

CGCAT FOR TECHNICAL OFFICERS ENTRY
(Mechanical)
Model Question Paper

Instructions for Candidates

Time Allotted: 02 Hrs

1. Total number of Questions 100. Each Question is of four marks.
 2. One mark will be deducted for every wrong answer.
 3. No mark will be deducted for un-attempted Question.
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(Section-A)

Q1-6 Select the most appropriate word from the options against each number:-

As home entertainment, television is rapidly becoming more (4) than any other form. A news broadcast becomes more immediate when people (5) actually see the scene (6) question and the movement of the figures. Films could be viewed in the (7) of the home and a variety of shows are also available. One of the advantages of travel programmes is the (8) of faraway places which many viewers would not (9) see.

- Q1. (a) interesting (b) popular (c) powerful (d) purposeful
Q2. (a) could (b) would (c) might (d) shall
Q3. (a) of (b) with (c) as (d) in
Q4. (a) surroundings (b) assistance (c) comfort (d) privilege
Q5. (a) glimpses (b) image (c) portrait (d) picture
Q6. (a) possible (b) rather (c) else (d) otherwise

Q7-10. Choose the word which is nearest in meaning to the given word:-

- Q7. Intransigent
(a) Authoritative (b) Impersonal (c) Strenuous (d) Unbending
Q8. Intimidate
(a) Mislead (b) Misplace (c) Frighten (d) Demoralise
Q9. Sporadic
(a) Epidemic (b) Whirling (c) Occasional (d) Stagnant
Q10. Genesis
(a) Style (b) Beginning (c) Movement (d) Relevant

(Section-B)

- Q11. A Train travelling at a uniform speed clears a platform 200 m long in 10 seconds and passes a telegraph post in 5 seconds. The speed of the train is
(a) 36 km/h (b) 39 km/h (c) 72 km/h (d) 78 km/h
- Q12. The price of sugar increases by 20% due to the festive season. By what percentage should a family reduce the consumption of sugar so that there is no change in the expenditure?
(a) 20% (b) $18\frac{1}{2}\%$ (c) $16\frac{2}{3}\%$ (d) $16\frac{1}{2}\%$
- Q13. A's salary is 20% lower than B's salary, which is 15% lower than C's salary. By how much percent is C's salary more than A's salary?

- (a) 44.05% (b) 45.05% (c) 46.05% (d) 47.05%

Q14. The average weight of 5 men is increased by 2 Kg when one of the men whose weight is 60 Kg is replaced by a new man. The weight of the new man is

- (a) 50 Kg (b) 65 Kg (c) 68 Kg (d) 70 Kg

Q15. A and B can do a piece of work in 18 days; B and C can do it in 24 days, A and C can do it in 36 days. In how many days B alone can finish the work?

- (a) 48 days (b) 45 days (c) $28 \frac{4}{5}$ days (d) 144 days

Q16. Choose the correct order of letters which are required to form a correct meaningful word

VARSTE

- (A) 2,3,1,6,4,5
 (B) 3,2,4,5,6,1
 (C) 4,5,2,3,1,6
 (D) 6,3,4,5,2,1

Q17. In these series, you will be looking at both the letter pattern and the number pattern. Fill the blank in the series.

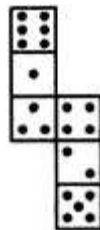
SCD, TEF, UGH, _____, WKL

- (A) CMN (B) VIJ
 (C) IJT (D) UJI

Q18. Introducing a boy, a girl said, "He is the son of the daughter of the father of my uncle." How is the boy related to the girl?

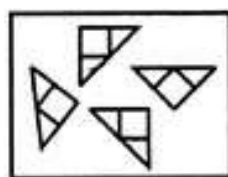
- (A) Brother (B) Nephew
 (C) Uncle (D) Son-in-law

Q19. How many dots lie opposite to the face having three dots, when the given figure is folded to form a cube?

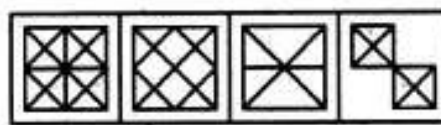


- (A) 2 (B) 3
 (C) 5 (D) 6

Q20. Find out which of the figures (1), (2), (3) and (4) can be formed from the pieces given in figure (X).



(X)



(1) (2) (3) (4)

- (A) 2 (B) 3
 (C) 1 (D) 4

(Section-C)

- Q21. What phenomenon is responsible for twinkling of stars?
(A) Diffraction (B) Refraction
(C) Dispersion (D) Scattering of Light
- Q22. What will be the power consumption of two 300 W bulbs, three 100 W fans and one 1200 W Refrigerator for continuous operation of 30 hours?
(A) 54 kWh (B) 60 kWh
(C) 63 kWh (D) None of these
- Q23. What type of image is formed by the eye lens on the retina?
(A) Real and erect
(B) Virtual and inverted
(C) Real and inverted
(D) Virtual and erect
- Q24. The magnetic field is the strongest at
(A) middle of the magnet.
(B) north pole.
(C) south pole.
(D) both poles.
- Q25. The heating element of an electric iron is made up of:
(A) copper
(B) nichrome
(C) aluminium
(D) iron
- Q26. There are three numbers A, B and C. A is 50% of C and B is 75% of C, then A is what percentage of B?
(A) 66.66% (B) 50%
(C) 75% (D) 80%
- Q27. A and B together can complete a particular task in 4 days. If A alone can complete the same task in 6 days, how many days will B take to complete the task if he works alone?
(A) 8 (B) 7
(C) 12 (D) None of these
- Q28. If the perimeter of a rectangle is 138 metres and the difference between the length and the breadth is 7 metres, what is the area of the rectangle?
(A) 1216 square meters (B) 1147 square metres
(C) 1184 square metres (D) 1178 square metres
- Q29. What will come in place of question mark (?) in the following question?
25% of 84 \times 24% of 85 = ?
(A) 144.4 (B) 244.4
(C) 428.4 (D) 333.4

- Q30. If in a triangle ABC, $AB = AC$, $\angle A = x + 15^\circ$, $\angle B = 2x + 25^\circ$ then value of $\angle C$
- (A) 71° (B) 51°
(C) 61° (C) 41°

(Section-D)

- Q31. Which country among the following has been declared Ebola-free by WHO?
(a) Sierra Leone (b) Liberia (c) Nigeria (d) Guinea
- Q32. How many Gold medals did India win in the Incheon Asian Games held in Oct 2014?
(a) 10 (b) 11 (c) 12 (d) 8
- Q33. Who has been appointed as the new Finance Secretary of India?
(a) Arvind Mayaram (b) Rajiv Mehrishi
(c) Kaushik Basu (d) Dinesh Gupta
- Q34. Which among the following is India's first long range subsonic cruise missile?
(a) Agni II (b) Prithvi (c) Dhanush (d) Nirbhay
- Q35. The branch of science that studies cells is called
(a) Cytology (b) Entomology (c) Homoplastic (d) Hormonology
- Q36. How many Vice Presidents are elected at the start of its each regular session of UN General Assembly?
(a) Nine (b) Fifteen (c) Two (d) Twenty one
- Q37. The highest civilian award of India 'Bharat Ratna' has been awarded to only two foreigners so far.
One of them is Nelson Mandela. The other is
(a) Marshal Tito (b) Mikhail Gorbachev
(c) Khan Abdul Ghaffar Khan (d) Abdul Wali Khan
- Q38. Sir CV Raman was awarded Nobel Prize for his work connected with which of the following phenomenon of radiation?
(a) Scattering (b) Diffraction (c) Interference (d) Polarisation
- Q39. In which city is the headquarters of Asian Development Bank located?
(a) Manila (b) Singapore (c) Bangkok (d) Jakarta
- Q40. K-15 missile is
(a) Submarine launched Ballistic Missile (SLBM)
(b) Inter Continental Ballistic Missile (ICBM)
(c) Medium Range Ballistic Missile (MRBM)
(d) Short Range Ballistic Missile (SRBM)

(Section-E)

- Q41. One quick way to view the entire drawing area is to use the Zoom command by typing_____.
- (a) type Z enter A enter (b) type Z enter E enter
(c) type SHOWALL enter (d) type ALL enter
- Q42. When setting up a mechanical drawing in AutoCAD the drafter should set the units to_____.
- (a) fractional (b) decimal (c) architectural (d) metric
- Q43. In a class B push-pull amplifier, the transistors are biased slightly above cut-off to avoid
- (a) crossover distortion (b) unusually high efficiency
(c) negative feedback (d) a low input impedance
- Q44. The depletion-mode MOSFET
- (a) can operate with only positive gate voltages
(b) can operate with only negative gate voltages
(c) cannot operate in the ohmic region
(d) can operate with positive as well as negative gate voltages
- Q45. Ailerons are used to control
- (a) Yaw of aircraft (b) pitch (c) roll (d) None of these
- Q46. Stalling of the aerofoil occurs
- (a) When the angle of attack is beyond critical angle of attack.
(b) When the angle of attack is less than critical angle of attack.
(c) Both A and B
(d) None of the above
- Q47. As per Charles' law, the volume of a given mass of a perfect gas varies _____ as its absolute temperature, when the absolute pressure remains constant.
- (a) directly (b) indirectly (c) no relation (d) none of the above
- Q48. In an extensive property of a thermodynamic system
- (a) extensive heat is transferred (b) extensive work is done
(c) extensive energy is utilised (d) none of these
- Q49. Rotary compressors are used for delivering
- (a) small quantities of air at high pressures
(b) large quantities of air at high pressures
(c) small quantities of air at low pressures
(d) large quantities of air at low pressures
- Q50. A rotary compressor is driven by an
- (a) electric motor (b) engine (c) either (a) or (b) (d) none of these
- Q51. In a centrifugal compressor, an increase in speed at a given pressure ratio causes
- (a) increase in flow (b) decrease in flow
(c) increase in efficiency (d) increase in flow and decrease in efficiency
- Q52. A large clearance Volume in a reciprocating compressor results in
- (a) reduced volume flow rate (b) increased volume flow rate
(c) lower suction pressure (d) lower delivery pressure

- Q53. Newton is unit of force. It is the unit in
(a) MKS system (b) CGS system (c) FPS system (d) none of these
- Q54. A Farad is defined as
(a) stat coulomb /volt (b) coulomb/volt (c) coulomb x volt (d) stat coulomb x volt
- Q55. Permeance of a magnetic circuit corresponds to the following quantity in electrical circuit
(a) conductivity (b) resistivity (c) conductance (d) resistance
- Q56. Hydrometer is an instrument for measuring
(a) relative humidity (b) pressure of water (c) volume of liquids (d) specific gravity
- Q57. Radioactivity is a property of
(a) atomic nuclei (b) excited electron (c) gamma rays (d) ultraviolet light
- Q58. A bar of length ' L ' meters extends by ' l ' mm under a tensile force of ' P '. The strain produced in the bar is
(a) l/L (b) $0.1 l/L$ (c) $0.01 l/L$ (d) $0.001 l/L$
- Q59. A rod is enclosed centrally in a tube and the assembly is tightened by rigid washers. If the assembly is subjected to a compressive load, then
(a) rod is under compression (b) tube is under compression
(c) both rod and tube are under compression (d) tube is under tension and rod is under compression
- Q60. The shear force and bending moment are zero at the free end of a cantilever beam, if it carries a
(a) point load at the free end (b) point load at the middle of its length
(c) uniformly distributed load over the whole length (d) none of the above
- Q61. The moment of resistance of a balanced reinforced concrete beam is based on the stresses in
(a) steel only (b) concrete only (c) steel and concrete both (d) none of these
- Q62. In a flange coupling, the flanges are coupled together by means of
(a) bolts and nuts (b) studs (c) headless taper bolts (d) none of these
- Q63. A transmission shaft includes
(a) counter shaft (b) line shaft (c) over head shaft (d) all of these
- Q64. A locking device in which the bottom cylindrical portion is recessed to receive the tip of the locking set screw, is called
(a) castle nut (b) jam nut (c) ring nut (d) sawn nut
- Q65. In a venturiflume, the flow takes place at
(a) atmospheric pressure (b) gauge pressure
(c) absolute pressure (d) none of these

- Q66. The total pressure on the top of a closed cylindrical vessel completely filled up with a liquid is
(a) directly proportional to (radius)² (b) inversely proportional to (radius)²
(c) directly proportional to (radius)⁴ (d) inversely proportional to (radius)⁴
- Q67. When the Mach number is more than 6, the flow is called
(a) subsonic flow (b) sonic flow
(c) super-sonic flow (d) hyper-sonic flow
- Q68. The discharge through a convergent mouthpiece is _____ the discharge through an internal mouthpiece of the same diameter and head of water.
(a) equal to (b) one-half (c) three fourth (d) double
- Q69. Which of the following statement is wrong?
(a) The spheroidising process is usually applied to high carbon tool steels which are difficult to machine
(b) In spheroidising process, the cementite in the granular form is produced in the structure of steel
(c) The annealing process causes complete recrystallisation in steels which have been severely cold worked and a new grain structure is formed
(d) none of the above
- Q70. Duplex process of steel making is a combination of
(a) basic bessemer and acid open hearth processes
(b) acid bessemer and basic open hearth processes
(c) acid bessemer and acid open hearth processes
(d) basic bessemer and basic open hearth processes
- Q71. The property of a material necessary for forgings, in stamping images on coins and in ornamental work, is
(a) elasticity (b) plasticity (c) ductility (d) malleability
- Q72. A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act
(a) towards the wall at its upper end (b) away from the wall at its upper end
(c) downward at its upper end (d) upward at its upper end
- Q73. The slope on the road surface generally provided on the curves is known as
(a) angle of friction (b) angle of repose (c) angle of banking (d) none of these
- Q74. For any system of coplanar forces, the condition of equilibrium is that the
(a) algebraic sum of the horizontal components of all the forces should be zero
(b) algebraic sum of the vertical components of all the forces should be zero
(c) algebraic sum of moments of all the forces about any point should be zero
(d) all of the above
- Q75. An open cycle gas turbine works on
(a) Carnot cycle (b) Otto cycle (c) Joule's cycle (d) Stirling cycle
- Q76. When the gas is cooled at constant pressure,
(a) its temperature increases but volume decreases
(b) its volume increases but temperature decreases
(c) both temperature and volume increases
(d) both temperature and volume decreases

- Q77. The effect of having excess camber is
 (a) excessive steering alignment torque (b) hard steering
 (c) too much traction (d) uneven tyre wear
- Q78. If the air-fuel mixture ignites before the spark takes place at spark plug, the condition is called
 (a) detonation (b) ignition (c) pre-ignition (d) rumble
- Q79. The diagram which shows the correct crank positions corresponding to the opening and closing of the valves, is known as
 (a) indicator diagram (b) axial force diagram
 (c) valve timing diagram (d) none of these
- Q80. In value engineering, the term value refers to
 (a) manufacturing cost of the product (b) selling price of the product
 (c) total cost of the product (d) utility of the product
- Q81. Production cost refers to prime cost plus
 (a) factory overheads
 (b) factory and administration overheads
 (c) factory, administration and sales overheads
 (d) factory, administration, sales overheads and profit
- Q82. A systematic job improvement sequence will consist of
 (a) motion study (b) time study (c) job enrichment (d) all of these
- Q83. Cast iron during machining produces
 (a) continuous chips (b) discontinuous chips
 (c) continuous chips with built-up-edge (d) none of these
- Q84. A single point thread cutting tool should ideally have
 (a) zero rake angle (b) positive rake angle
 (c) negative rake angle (d) point angle
- Q85. The cutting tool in a milling machine is mounted on
 (a) spindle (b) arbor (c) column (d) knee
- Q86. If the centre of a circle is $(-6,8)$ and it passes through the origin, then equation to its tangent at the origin is
 (a) $2y = x$ (b) $4y = 3x$ (c) $3y = 4x$ (d) $3x + 4y = 0$
- Q87. The liquid is flowing separately through each of two pipes whose diameters are in the ratio of 2:1, if the ratio of the velocities of flow in the two pipes by 1:2, then the ratio of the amounts of the liquid flowing per sec through the pipe will be
 (a) 2:1 (b) 1:1 (c) 4:1 (d) 1:8
- Q88. If $f(x) = x + |x^2 - 8|$ then the derivative of $f(x)$ at $x=3$ is
 (a) 6 (b) 7 (c) 8 (d) -8
- Q89. Given $P(A) = 1/4$, $P(B)=1/3$ and $P(A \cup B)= 1/2$. Value of $P(A/B)$ is
 (a) $1/4$ (b) $1/3$ (c) $1/6$ (d) $1/7$
- Q90. The angle between two vectors $a = i+2j-k$ and $b=2i+j+k$ is
 (a) 30 deg (b) 45 deg (c) 60 deg (d) 90 deg

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