Inversely proportional to | Inversely proportional to the square root of | Directly proportional to the square root of |
| Right Answer | D | | | |

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|-----------------|--|---------------------|---------------------------------|------------------------|
| Question No. 86 | A rotameter is a device that measures the volumetric flow rate of fluid in a closed tube. It's operation is based on _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | pressure drop across a nozzle. | variable flow area. | pressure at a stagnation point. | rotation of a turbine. |
| Right Answer | B | | | |

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|-----------------|---|----------------------|---------------------------------|-------------------------|
| Question No. 87 | Thermocouples are a widely used type of temperature sensor. It is useful: | | | |
| Answer Options | A) | B) | C) | D) |
| | Very high temperature | Very low temperature | Both of high & low temperatures | Only liquid temperature |
| Right Answer | C | | | |

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|-----------------|--|-------------|--------------------|-----------------|
| Question No. 88 | A process operating properly with automatic process control can: | | | |
| Answer Options | A) | B) | C) | D) |
| | make the process operate uniformly | reduce cost | reduce maintenance | reduce manpower |
| Right Answer | A | | | |

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|-----------------|---|---------------------|-----------------------|-----------------------|
| Question No. 89 | Bourdon tube pressure gauges are the most common type in many areas and are used to measure medium to high pressures. They are used to measure pressures: | | | |
| Answer Options | A) below 30 psia | B) above 30 psia | C) below 3 microns | D) below 14.7 psia |
| Right Answer | B | | | |

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|-----------------|---|-------------------------|---|-------------------------------------|
| Question No. 90 | A balance sheet for an industry is one of the three fundamental financial statements. It shows: | | | |
| Answer Options | A) Only current assets | B) Only fixed assets | C) The financial condition at any given time | D) Only current and fixed assets |
| Right Answer | C | | | |

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|-----------------|--|--|--|---|
| Question No. 91 | Operation of Vertical condensers are generally easier than Horizontal condensers for operation. It is possible when: | | | |
| Answer Options | A) Hydrostatic head is required for refluxing the condensate | B) Only the function of condensation is to be carried out | C) Sub cooling of condensate is desired | D) Both the functions of condensation & sub cooling are carried out in a single unit |
| Right Answer | D | | | |

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|-----------------|--|--------------------------------------|--|-----------------|
| Question No. 92 | The fouling factor represents the theoretical resistance to heat flow. The value of it depends upon the: | | | |
| Answer Options | A) characteristic of process fluid. | B) suspended solids in the fluid. | C) velocity of process fluid containing suspended solids. | D) All these |
| Right Answer | D | | | |

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|-----------------|---|-------------------------|--|------------------------------------|
| Question No. 93 | Financial accounting of a chemical plant is a very interesting subject. Among the following, which is <u>not</u> correct? | | | |
| Answer Options | A) Assets = Capital | B) Assets = Equities | C) Assets = Liabilities + Net worth | D) Total income = Cost + Profit |
| Right Answer | A | | | |

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|-----------------|---|------------------------------------|--------------------|---|
| Question No. 94 | Feasibility study of a chemical process plant is a subject taught during study of financial management. Among the following, which is <u>not</u> considered as major component during such feasibility study? | | | |
| Answer Options | A) Pay out period | B) Rate of return on investment | C) Cash Reserve | D) Discounted cash flow based on full life performance |
| Right Answer | C | | | |

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|-----------------|--|-------------------|---------------|-----------------------|
| Question No. 95 | For manufacturing nitrogenous fertilizer, commercial hydrogen is required. The costliest route is: | | | |
| Answer Options | A) | B) | C) | D) |
| | Steam reforming of naphtha | Coal gasification | Coke oven gas | Electrolysis of water |
| Right Answer | D | | | |

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|-----------------|---|----------------|----------------|----------------|
| Question No. 96 | Contact process of Sulfuric acid yields _____ Sulfuric acid | | | |
| Answer Options | A) | B) | C) | D) |
| | 99.5% | 99% and higher | 98% and higher | 80% and higher |
| Right Answer | C | | | |

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|-----------------|--|------------------------------|----------------------|-----------------------------|
| Question No. 97 | There are many gases which are derived from solid fuel. These gases are water gas, producer gas, coal gas etc. The main constituents of water gas are: | | | |
| Answer Options | A) | B) | C) | D) |
| | Carbon monoxide and Nitrogen | Carbon monoxide and Hydrogen | Methane and Hydrogen | Carbon dioxide and Hydrogen |
| Right Answer | B | | | |

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|-----------------|---|---|---|---|
| Question No. 98 | For a fuel cell, which is the most correct answer? | | | |
| Answer Options | A) | B) | C) | D) |
| | Chemical energy is converted into Electrical energy | Electrical energy is converted into chemical energy | Electrical energy is converted into Mechanical energy | Mechanical energy is converted into Electrical energy |
| Right Answer | A | | | |

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|-----------------|---|---------------|--------------|------------|
| Question No. 99 | The basic constituent of vegetable oil is _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Fatty acid | Fatty alcohol | Triglyceride | Mono ester |
| Right Answer | C | | | |

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|------------------|-------------------------------------|-----------|----------------|-----------|
| Question No. 100 | Hydrolysis of sugar is called _____ | | | |
| Answer Options | A) | B) | C) | D) |
| | Sugarolysis | Inversion | Esterification | Hydration |
| Right Answer | B | | | |