P R E F A C E

This book has been meticulously crafted to serve as a comprehensive guide for aspirants preparing for the GATE Mechanical Engineering examination. The GATE Mechanical Engineering exam presents challenges such as a vast syllabus, diverse question formats (MCQs, MSQs, and NATs), and the need for effective time management. Success requires strong conceptual understanding, as rote memorization is insufficient. With intense competition for limited seats, aspirants must not only master the material but also refine their problem-solving and exam strategies. This book aims to guide you through these obstacles with comprehensive solutions and strategic insights.

This book is a thorough collection of solutions to **GATE Mechanical Engineering** exam questions from the past 30 years, spanning **from 1996 to 2025**. It is an invaluable resource for aspirants who seek to understand the evolution of question patterns and master solution techniques. By offering a detailed breakdown of each question and solution, this book ensures that students not only enhance their problem-solving skills but also gain a deeper understanding of the underlying concepts tested in GATE.

Organized into multiple chapters, this book covers the entire GATE Mechanical Engineering syllabus. Each chapter is subdivided into units for clear topic segmentation, making the study process more manageable. The questions are sorted year-wise, highlighting the progression of concepts and formats over time, and categorized into Multiple Choice Questions (MCQs), Multiple Select Questions (MSQs), and Numerical Answer Type (NAT) formats. This structure mirrors the varied question styles found in the exam, helping students prepare for every aspect of the test. Each solution is presented in a detailed, step-by-step manner, ensuring clarity in both the problem-solving process and the conceptual framework behind each question.

Through this book, students can solidify their understanding of key topics, identify recurring trends in question formats, and enhance their time management skills. It is designed to be a practical tool for building confidence and competence, empowering candidates to approach the GATE exam with thorough preparation and a clear strategy.

A C K N O W L E D G E M E N T

The creation of this book has been a rewarding and enriching journey, made possible by the contributions, support, and encouragement of many individuals. We would like to extend our heartfelt thanks to Mr. Radheshyam Choudhary, Director at IFAS Publications, and Dr. Kailash Choudhary, Founder of IFAS. Our special thanks go to Mr. Dadasaheb Sondge and Mr. Digambar Jagtap for their critical support and suggestions, which were instrumental in bringing this book to its present form.

We also wish to thank **Mr. Satyam Rai**, whose critical reviews and suggestions helped refine the manuscript and ensure its clarity and quality. Their constructive input has greatly enhanced the content and structure of this book. A special note of appreciation goes to Mr. Omkar Girkar, who provided the resources, guidance, and technical expertise necessary for the production of this book.

This book is a team effort, and its production would not have been possible without the helping and supportive individuals at IFAS Publications. We are thankful to the team, especially Mrs. Gitanjalee Jadhav for her helpful suggestions and timely reminders to ensure the project's completion. It has been a pleasure working with Mr. Vikendra Metha and Mr. Kuldeep Singh, who took great care during the copy-editing and production processes. A special thanks goes to our graphics team – Mr. Avinash Tanwade, Ms. Yogeshwari Lokhande, Ms. Anushree Gupta, Mr. Sujit Singh, and Mr. Anup Chandole – for their excellent work in creating clear, precise diagrams that enhance the understanding of complex concepts.

This book would not have been possible without the collective effort and dedication of all those involved. We hope that it serves as a valuable resource for students preparing for the **GATE Mechanical Engineering Exam**.

Thank you to everyone who made this project possible.

GATE MECHANICAL ENGINEERING

- CUT OFF -

YEAR	GEN	OBC	SC/ST
2024	28.60	25.70	19.00
2023	28.40	25.50	18.90
2022	28.10	25.20	18.70
2021	33.00	29.70	22.00
2020	34.00	30.60	22.60
2019	34.10	30.70	22.70
2018	34.70	31.20	23.10
2017	32.87	29.00	21.00
2016	29.60	26.60	19.70
2015	32.73	29.46	21.82
2014	28.86	25.97	19.24

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General Aptitude

SECTION 1

SYLLABUS

VERBAL APTITUDE

BASIC ENGLISH GRAMMAR: TENSES, ARTICLES, ADJECTIVES, PREPOSITIONS, CONJUNCTIONS, VERB-NOUN AGREEMENT, & OTHER PARTS OF SPEECH. BASIC VOCABULARY: WORDS, IDIOMS, & PHRASES IN CONTEXT, READING & COMPREHENSION, NARRATIVE SEQUENCING.

QUANTITATIVE APTITUDE

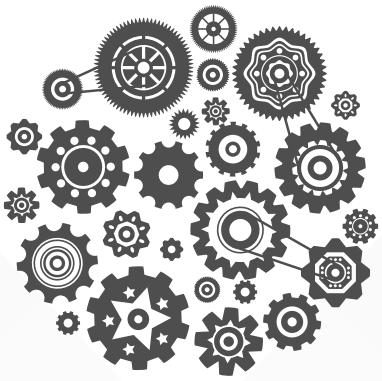
DATA INTERPRETATION: DATA GRAPHS (BAR GRAPHS, PIE CHARTS, & OTHER GRAPHS REPRESENTING DATA), 2- & 3-DIMENSIONAL PLOTS, MAPS & TABLES NUMERICAL COMPUTATION & ESTIMATION: RATIOS, PERCENTAGES, POWERS, EXPONENTS & LOGARITHMS, PERMUTATIONS & COMBINATIONS, & SERIES MENSURATION & GEOMETRY ELEMENTARY STATISTICS & PROBABILITY.

ANALYTICAL APTITUDE

LOGIC: DEDUCTION & INDUCTION, ANALOGY, NUMERICAL RELATIONS & REASONING.

SPATIAL APTITUDE

TRANSFORMATION OF SHAPES: TRANSLATION, ROTATION, SCALING, MIRRORING, ASSEMBLING, & GROUPING PAPER FOLDING, CUTTING, & PATTERNS IN 2 & 3 DIMENSIONS.



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GATE MECHANICAL ENGINEERING: NUMBER OF QUESTIONS ASKED IN PREVIOUS EXAMS (2010-2025)																	
General Aptitude		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
1.1	**Verbal Aptitude**	4	5	5	5	10	14	12	7	4	10	9	3	2	4	1	3
1.2	**Quantitative Aptitude**	3	5	4	5	18	11	13	8	13	7	7	6	5	3	5	5
1.3	**Analytical Aptitude**	3	-	1	-	12	5	4	5	3	2	3	10	2	3	2	1
1.4	**Spatial Aptitude**	-	-	-	-	-	-	1	-	-	1	-	2	1	1	1	1

GENERAL APTITUDE

CHAPTER 1

Unit 1.1: Verbal Aptitude

[2010: 1 Mark]

1. Choose the most appropriate word from the options given below to complete the following sentence:
If we manage to _____ our natural resources, we would leave a better planet for our children.
(A) uphold (B) restrain
(C) cherish (D) conserve

[2010: 1 Mark]

2. Which of the following options is the closest in meaning to the word below: 'Circuitous'
(A) cyclic (B) indirect
(C) confusing (D) crooked

[2010: 1 Mark]

3. Choose the most appropriate word from the options given below to complete the following Sentence:
His rather casual remarks on politics_____ his lack of seriousness about the subject.
(A) masked (B) belied
(C) betrayed (D) suppressed

[2010: 2 Marks]

4. Modern warfare has changed from large scale clashes of armies to suppression of civilian populations. Chemical agents that do their work silently appear to be suited to such warfare; and regretfully, there exist people in military establishments who think that chemical agents are useful tools for their cause.
Which of the following statements best sums up the meaning of the above passage:
(A) Modern warfare has resulted in civil strife.
(B) Chemical agents are useful in modern warfare.
(C) Use of chemical agents in warfare would be undesirable.
(D) People in military establishments like to use chemical agents in war.

[2011: 1 Mark]

5. Choose the word from the options given below that is most nearly opposite in meaning to the given word:
Amalgamate
(A) merge (B) split
(C) collect (D) separate

[2011: 1 Mark]

6. Which of the following options is the closest in the meaning to the word below:
Inexplicable
(A) Incomprehensible (B) Indelible
(C) Inextricable (D) Infallible

[2011: 1 Mark]

7. Choose the most appropriate word(s) from the options given below to complete the following sentence.
I contemplated _____ Singapore for my vacation but decided against it.
(A) to visit (B) having to visit
(C) visiting (D) for a visit

[2011: 1 Mark]

8. Choose the most appropriate word from the options given below to complete the following sentence.
If you are trying to make a strong impression on your audience, you cannot do so by being understated, tentative or_____.
(A) hyperbolic (B) restrained
(C) argumentative (D) indifferent

[2011: 2 Marks]

9. Few school curricula include a unit on how to deal with bereavement and grief, and yet all students at some point in their lives suffer from losses through death and parting. Based on the above passage which topic would not be included in a unit on bereavement?
(A) how to write a letter of condolence
(B) what emotional stages are passed through in the healing process
(C) what the leading causes of death are
(D) how to give support to a grieving friend

[2012: 1 Mark]

10. Choose the most appropriate alternative from the options given below to complete the following sentence:
Suresh's dog is the one_____ was hurt in the stampede.
(A) that (B) which
(C) who (D) whom

[2012: 1 Mark]

11. Choose the most appropriate alternative from the options given below to complete the following sentence:

Despite several_____ the mission succeeded in its attempt to resolve the conflict.

(A) attempts (B) setbacks
(C) meetings (D) delegations

[2012: 1 Mark]

12. Which one of the following options is the closest in meaning to the word given below?
Mitigate

(A) Diminish (B) Divulge
(C) Dedicate (D) Denote

[2012: 1 Mark]

13. Choose the grammatically INCORRECT sentence:

(A) They gave us the money back less the service charges of Three Hundred rupees.
(B) This country's expenditure is not less than that of Bangladesh.
(C) The committee initially asked for a funding of Fifty Lakh rupees, but later settled for a lesser sum.
(D) This country's expenditure on educational reforms is very less.

[2012: 2 Marks]

14. Wanted Temporary, Part-time persons for the post of Field Interviewer to conduct personal interviews to collect and collate economic data. Requirements: High School-pass, must be available for Day, Evening and Saturday work. Transportation paid, expenses reimbursed.
Which one of the following is the best inference from the above advertisement?

(A) Gender-discriminatory
(B) Xenophobic
(C) Not designed to make the post attractive
(D) Not gender-discriminatory

[2013: 1 Mark]

15. Complete the sentence: Universalism is to particularism as diffuseness is to_____ .

(A) specificity (B) neutrality
(C) generality (D) adaptation

[2013: 1 Mark]

16. Were you a bird, you _____ in the sky.

(A) would fly (B) shall fly
(C) should fly (D) shall have flown

[2013: 1 Mark]

17. Which one of the following options is the closest in meaning to the word given below?
Nadir

(A) Highest (B) Lowest
(C) Medium (D) Integration

[2013: 1 Mark]

18. Choose the grammatically INCORRECT sentence:

(A) He is of Asian origin.
(B) They belonged to Africa.
(C) She is an European.
(D) They migrated from India to Australia.

[2013: 2 Marks]

19. After several defeats in wars, Robert Bruce went in exile and wanted to commit suicide. Just before committing suicide, he came across a spider attempting tirelessly to have its net. Time and again, the spider failed but that did not deter it to refrain from making attempts. Such attempts by the spider made Bruce curious. Thus, Bruce started observing the near-impossible goal of the spider to have the net. Ultimately, the spider succeeded in having its net despite several failures. Such act of the spider encouraged Bruce not to commit suicide. And then, Bruce went back again and won many a battle, and the rest is history.
Which of the following assertions is best supported by the above information?

(A) Failure is the pillar of success.
(B) Honesty is the best policy.
(C) Life begins and ends with adventures.
(D) No adversity justifies giving up hope.

[2014: 1 Mark, SET 1]

20. Choose the most appropriate phrase from the options given below to complete the following sentence.
The aircraft _____ take off as soon as its flight plan was filed.

(A) is allowed to (B) will be allowed to
(C) was allowed to (D) has been allowed to

[2014: 1 Mark, SET 1]

21. Choose the most appropriate word from the options given below to complete the following sentence.
Many ancient cultures attributed disease to supernatural causes. However, modern science has largely helped _____such notions.

(A) impel (B) dispel
(C) propel (D) repel

[2014: 1 Mark, SET 2]

22. Choose the most appropriate word from the options given below to complete the following sentence.
Communication and interpersonal skills are _____ important in their own ways.

(A) each (B) both
(C) all (D) either

R. All of them thought that easily they could lay their hands on gold and become wealthy overnight.

S. About a hundred years ago, the news that gold had been discovered in Kolar spread like wildfire and the whole State was in raptures.

(A) P → Q → R → S (B) Q → S → R → P

(C) S → Q → P → R (D) S → P → R → Q

ANSWER KEY									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
D	B	C	D	A	A	C	B	C	A
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
B	A	D	D	A	A	B	C	D	C
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	B	B	C	B	B	A	B	B	B
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
A	C	B	B	B	B	A	A	B	A
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
C	B	C	A	B	A	B	B	A	D
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
C	C	B	C	A	D	D	C	B	C
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
A	D	A	C	D	A	C	C	B	C
71	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**
A	B	A	D	B	A	C	A	C	B
81	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**
D	A	A	B	C	D	A	D	B	C
91	**92**	**93**	**94**	**95**	**96**	**97**	**98**		
A	B	C	A	B	A	A	D		

EXPLANATION

1. **Explanation: (D)** "conserve" best fits because it means to protect resources from depletion, aligning directly with responsible resource management. Options A, B, and C lack this clear action-oriented approach for preserving resources. "Conserve" specifically addresses sustainable use.

2. **Explanation: (B)** "Circuitous" means taking a roundabout or indirect route rather than the shortest way. Among the options, (B) indirect directly matches this definition. Meaning of other words like, Cyclic: following a repeated pattern, Confusing: Difficult to understand, Crooked: not straight or even.

3. **Explanation: (C)** "Betrayed" means unintentionally revealed or exposed. The sentence suggests that his casual remarks on politics revealed his lack of seriousness about the subject. Therefore, "betrayed" best completes the sentence by indicating that his remarks exposed his true attitude. The other options do not convey this unintended revelation.

4. **Explanation: (D)** The passage highlights that modern warfare targets civilians and mentions chemical agents are suited for this. It expresses regret that some military personnel consider chemical agents useful tools for their objectives. Therefore, the main point is that people in military establishments like to use chemical agents in war. So, option (D) is the correct answer.

5. **Explanation: (A)** The word most nearly opposite in meaning to "Amalgamate" is split. "Amalgamate" means to combine or unite, while "split" means to divide or separate into parts, making them antonyms.

6. **Explanation: (A)** "Inexplicable" refers to something that cannot be explained or accounted for, and "incomprehensible" means something that cannot be understood, making them synonymous.

7. **Explanation: (C)** "I contemplated **visiting** Singapore for my vacation but decided against it. The verb "contemplated" is usually followed by a gerund (a verb ending in -ing), so "visiting" fits grammatically and conveys the intended meaning.

8. **Explanation: (B)** Understated, tentative, and restrained all suggest holding back or being limited in expression. If you're trying to make a strong impression, being restrained would contradict that goal, just like being understated or tentative.

9. **Explanation: (C)** 'What the leading causes of death are ' is not typically included in a bereavement unit. Bereavement education focuses on coping with loss, understanding emotional stages, and supporting others. Writing condolence letters and providing support are practical skills related to grief. Understanding causes of death is more about medical information and doesn't address the emotional aspects of bereavement.

10. **Explanation: (A)** When referring to animals in relative clauses, **"that"** is generally used for specificity. "Who" and "whom" are typically used for people, while "which" is generally used for objects or when the animal is not being referred to personally. Hence, the sentence should read: "Suresh's dog is the one **that** was hurt in the stampede."

11. **Explanation: (B)** "Setbacks" appropriately contrasts with the mission's success, indicating challenges overcome. The other options don't convey this opposing relationship effectively.

12. **Explanation: (A)** "Mitigate" means to make something less severe or intense, which is synonymous with "diminish." The other options do not share this meaning.

13. **Explanation: (D)** The usage of 'less' is wrong in option 4. 'Less' is generally used as a way of comparing two quantities or amounts. Here, the word 'less' needs to be replaced with the words 'little' or 'low'.

14. **Explanation: (D)** The advertisement uses gender-neutral terms like "persons" without specifying any gender. There are no requirements that exclude any gender. Therefore, it is not gender-discriminatory.

15. **Explanation: (A)** Universalism is the opposite of particularism, meaning that it applies to everyone or everything. Similarly, diffuseness is the opposite of specificity, meaning that it is broad or general.

16. **Explanation: (A)** The sentence is a conditional statement (using "were" in the past tense), which typically requires a hypothetical or unreal outcome. In this case, "would" is used to express a hypothetical action in the present or future, making, would fly the correct choice.

17. **Explanation: (B)** The word nadir refers to the lowest point, whether it is in a person's fortunes or in a situation. Therefore, the closest meaning is Lowest.

18. **Explanation: (C)** Since European begins with a consonant sound (the Y sound in You-ropean), the correct article is a instead of an. Therefore, option (C): ‘She is an European’ is grammatically incorrect, as it should be She is a European.

19. **Explanation: (D)** The story illustrates how observing the spider's persistence, despite repeated failures, inspired Robert Bruce not to give up hope, even in the face of adversity. This aligns closely with the idea that no challenge or hardship should lead one to abandon hope.

20. **Explanation: (C)** The phrase "as soon as its flight plan was filed" indicates a completed action in the past. To match this past action, the verb phrase in the blank should also be in the past tense. Among the options, only "was allowed to" is in the past tense, making it the most suitable choice to complete the sentence.

21. **Explanation: (B)** The sentence suggests that modern science has helped to remove or eliminate the belief in supernatural causes for disease. The word "dispel" means to drive away or eliminate a belief, idea, or feeling, making it the most appropriate choice here.

22. **Explanation: (B)** Communication skills help you express ideas clearly, while interpersonal skills help you build relationships and understand others' perspectives. Both are crucial for effective teamwork and collaboration. Together, they enable successful and meaningful interactions in any setting.

23. **Explanation: (B)** In English, when using an "if" clause to talk about a probable future condition, the simple present tense is used in the "if" clause, not the future tense. "Gets" is the correct form to indicate that resting will help her feel better.

24. **Explanation: (C)** "Bear" means to endure or tolerate something unpleasant, which fits the context of the sentence. "Losing" is the correct spelling of the word meaning "not winning." She could not bear the thought of losing the election to her bitter rival.

25. **Explanation: (B)** When the value of the Indian Rupee decreases relative to the U.S. dollar (from 60 to 65 INR per USD), it means the Rupee has lost value or depreciated against the dollar.

26. **Explanation: (B)** "Advice" is a noun, meaning guidance or recommendations offered to someone. The verb form is "advise."

27. **Explanation: (A)** "Dissent" means to hold or express opinions that are different from those officially held, which closely aligns with "freedom to disagree" in the context of a democracy.

28. **Explanation: (B)** In common usage, "revert" often means "to respond" or "get back to someone" in business or informal communication. Tom is expecting a reply, so the correct answer is to get back to him.

29. Explanation: (B) "Vindicated" means to be proven right or justified, especially after being doubted or criticized. "Substantiated" is closest in meaning, as it implies being confirmed or justified.

30. Explanation: (B) The phrase "as well as" is not a coordinating conjunction like "and." It doesn't make the subject plural. The main subject of the sentence is "Dhoni," which is singular. Therefore, the correct verb form is "was", to agree with the singular subject.

31. Explanation: (A) The word "awkward" means lacking skill or grace, which is similar in meaning to "inept." The other options do not match this meaning: Graceful (opposite of awkward), Suitable (appropriate), Dreadful (terrible).

32. Explanation: (C) The adverb form of the adjective "misogynous" is "misogynously." Adverbs typically describe how an action is performed, and adding "-ly" to an adjective often turns it into an adverb.

33. Explanation: (B) Here, from the first part it is evident that the action happened in the past hence the word 'corrected' is used. But since the students have already corrected the errors in the past it is clear that those errors were marked by the instructor much before they corrected it. Thus, the use of simple past is not enough here and so there is an error in this part. Past perfect tense must be used here and the sentence should read 'The students corrected all the errors that the instructor had marked on the answer book.' Thus, answer B is the correct one.

34. Explanation: (B)

Statement (iv) is valid because the passage mentions the gradual sidelining of arts in school curricula, which prompted the artists to act.

Statement (i) is valid as the artists were disappointed by the lack of increased funding, indicating an expectation.

Statement (iii) is irrelevant, as the passage does not imply the Chief Minister is an artist.

Statement (ii) lacks support, as there is no indication of the Chief Minister's receptiveness. Thus, option (B) is correct.

35. Explanation: (B) The sentence is in the past hypothetical context, indicating something the athlete *did not do* but *should have done* to achieve a different outcome. "Should have practiced" fits this context as it refers to an action that ideally would have been completed in the past.

36. Explanation: (B) "Viaticum" refers to provisions for a journey or the last rites given to a person before a journey (often used figuratively for a journey). It can also relate to travel or a journey, making it the closest match to "connotation of a road or way."

37. Explanation: (A) "Let us alternate" is the only option that forms a grammatically correct and meaningful phrase, suggesting taking turns or switching. The other options—introvert, atheist, and altruist—do not fit in this context.

38. Explanation: (A) Option (A) is correct because after prepositions like "between," pronouns should be in the objective case ("me" instead of "I"). So, "between you and me" is grammatically correct. Options (B) and (C) incorrectly use "I," and option (D) changes the meaning by excluding "you" from the agreement.

39. Explanation: (B) The correct sequence is: 5, 2, 4, 3.

40. Explanation: (A) This means that although something may appear lifeless, it actually contains dormant life within it. The word "harbours" best fits because it suggests that life is concealed or held within something that seems inactive or lifeless.

41. Explanation: (C) The idiom "fish out of water" means someone who feels out of place or uncomfortable in a new or unfamiliar environment. This phrase best describes the boy from the town in the sleepy village.

42. Explanation: (B) "Eluding" means escaping or avoiding, and "elusive" means difficult to catch or find. In this context, the thief avoids capture, making "eluding" and "elusive" correctly used.

43. Explanation: (C) Option (C) is correct because it makes the sentence grammatically correct and meaningful. The adverb "necessarily" properly modifies the verb "reflects," indicating that the increase in productivity inevitably shows greater efforts by employees. Options (A) and (B) are grammatically incorrect or awkward. Therefore, option (C) is the best replacement.