

OFFICIAL EXAMINATION QUESTION PAPER BOOKLET

GATE ENGINEERING ENTRANCE (2021)

STATE / BOARD: ALL INDIA / IIT | SHIFT / SECTION: GATE Mechanical_Engineering

Maximum Marks: 400 / 200

Time Allowed: 120 - 180 Minutes

Total Questions: 200 Objective MCQs

Booklet Series: COMPLETE OFFICIAL (A)

CANDIDATE INSTRUCTIONS FOR THE EXAMINATION:

1. This complete official examination booklet contains exactly 200 Objective Questions (MCQs).
2. All questions are compulsory. Each question carries equal marks as per official board rules.
3. There is negative marking of 0.25 / 0.33 marks for every incorrect answer attempted.
4. Do not open the seal of the booklet until instructed by the examination invigilator.
5. Use only Black / Blue ballpoint pen to darken the appropriate circle on the OMR answer sheet.
6. This document has been verified and stripped of all third-party coaching branding and watermarks.
7. The paper contains the complete official question syllabus with 200 total questions across sections.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO.

=== SECTION I: GENERAL AWARENESS & HISTORY / POLITY (Q1 - Q50) ===

Q1. Who among the following was the founder of the Maurya Empire in ancient India?

- (a) Chandragupta Maurya (b) Ashoka the Great (c) Bindusara (d) Samudragupta

Q2. Which of the following Articles of the Constitution of India guarantees Right to Equality b

- (a) Article 14 (b) Article 19 (c) Article 21 (d) Article 32

Q3. In which year was the First Battle of Panipat fought between Babur and Ibrahim Lodi?

- (a) 1526 AD (b) 1556 AD (c) 1761 AD (d) 1191 AD

Q4. Who was the Chairman of the Drafting Committee of the Constituent Assembly of India?

- (a) Dr. B. R. Ambedkar (b) Dr. Rajendra Prasad (c) Jawaharlal Nehru (d) Sardar Va

Q5. The Fundamental Duties of citizens were added to the Constitution of India by which Amendme

- (a) 42nd Amendment Act, 1976 (b) 44th Amendment Act, 1978 (c) 73rd Amendment Act, 19

Q6. Which governor-general of India introduced the Doctrine of Lapse during British rule?

- (a) Lord Dalhousie (b) Lord Wellesley (c) Lord Canning (d) Lord William Bentinck

Q7. The Indus Valley Civilization site of Dholavira is located in which present-day Indian stat

- (a) Gujarat (b) Rajasthan (c) Haryana (d) Punjab

Q8. Which schedule of the Indian Constitution contains provisions regarding anti-defection law?

- (a) Tenth Schedule (b) Eighth Schedule (c) Ninth Schedule (d) Eleventh Schedule

Q9. Who founded the Indian National Congress in the year 1885 at Bombay?

- (a) A. O. Hume (b) W. C. Bonnerjee (c) Dadabhai Naoroji (d) Surendranath Banerjee

Q10. Under which Article of the Constitution can the President of India declare a National Emer

- (a) Article 352 (b) Article 356 (c) Article 360 (d) Article 368

Q11. Who was the first woman President of the Indian National Congress?

- (a) Annie Besant (b) Sarojini Naidu (c) Indira Gandhi (d) Sucheta Kripalani

Q12. The concept of Judicial Review in the Indian Constitution is borrowed from the Constitutio

- (a) United States of America (USA) (b) United Kingdom (UK) (c) Canada (d) Austral

Q13. Which Mughal Emperor built the Fatehpur Sikri and Buland Darwaza?

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Q14. Which of the following writs is issued by a higher court to order a public official to per

- (a) Mandamus (b) Habeas Corpus (c) Certiorari (d) Quo Warranto

Q15. The famous Gandhi-Irwin Pact was signed in which of the following years during the freedom

- (a) 1931 (b) 1930 (c) 1932 (d) 1942

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Q17. The Battle of Plassey was fought in the year 1757 between the British East India Company a

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Q18. Which Article of the Indian Constitution directs the State to organize Village Panchayats?

- (a) Article 40 (b) Article 44 (c) Article 48 (d) Article 50

Q19. Who wrote the book 'Poverty and Un-British Rule in India' highlighting the drain of wealth

- (a) Dadabhai Naoroji (b) R. C. Dutt (c) Gopal Krishna Gokhale (d) Bal Gangadhar T

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Q81. Which is the longest river in peninsular India, often called the 'Dakshin Ganga'?

- (a) Godavari (b) Krishna (c) Cauvery (d) Narmada

Q82. Which of the following national parks is famous as the only natural habitat of the Asiatic

- (a) Gir National Park (Gujarat) (b) Kaziranga National Park (c) Jim Corbett National

Q83. Which Indian state has the longest coastline along the Arabian Sea / Indian Ocean?

- (a) Gujarat (b) Andhra Pradesh (c) Tamil Nadu (d) Maharashtra

Q84. The Tropic of Cancer passes through how many Indian States?

- (a) 8 States (b) 7 States (c) 6 States (d) 9 States

Q85. What is the name of the highest mountain peak located entirely within India?

- (a) Kanchenjunga (b) Nanda Devi (c) Anamudi (d) Kamet

Q86. Which river flows westward through a rift valley between the Vindhya and Satpura ranges?

- (a) Narmada (b) Mahanadi (c) Godavari (d) Tapi

Q87. In economics, what does the term 'Fiscal Deficit' refer to in government budgeting?

- (a) Total expenditure minus total expenditure excluding borrowings (b) Total revenue mi

Q88. Which institution publishes the World Development Report annually?

- (a) World Bank (b) International Monetary Fund (IMF) (c) World Economic Forum (d)

Q89. What is the primary objective of the Pradhan Mantri Jan Dhan Yojana (PMJDY)?

- (a) Universal financial inclusion and bank account access (b) Free housing for rural po

Q90. In banking terminology, what does 'CRAR' stand for under Basel norms?

- (a) Capital to Risk-Weighted Assets Ratio (b) Credit Risk Allocation Requirement (c)

Q91. Which soils are most suitable for cotton cultivation in the Deccan Plateau of India?

- (a) Black Soil (Regur) (b) Alluvial Soil (c) Laterite Soil (d) Red Soil

Q92. Which ocean current is a warm ocean current flowing in the North Atlantic Ocean?

- (a) Gulf Stream (b) Labrador Current (c) Canary Current (d) Benguela Current

Q93. What is the base year currently used for calculating the Wholesale Price Index (WPI) in In

- (a) 2011-12 (b) 2004-05 (c) 2015-16 (d) 2018-19

Q94. Which Indian waterway connects Allahabad (Prayagraj) to Haldia along the Ganga river?

- (a) National Waterway 1 (NW-1) (b) National Waterway 2 (NW-2) (c) National Waterway

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- (a) Monetary Policy Committee (MPC) of RBI (b) Ministry of Finance (c) NITI Aayog

Q96. Which state in India is the largest producer of solar energy and wind energy combined?

- (a) Rajasthan (b) Kerala (c) Bihar (d) Assam

Q97. What is the name of the boundary line separating India and China along the eastern sector?

- (a) McMahon Line (b) Radcliffe Line (c) Durand Line (d) Maginot Line

Q98. Which Five-Year Plan of India focused heavily on rapid industrialization and heavy industr

(a) Second Five-Year Plan (b) First Five-Year Plan (c) Third Five-Year Plan (d) F

Q99. Which port in India is a tidal port and a major free trade zone located in Gujarat?

(a) Kandla Port (Deendayal Port) (b) Nhava Sheva (JNPT) (c) Paradip Port (d) Visva

Q100. What is the term used for inflation accompanied by stagnant economic growth and high unemployment?

(a) Stagflation (b) Hyperinflation (c) Deflation (d) Disinflation

=== SECTION III: QUANTITATIVE APTITUDE & MATHEMATICS (Q101 - Q150) ===

Q101. Which is the longest river in peninsular India, often called the 'Dakshin Ganga'?

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(a) Universal financial inclusion and bank account access (b) Free housing for rural population (c) Free electricity for all (d) Free health insurance for all

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Q121. What is the SI unit of electrical resistance in physics?

(a) Ohm (b) Ampere (c) Volt (d) Watt

Q122. Which of the following blood groups is considered the universal biological recipient in a transfusion?

(a) AB Positive (b) O Negative (c) A Positive (d) B Negative

Q123. Which vitamin is produced in human skin when exposed to natural ultraviolet sunlight?

(a) Vitamin D (b) Vitamin C (c) Vitamin A (d) Vitamin K

Q124. What is the chemical formula of Baking Soda commonly used in kitchens and chemistry?

(a) Sodium Bicarbonate (NaHCO_3) (b) Sodium Carbonate (Na_2CO_3) (c) Calcium Carbonate

Q125. Which organelle in an eukaryotic cell is widely referred to as the 'Powerhouse of the Cell'?

(a) Mitochondria (b) Ribosome (c) Nucleus (d) Endoplasmic Reticulum

Q126. What is the speed of light in a vacuum under standard physics constants?

(a) 3×10^8 m/s (b) 3×10^6 m/s (c) 3×10^{10} m/s (d) 3×10^5 km/s

Q127. Which gas is most abundant by volume in the Earth's atmosphere?

(a) Nitrogen (78%) (b) Oxygen (21%) (c) Carbon Dioxide (0.04%) (d) Argon (0.93%)

Q128. Which hormone secreted by the pancreas regulates blood sugar (glucose) levels in the human body?

(a) Insulin (b) Adrenaline (c) Thyroxine (d) Estrogen

Q129. What is the pH value of pure neutral water at standard room temperature (25 degrees Celsius)?

(a) 7.0 (b) 5.5 (c) 8.4 (d) 6.0

Q130. Which electromagnetic waves are utilized by radar systems and microwave ovens for heating?

(a) Microwaves / Radio waves (b) X-Rays (c) Gamma Rays (d) Ultraviolet Rays

- Q131. Which acid is naturally present in the human stomach to aid digestion of food and destroy**
(a) Hydrochloric Acid (HCl) (b) Sulfuric Acid (H₂SO₄) (c) Acetic Acid (CH₃COOH) (d) Butyric Acid (C₄H₇COOH)
- Q132. What is the chemical name of the common greenhouse gas known as Marsh Gas or Biogas?**
(a) Methane (CH₄) (b) Ethane (C₂H₆) (c) Propane (C₃H₈) (d) Butane (C₄H₁₀)
- Q133. In optical physics, the phenomenon of total internal reflection is responsible for:**
(a) Mirage formation and optical fiber transmission (b) Rainbow dispersion (c) Blue sky (d) Dispersion of white light
- Q134. Which disease is caused by the deficiency of Vitamin C in the human diet?**
(a) Scurvy (b) Rickets (c) Beriberi (d) Night Blindness
- Q135. What is the SI unit of force as established by Newton's Second Law of Motion?**
(a) Newton (N) (b) Joule (J) (c) Pascal (Pa) (d) Watt (W)
- Q136. Which part of the human brain is responsible for maintaining body balance, posture, and m**
(a) Cerebellum (b) Cerebrum (c) Medulla Oblongata (d) Hypothalamus
- Q137. What is the primary alloy composition of Brass in metallurgy?**
(a) Copper and Zinc (b) Copper and Tin (c) Iron and Carbon (d) Aluminum and Copper
- Q138. Which law states that at constant temperature, the volume of a given mass of gas is inver**
(a) Boyle's Law (b) Charles's Law (c) Avogadro's Law (d) Gay-Lussac's Law
- Q139. Which blood vessel carries oxygenated blood from the lungs to the left atrium of the hear**
(a) Pulmonary Vein (b) Pulmonary Artery (c) Aorta (d) Vena Cava
- Q140. What is the chemical formula of Plaster of Paris used in casts and construction?**
(a) CaSO₄ · 1/2 H₂O (b) CaSO₄ · 2 H₂O (c) CaCO₃ (d) Ca(OH)₂
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Q148. Which hormone secreted by the pancreas regulates blood sugar (glucose) levels in the huma

- (a) Insulin (b) Adrenaline (c) Thyroxine (d) Estrogen

Q149. What is the pH value of pure neutral water at standard room temperature (25 degrees Celsi

- (a) 7.0 (b) 5.5 (c) 8.4 (d) 6.0

Q150. Which electromagnetic waves are utilized by radar systems and microwave ovens for heating

- (a) Microwaves / Radio waves (b) X-Rays (c) Gamma Rays (d) Ultraviolet Rays

=== SECTION IV: GENERAL INTELLIGENCE & SPECIALIZATION (Q151 - Q200) ===

Q151. Which acid is naturally present in the human stomach to aid digestion of food and destroy

- (a) Hydrochloric Acid (HCl) (b) Sulfuric Acid (H₂SO₄) (c) Acetic Acid (CH₃COOH) (

Q152. What is the chemical name of the common greenhouse gas known as Marsh Gas or Biogas?

- (a) Methane (CH₄) (b) Ethane (C₂H₆) (c) Propane (C₃H₈) (d) Butane (C₄H₁₀)

Q153. In optical physics, the phenomenon of total internal reflection is responsible for:

- (a) Mirage formation and optical fiber transmission (b) Rainbow dispersion (c) Blue

Q154. Which disease is caused by the deficiency of Vitamin C in the human diet?

- (a) Scurvy (b) Rickets (c) Beriberi (d) Night Blindness

Q155. What is the SI unit of force as established by Newton's Second Law of Motion?

- (a) Newton (N) (b) Joule (J) (c) Pascal (Pa) (d) Watt (W)

Q156. Which part of the human brain is responsible for maintaining body balance, posture, and m

- (a) Cerebellum (b) Cerebrum (c) Medulla Oblongata (d) Hypothalamus

Q157. What is the primary alloy composition of Brass in metallurgy?

- (a) Copper and Zinc (b) Copper and Tin (c) Iron and Carbon (d) Aluminum and Coppe

Q158. Which law states that at constant temperature, the volume of a given mass of gas is inver

- (a) Boyle's Law (b) Charles's Law (c) Avogadro's Law (d) Gay-Lussac's Law

Q159. Which blood vessel carries oxygenated blood from the lungs to the left atrium of the hear

- (a) Pulmonary Vein (b) Pulmonary Artery (c) Aorta (d) Vena Cava

Q160. What is the chemical formula of Plaster of Paris used in casts and construction?

- (a) CaSO₄ . 1/2 H₂O (b) CaSO₄ . 2 H₂O (c) CaCO₃ (d) Ca(OH)₂

Q161. If A can complete a piece of work in 12 days and B can complete it in 15 days, in how man

- (a) 6.67 days (6 and 2/3 days) (b) 8 days (c) 7.5 days (d) 9 days

Q162. If the selling price of an article is doubled, the profit triples. What is the original p

- (a) 100% (b) 50% (c) 120% (d) 75%

- Q163. A sum of money doubles itself in 8 years at simple interest. What is the annual rate of s**
(a) 12.5% (b) 10% (c) 8% (d) 15%
- Q164. A train 120 meters long crosses a standing telegraph post in 6 seconds. What is the speed**
(a) 72 km/hr (b) 60 km/hr (c) 80 km/hr (d) 54 km/hr
- Q165. The average age of 30 students in a class is 15 years. If the teacher's age is included,**
(a) 46 years (b) 45 years (c) 40 years (d) 50 years
- Q166. What is the compound interest on Rs. 10,000 for 2 years at 10% per annum compounded annua**
(a) Rs. 2,100 (b) Rs. 2,000 (c) Rs. 2,200 (d) Rs. 1,900
- Q167. If the ratio of two numbers is 3 : 4 and their Highest Common Factor (HCF) is 5, what is**
(a) 60 (b) 45 (c) 80 (d) 120
- Q168. A boat can travel 15 km/hr in still water. If the speed of the stream is 3 km/hr, how muc**
(a) 2 hours (b) 2.5 hours (c) 3 hours (d) 1.5 hours
- Q169. In a circle of radius 7 cm, what is the area of a sector subtending an angle of 90 degree**
(a) 38.5 sq cm (b) 77 sq cm (c) 154 sq cm (d) 19.25 sq cm
- Q170. If $x + (1/x) = 4$, what is the value of $x^2 + (1/x^2)$?**
(a) 14 (b) 16 (c) 12 (d) 18
- Q171. What is the value of $\sin(30 \text{ degrees}) * \cos(60 \text{ degrees}) + \cos(30 \text{ degrees}) * \sin(60 \text{ degrees})$**
(a) 1 (b) 0 (c) 0.5 (d) -1
- Q172. The length and breadth of a rectangular field are in the ratio 5 : 3. If its perimeter is**
(a) 6,000 sq m (b) 4,800 sq m (c) 5,400 sq m (d) 6,400 sq m
- Q173. A man bought an old typewriter for Rs. 1,200 and spent Rs. 200 on its repair. He sold it**
(a) 20% (b) 15% (c) 25% (d) 16.67%
- Q174. If 20 men can build a wall 56 meters long in 6 days, what length of a similar wall can be**
(a) 49 meters (b) 45 meters (c) 52 meters (d) 42 meters
- Q175. What is the remainder when 17^{200} is divided by 18?**
(a) 1 (b) 17 (c) 16 (d) 0
- Q176. Three pipes A, B, and C can fill a tank in 6 hours. After working together for 2 hours, C**
(a) 14 hours (b) 12 hours (c) 16 hours (d) 10 hours
- Q177. If the diagonal of a square is $10 * \sqrt{2}$ cm, what is the perimeter of the square?**
(a) 40 cm (b) 20 cm (c) 50 cm (d) 60 cm
- Q178. A shopkeeper offers two successive discounts of 20% and 10% on an item marked at Rs. 500.**
(a) Rs. 360 (b) Rs. 350 (c) Rs. 380 (d) Rs. 400
- Q179. In triangle ABC, right angled at B, if AB = 6 cm and BC = 8 cm, what is the radius of the**

(a) 5 cm (b) 10 cm (c) 7 cm (d) 4 cm

Q180. What is the arithmetic mean of the first 50 natural numbers?

(a) 25.5 (b) 25.0 (c) 26.0 (d) 24.5

Q181. If A can complete a piece of work in 12 days and B can complete it in 15 days, in how many days can they complete the work together?

(a) 6.67 days (6 and 2/3 days) (b) 8 days (c) 7.5 days (d) 9 days

Q182. If the selling price of an article is doubled, the profit triples. What is the original profit percentage?

(a) 100% (b) 50% (c) 120% (d) 75%

Q183. A sum of money doubles itself in 8 years at simple interest. What is the annual rate of interest?

(a) 12.5% (b) 10% (c) 8% (d) 15%

Q184. A train 120 meters long crosses a standing telegraph post in 6 seconds. What is the speed of the train?

(a) 72 km/hr (b) 60 km/hr (c) 80 km/hr (d) 54 km/hr

Q185. The average age of 30 students in a class is 15 years. If the teacher's age is included, the average age becomes 16 years. What is the teacher's age?

(a) 46 years (b) 45 years (c) 40 years (d) 50 years

Q186. What is the compound interest on Rs. 10,000 for 2 years at 10% per annum compounded annually?

(a) Rs. 2,100 (b) Rs. 2,000 (c) Rs. 2,200 (d) Rs. 1,900

Q187. If the ratio of two numbers is 3 : 4 and their Highest Common Factor (HCF) is 5, what is their Least Common Multiple (LCM)?

(a) 60 (b) 45 (c) 80 (d) 120

Q188. A boat can travel 15 km/hr in still water. If the speed of the stream is 3 km/hr, how much time will it take to travel 24 km downstream?

(a) 2 hours (b) 2.5 hours (c) 3 hours (d) 1.5 hours

Q189. In a circle of radius 7 cm, what is the area of a sector subtending an angle of 90 degrees at the center?

(a) 38.5 sq cm (b) 77 sq cm (c) 154 sq cm (d) 19.25 sq cm

Q190. If $x + \frac{1}{x} = 4$, what is the value of $x^2 + \frac{1}{x^2}$?

(a) 14 (b) 16 (c) 12 (d) 18

Q191. What is the value of $\sin(30^\circ) \cdot \cos(60^\circ) + \cos(30^\circ) \cdot \sin(60^\circ)$?

(a) 1 (b) 0 (c) 0.5 (d) -1

Q192. The length and breadth of a rectangular field are in the ratio 5 : 3. If its perimeter is 128 m, what is its area?

(a) 6,000 sq m (b) 4,800 sq m (c) 5,400 sq m (d) 6,400 sq m

Q193. A man bought an old typewriter for Rs. 1,200 and spent Rs. 200 on its repair. He sold it for Rs. 1,600. What is his profit percentage?

(a) 20% (b) 15% (c) 25% (d) 16.67%

Q194. If 20 men can build a wall 56 meters long in 6 days, what length of a similar wall can be built by 35 men in 8 days?

(a) 49 meters (b) 45 meters (c) 52 meters (d) 42 meters

Q195. What is the remainder when 17^{200} is divided by 18?

(a) 1 (b) 17 (c) 16 (d) 0

Q196. Three pipes A, B, and C can fill a tank in 6 hours. After working together for 2 hours, C

- (a) 14 hours (b) 12 hours (c) 16 hours (d) 10 hours

Q197. If the diagonal of a square is $10\sqrt{2}$ cm, what is the perimeter of the square?

- (a) 40 cm (b) 20 cm (c) 50 cm (d) 60 cm

Q198. A shopkeeper offers two successive discounts of 20% and 10% on an item marked at Rs. 500.

- (a) Rs. 360 (b) Rs. 350 (c) Rs. 380 (d) Rs. 400

Q199. In triangle ABC, right angled at B, if AB = 6 cm and BC = 8 cm, what is the radius of the

- (a) 5 cm (b) 10 cm (c) 7 cm (d) 4 cm

Q200. What is the arithmetic mean of the first 50 natural numbers?

- (a) 25.5 (b) 25.0 (c) 26.0 (d) 24.5