

SET - A

Question Booklet No. 101203

PGDC CET - 2013
GROUP 1 - MECHANICAL

Maximum Time Allowed : 150 Minutes (2½ hours)
Negative Marking : (1/2) half mark

No. of Questions : 180
Maximum Marks : 360

Roll No.

Candidate's Name _____

INSTRUCTIONS

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

- Strictly follow the instructions given by Centre Supervisor / Room Invigilator and those given on the Question Booklet.
- Check the question booklet thoroughly** : In case of any defect - Misprint, Missing Question(s) or duplication of question(s)/Page(s) get the booklet changed with the booklet of the same series. No complaint shall be entertained after the entrance test.
- Use ONLY blue/black ball point pen for darkening the circles on the OMR Answer Sheet. Use of eraser, whitener (fluid) and cutting is not allowed on the OMR Answer Sheet.
- Put your signature on Side-2 of the OMR Answer Sheet and write your Name, Roll No. Category, Set A or B as given on the left hand top corner of this Question Booklet; on Side-1 of the OMR Answer Sheet and shade the required circles in Serial Numbers 1 to 9.
- The test is of objective type containing 180 multiple choice questions (MCQs). There are 30 questions of Aptitude/ Mental Ability as Part I, 60 questions of General Engineering as Part II and 90 questions of concerned Discipline of main Engineering as Part III. Group 1 is for **Mechanical** and Group 2 is for **Electrical**. Each objective question is followed by four responses. Choose the correct/best response and mark your response on the OMR Answer Sheet and not in the Question Booklet.
- Mark answer only in the space provided. DO NOT make any stray mark anywhere on the OMR Answer Sheet. DO NOT fold or wrinkle the OMR Answer Sheet. Rough work MUST NOT be done on the answer sheet. Use your question booklet for this purpose.
- Completely darken the CIRCLE so that the number inside the CIRCLE is not visible as shown in the example below.

| | |
|----------------|---|
| Correct Method | Wrong Methods |
| ① ● ③ ④ | ① ⊗ ③ ④ / ① ⊗ ③ ④ / ① ⊗ ③ ④ / ① ⊗ ③ ④ / ① ● ③ ● |
- Darken ONLY ONE CIRCLE for each answer. If you darken more than one circle, it will be treated as a wrong answer.
- If a question is left blank i.e. no answer is given by the candidate, no marks will be awarded or deducted. If a candidate gives more than one answer, it will be treated as wrong answer. Hence (1/2) half mark will be deducted.
- Candidates are not allowed to carry any papers, notes, books, calculators, mobile phones, scanning devices etc. in the Examination Hall. Any candidate found using or in possession of such unauthorized material or indulging in copying or impersonation or adopting unfair means / reporting late / without Admit Card will be debarred from the Written Test.

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DO NOT OPEN THE SEAL OF THIS BOOKLET UNTIL TOLD TO DO SO

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20. A merchant sells an article increasing its cost first by 10% and then reducing it by 10%. What is the net effect to the merchant in that business ?
1. 2% profit
 2. 1% loss
 3. 1% profit
 4. No loss - no profit
21. A is D's brother. D is B's father. B and C are sisters. How is C related to A ?
1. Cousin
 2. Niece
 3. Aunt
 4. Nephew
22. I am facing West. I turn 90° in clockwise direction and then 135° in anticlockwise direction. What direction am I facing ?
1. South
 2. North
 3. North-West
 4. South-West

Direction (Questions 23 to 24) : Some statement(s) is/are given followed by two conclusions I and II. You have to consider the statement(s) to be true, even if it/they seems/seem to be at variance from the commonly known facts. You are to decide which of the given conclusions can definitely be drawn from the given statement(s). Indicate your answer accordingly.

23. **Statement :**
The situation calls for an immediate action.
Conclusions :
- I. The situation is serious.
 - II. Immediate action is possible.
1. Only I follows
 2. Only II follows
 3. Both I and II follow
 4. Neither I nor II follows
24. **Statement :**
All basketball players are tall men.
All basketball players are athletes.
Conclusions :
- I. All tall men are basketball players.
 - II. All athletes are basketball players.
1. I alone can be drawn
 2. Both can be drawn
 3. Both cannot be drawn
 4. II alone can be drawn
25. What is the greatest number of three digits which when divided by 6, 9 and 12 leaves a remainder of 3 in each case ?
1. 975
 2. 996
 3. 939
 4. 903

26. Two numbers are such that the square of bigger one is 224 less than 8 times the square of the smaller one. If the numbers are in the ratio of 3 : 4, the numbers are
1. 12, 16
 2. 6, 8
 3. 9, 12
 4. none of these
27. Which of the diagrams given below correctly represents the relationship among Husband, Wife and Family ?



1 2 3 4

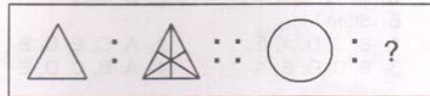
28. Select the missing number from the given responses

| | | |
|-----|-----|------|
| 2 | 12 | ? |
| 50 | 300 | 550 |
| 10 | 60 | 110 |
| 124 | 744 | 1364 |

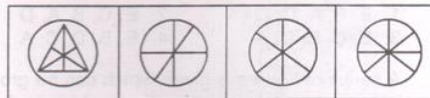
1. 22
2. 33
3. 44
4. 55

29. Choose the figure amongst the Answer Figures which will complete the series of the Problem Figures

Problem Figures

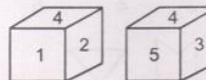


Answer Figures



1 2 3 4

30. Two positions of a dice are shown below, when 3 is at the bottom, which number is at the top ?



1. 4
2. 5
3. 2
4. 1

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PART - II

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GENERAL ENGINEERING

31. In electric welding, arc-blow can be avoided by
 1. using bare electrode
 2. welding away from earth ground connection
 3. using a.c. welding machine
 4. increasing arc length
32. Inflammable articles like plastic and wooden products can be safely heated by
 1. resistance heating
 2. dielectric heating
 3. induction heating
 4. eddy-current heating
33. Diesel electric traction has comparatively limited over-load capacity because
 1. diesel electric locomotive is heavier than a plain electric locomotive
 2. diesel engine has shorter life span
 3. diesel engine is a constant kW output prime mover
 4. regenerative braking cannot be employed
34. An ideal diesel engine has a diameter of 15 cm and stroke 20 cm. The clearance volume is 10 per cent of the swept volume. The compression ratio will be

| | |
|---------|----------|
| 1. 11 | 2. 12 |
| 3. 11.5 | 4. 12.75 |
35. A certain engine produces 10 kW indicated power. Its mechanical efficiency is 80%. The brake power delivered by the engine will be
 1. 8 kW
 2. 7.5 kW
 3. 8.5 kW
 4. 8.75 kW
36. Natural uranium contains
 1. 0.7% U^{235}
 2. 0.7% U^{238}
 3. 100% U^{235}
 4. 50% U^{238}
37. Fuels like U^{238} and Th^{232} which can be converted into fissionable materials by absorbing a neutron are called
 1. active materials
 2. reactive materials
 3. ferrite materials
 4. fertile materials
38. The process by which coal is crushed into very small pieces is called
 1. condensation
 2. chain reaction
 3. fermentation
 4. pulverisation
39. A thermal power station consumes 0.7 kg of coal to generate 1 kWh of electrical energy. If the calorific value of coal is 7420 kcal/kg, the overall efficiency of the plant will be
 1. 20%
 2. 20.5%
 3. 15.75%
 4. 16.56%
40. An FM signal with a modulation index mf is passed through a frequency tripler. The wave in the output of the tripler will have a modulation index of
 1. mf/3
 2. mf
 3. 3 mf
 4. 6 mf
41. The mechanical time constant of motor is equal to 50 sec. If the friction coefficient is 0.02 Nm/rad/sec, the value of moment of inertia of motor is equal to
 1. 50 kg - m²
 2. 1/50 kg - m²
 3. 1 kg - m²
 4. 0.1 kg - m²
42. In the gear train shown in the figure given below, the ratio θ_1/θ_2 is equal to

 1. N_1/N_2
 2. N_2/N_1
 3. N_1/N_2^2
 4. N_1^2/N_2

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43. When the modulating frequency is doubled, the modulation index is halved and modulating voltage remains constant. The modulation system is
1. amplitude modulation
 2. phase modulation
 3. frequency modulation
 4. any one of these
44. In a communication system, noise is most likely to affect the signal
1. at the transmitter
 2. in the channel
 3. in the information source
 4. at the destination
45. If the carrier of a 100% modulated AM wave is suppressed the percentage power saving will be
1. 50%
 2. 150%
 3. 100%
 4. 66.66%
46. In a closed loop system for which the output is the speed of a motor, the output rate control can be used to
1. limit the speed of motor
 2. limit the torque of the motor
 3. limit the acceleration of the motor
 4. reduce the damping of the system
47. Unbreakable crockery is made from
1. polysterene
 2. melamine polymers
 3. mica
 4. polyethylene
48. Hard bakelite is a
1. linear polymer
 2. cross-linked polymer
 3. crystalline solid
 4. branched-chain polymer
49. The capacity of a parallel plate capacitor is 'C'. Its capacity when the separation between the plates is halved, will be
1. 4C
 2. 2C
 3. C/2
 4. C/4
50. The average emf per cell of lead-acid cell is
1. 1.2 V
 2. 1.08 V
 3. 1.5 V
 4. 2.2 V
51. As the diameter of a wire is doubled, the resistance of wire becomes
1. double
 2. one-half
 3. one-fourth
 4. one-third
52. The colour code on a carbon resistance is yellow-brown-red. The value of resistance is
1. 4100 Ω
 2. 4100 \pm 20% Ω
 3. 4200 Ω
 4. 4200 \pm 20% Ω
53. In adiabatic process, the exchange between system and surrounding is of
1. heat only
 2. work only
 3. both heat and work
 4. neither heat nor work
54. What is energy performance ratio ?
1. Efficiency of the engine
 2. COP of engine
 3. COP of refrigerator
 4. COP of heat pump
55. An ideal fluid is defined as the fluid which
1. is compressible
 2. is incompressible
 3. is incompressible and non-viscous
 4. has negligible surface tension
56. The gases are considered incompressible when their Mach number is
1. less than 0.2
 2. equal to 0.5
 3. more than 0.3
 4. equal to 0.3
57. For a floating body, the buoyant force passes through the
1. centre of gravity of the body
 2. centre of gravity of the submerged body
 3. meta centre of the body
 4. centroid of the liquid displaced by the body
58. Maximum efficiency of power transmission through pipe is
1. 50%
 2. 66.67%
 3. 75%
 4. 80%

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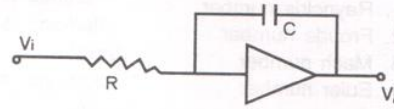
59. The ratio of inertia force to viscous force is known as
1. Reynolds number
 2. Froude number
 3. Mach number
 4. Euler number
60. Rota meter is used for measuring
1. density of fluid
 2. velocity of fluid
 3. discharge of fluid
 4. pressure of fluid
61. A hot wire anemometer is a device used for measuring
1. viscosity
 2. velocity of gases
 3. pressure of gases
 4. enthalpy of gases
62. A vector is inclined at 60° to X-axis and 60° to Y-axis. What is its inclination with Z-axis ?
1. 30°
 2. 45°
 3. 60°
 4. 90°
63. The centroid of a semi circular area of radius R lies at a distance of \bar{Y} from diameter. The value of \bar{Y} is
1. R/π
 2. $2R/\pi$
 3. $4R/3\pi$
 4. $\pi/3R$
64. The sun light reaches the earth by the process of
1. conduction
 2. convection
 3. radiation
 4. forced convection
65. The basic meter movement can be converted into an ohm meter by connecting
1. high resistance in series with it
 2. high inductance in series with it
 3. battery in series
 4. battery and a variable resistance in series
66. When a 400 Hz transformer is operated at 50 Hz, its kVA rating is
1. reduced to 1/8th
 2. increased 8 times
 3. unaffected
 4. doubled
67. Resistivity of earth increases sharply if the moisture falls below
1. 60%
 2. 50%
 3. 40%
 4. 20%
68. The I_p/I_v ratio of a tunnel diode is of primary importance in
1. determining the tunneling speed of electrons
 2. oscillator designing
 3. amplifier designing
 4. computer applications
69. FETs have properties similar to
1. PNP transistor
 2. NPN transistor
 3. thermionic valve
 4. unijunction transistor
70. First integrated circuit chip was developed by
1. C.V. Raman
 2. W.H. Brattin
 3. J.S. Kilby
 4. Robert Noyce
71. Which of the following circuits exhibits memory?
1. Astable multivibrator
 2. AND gate
 3. N AND gate
 4. Bistable multivibrator
72. The central processing unit of a computer contains
1. control and ALU
 2. control and RAM
 3. clock, control and RAM
 4. control, ALU, clock, RAM and ROM
73. The process of causing an unplanned branching operation to occur, usually initiated by external system is called
1. debugging
 2. masking
 3. interrupt
 4. iteration
74. The address lines required to address 2048 K byte of memory are
1. 11
 2. 18
 3. 20
 4. 21

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75. A sub routine can return
 1. only one value
 2. only two values
 3. only three values
 4. any number of values
76. Which one of the following systems is digital ?
 1. PPM
 2. PCM
 3. PFM
 4. PWM
77. Which of the following is the write-once optical storage medium ?
 1. ROM and RAM
 2. CD-ROM disk
 3. WORM disk
 4. Magneto-optical disk
78. A communication network which is used by large organisations over regional, national or global area is called
 1. LAN
 2. WAN
 3. MAN
 4. VAN
79. Most of the micro computer operating systems like Apple DOS, MS DOS and PC DOS etc. are called disk operating systems because they are
 1. memory resident
 2. initially stored on disk
 3. available on magnetic tapes
 4. partly on primary memory and partly on disk
80. Software instructions intended to satisfy a user's specific processing needs are called
 1. system software
 2. application software
 3. documentation
 4. programme interrupt
81. Which of the following was the first super computer purchased by India for medium range weather forecasting ?
 1. PARAM
 2. Cray XMP-14
 3. Medha-930
 4. CDC Cyber 930-11
82. Entropy is a measure of
 1. disorder of a system
 2. orderly behaviour of a system
 3. only temperature changes of a system
 4. none of these

83. The circuit shown below is used for



1. summation
 2. subtraction
 3. integration
 4. differentiation
84. Transient current in an RLC circuit is oscillatory when
 1. $R = 2\sqrt{LC}$
 2. $R = 0$
 3. $R > 2\sqrt{LC}$
 4. $R < 2\sqrt{LC}$
 85. The number of comparators required to build a 5 bit analog to digital converter (ADC) is
 1. 5
 2. 11
 3. 21
 4. 31
 86. Which of the following parts of spectrum of white light produces maximum visibility ?
 1. Red
 2. Yellow-green
 3. Blue
 4. Orange
 87. The rate at which solar energy falls on per meter² surface area of earth is **approximately**
 1. 10 W
 2. 100 W
 3. 1000 W
 4. 10,000 W
 88. Coefficient of static friction for metal on leather lies between
 1. 0.2 - 0.40
 2. 0.3 - 0.40
 3. 0.3 - 0.60
 4. 0.5 - 0.8
 89. An imaginary line on the ground joining the points of equal elevations is called
 1. vertical plane
 2. contour
 3. horizontal plane
 4. equi-elevational line
 90. For plain chlorination of water, the quantity of chlorine used is
 1. 0.1 mg/lit
 2. 0.2 mg/lit
 3. 0.3 mg/lit
 4. 0.5 mg/lit

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PART - III
MECHANICAL

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91. In a vernier calliper 10 divisions of the vernier scale coincide with 8 divisions of the main scale. Then the vernier constant will be
1. 0.8 of one main scale unit
 2. 0.2 of one main scale unit
 3. 1.25 of one main scale unit
 4. 1.0 of one main scale unit
92. Two gears have 80 and 20 teeth respectively. Their module is 2. Then the distance between the centres of the gears is
1. 15 mm
 2. 30 mm
 3. 20 mm
 4. 80 mm
93. For an efficient positive gear drive, the contact ratio should be
1. greater than one
 2. less than one
 3. zero
 4. equal to one
94. The ratio of excitation frequency to the natural frequency of a linear system is unity. The phase angle between the force of excitation and response motion is
1. 0°
 2. 90°
 3. 180°
 4. 360°
95. A cantilever beam is deflected by an amount d due to load F . If the load is made $2F$ then the deflection will be equal to
1. $2d$
 2. $4d$
 3. $d/8$
 4. $d/2$
96. A member is subjected to tensile force F and its normal cross-sectional area perpendicular to the line of force is A . The resulting normal stress in an oblique plane inclined at an angle θ to the transverse plane will be
1. $P / A \cos^2\theta$
 2. $P / 2A \sin^2\theta$
 3. $P / 2A \cos^2\theta$
 4. $P / A \sin^2\theta$
97. The units of mass moment of inertia in SI units are
1. Nm^2 / s
 2. m^4
 3. kg / m
 4. kgm^2
98. In spur gear drives the undesirable phenomenon of interference
1. can be avoided if involute teeth are cut on a milling machine
 2. is totally absent with cycloidal gear teeth
 3. can be avoided if the centre distance is maintained constant
 4. can be avoided if the number of teeth on the pinion is less than the minimum number of teeth
99. A six-cylinder, in-line and equally spaced 4-stroke engine is in complete balance if the firing order is
1. 1-3-4-5-6-2
 2. 1-4-2-5-3-6
 3. 1-5-3-6-2-4
 4. 1-5-4-2-6-3
100. A three-force member will be in equilibrium if the forces
1. are co-planar and parallel
 2. are parallel alone
 3. intersect at a point and are co-planar
 4. are co-planar and moments about any other point are zero
101. A and B are two hinges connected to two sliders in an elliptic trammel and P is its tracing point lying outside AB. The major and minor axes of the ellipses are respectively
1. twice AB and AP
 2. twice BP and AB
 3. twice AB and twice BP
 4. twice BP and AP
102. The instantaneous centre defining the pure rolling motion of a cylinder over a circular arc
1. the centre of curvature of the circular arc
 2. the centre of the cylinder cross-section
 3. the point of contact of the cylinder and circular arc
 4. at infinity in the direction of the line of centres defined in 1 and 2 above
103. Coriolis acceleration is present when a body is in
1. circular motion with non-uniform velocity
 2. non-circular motion with uniform velocity
 3. circular motion with uniform velocity
 4. non-circular motion with non-uniform velocity

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104. In a gearbox, the torque input is 40 Nm, counter-clockwise (CCW) and is overcoming a CCW torque of 80 Nm. The net torque acting on the gearbox casing is
1. 120 Nm CCW
 2. 40 Nm clockwise (CW)
 3. 120 Nm CW
 4. 40 Nm CCW
105. An elevator weighing 10,000 kgf attains an upward velocity of 4 m/s in 2 seconds with uniform acceleration. The tension in the cable will be **approximately**
1. 20,000 kgf
 2. 12,000 kgf
 3. 10,000 kgf
 4. 8,000 kgf
106. A wheel of centroidal radius of gyration k rolls on a horizontal surface with constant velocity v . It comes across an obstruction of height h . Because of its rolling speed, it just overcomes the obstruction. To determine v , one should use the principle(s) of conservation of
1. energy
 2. linear momentum
 3. energy and linear momentum
 4. energy and angular momentum
107. Consider the following statements :
- A. A round bar in a round hole forms a turning pair
 - B. A square bar in a square hole forms a sliding pair
 - C. A vertical shaft in a footstep bearing forms a successful constraint
- Of these statements
1. none is correct
 2. all are correct
 3. A and B are correct
 4. B and C are correct
108. The connection between the piston and cylinder in a reciprocating engine corresponds to
1. a completely constrained kinematic pair
 2. an incompletely constrained kinematic pair
 3. a successfully constrained kinematic pair
 4. a single link
109. A bicycle remains stable when it runs through a bend because of
1. gyroscopic action
 2. coriolis acceleration
 3. centrifugal action
 4. radius of the curved path
110. If the time ratio of cutting to return strokes of a quick return mechanism is 2, the ratio of crank length to the distance between the hinge points is
1. 2
 2. 0.5
 3. 1
 4. 1.5
111. The Whitworth quick return mechanism is formed in a slider-crank chain when the
1. coupler link is fixed
 2. longest link is a fixed link
 3. slider is a fixed link
 4. smallest link is a fixed link
112. For an involute gear, if ϕ is the pressure angle, the ratio of pitch circle radius to base circle radius is
1. $\sin \phi$
 2. $\cos \phi$
 3. $\sec \phi$
 4. $\operatorname{cosec} \phi$
113. The most suitable bearings for carrying very heavy loads at slow speed is
1. hydrodynamic bearings
 2. ball bearings
 3. roller bearings
 4. hydrostatic bearings
114. Thrust bearings of the sliding type are often provided with multiple sector-shaped bearing pads of the tilting type instead of a continuous annular bearing surface in order to
1. distribute the thrust load more uniformly
 2. provide limited adjustments to shaft misalignments
 3. enable the formation of a wedge-shaped oil film
 4. enable lubricating oil to come in contact with the total bearing area
115. A 100 kW motor using eight vee belts is used to transmit power in a rolling mill. If one of the belts breaks after 40 days of continuous running
1. the broken belt may be replaced by a similar belt
 2. all the belts are to be replaced
 3. the broken belt and two adjacent belts are to be replaced
 4. the broken belt and one adjacent belt are to be replaced

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116. For a simply supported beam on two end supports the bending moment is maximum
1. usually on the supports
 2. always at the mid-span
 3. where there is no shear force
 4. where the deflection is maximum
117. Consider the following statements :
The critical speed of a shaft is affected by the
- A. eccentricity of the shaft
 - B. span of the shaft
 - C. diameter of the shaft
- Of these statements
1. A and B are correct
 2. A and C are correct
 3. B and C are correct
 4. A, B and C are correct
118. Four-jaw chuck is mainly preferred over three-jaw chuck for
1. stronger grip
 2. quicker clamping
 3. higher accuracy
 4. higher speeds
119. Final finishing of slip gauges is done by
1. electroplating
 2. honing
 3. lapping
 4. super-finishing
120. Triple carbide cutting tools are made by
1. powder metallurgy
 2. hot forging
 3. casting
 4. electro-deposition
121. Which of the following is a high productivity process for making splines ?
1. Milling
 2. Grinding
 3. Shaping
 4. Broaching
122. Collapsible tubes are produced by
1. drawing
 2. impact extrusion
 3. piercing
 4. spinning
123. Electrodes for arc welding are coated to
1. avoid rusting of the wire
 2. protect the weld pool
 3. increase the weld current
 4. avoid electrical short circuit
124. Arc voltage during electric arc welding is close to
1. 20 volts
 2. 50 volts
 3. 220 volts
 4. 440 volts
125. In MIG welding the gas generally used is
1. hydrogen
 2. oxygen
 3. argon
 4. acetylene
126. The principle of flame cutting is based on
1. burning of metal
 2. melting of metal
 3. oxidation of metal
 4. reduction of metal
127. Risers are provided in moulds to
1. remove gases during pouring of metal
 2. feed the casting during solidification
 3. observe the flow of metal
 4. keep the mould cold
128. Mild steel is **not** generally cast because
1. it is easier to machine
 2. it will produce a soft casting
 3. it has a low fluidity in the molten state
 4. it is costly to do so
129. Black pipes are produced by the method of
1. centrifugal casting
 2. shell moulding
 3. extrusion
 4. lost wax process
130. For cut-off grinding wheels which of the following bond will be suitable ?
1. Vitrified
 2. Silicate
 3. Rubber
 4. Shellac
131. Which of the following statements is correct ?
1. Composition of cast iron is : 0.04% C, 1% Si, 1.3% S and rest iron
 2. Composition of mild steel is : 0.8% C and rest iron
 3. Composition of cast iron is : 3.5% C, 3.5% Si and rest iron
 4. Composition of mild steel is : 2.2% C, 1% Si and rest iron
132. Criterion for cutting tool life is generally
1. breakdown of cutting edge
 2. chatter
 3. flank wear
 4. crater wear
133. Work study involves
1. only method study
 2. only work measurement
 3. method study and work measurement
 4. only motion study

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134. Consider the following advantages
- A. Lower in-process inventory
 - B. Higher flexibility in rescheduling in case of machine breakdown
 - C. Lower cost in material handling equipment
- When compared to process layout, the advantages of product layout would include
- 1. A and B
 - 2. A and C
 - 3. B and C
 - 4. A, B and C
135. Consider the following situations :
- A. Loads are uniform
 - B. Materials move relatively continuously
 - C. Movement rate is variable
 - D. Routes do not vary
- For material transportation, conveyors are used when the prevailing conditions include
- 1. A, C and D
 - 2. A, B and D
 - 3. A, B and C
 - 4. B, C and D
136. A soft spring in an automobile will
- 1. give a smooth ride
 - 2. give a bumpy ride
 - 3. result in too much vibrations
 - 4. increase the noise level
137. A car rolls most when
- 1. braking
 - 2. cornering
 - 3. accelerating
 - 4. moving on a bad road at high speed
138. Caster is provided on the front wheels of a car to
- 1. reduce load on the front axle
 - 2. make steering easier
 - 3. give self-aligning characteristics for the steering wheel
 - 4. reduce cost of the vehicle
139. Camber is the
- 1. inclination of tyre when viewed from the side
 - 2. inclination of steering knuckle
 - 3. inclination of tyre when viewed from the front
 - 4. a cam provided in the engine
140. Camber should be
- 1. positive by about 5°
 - 2. negative by about 1°
 - 3. negative by about 5°
 - 4. positive by about $1/2$ to 1°
141. Bleeding of brakes is required to
- 1. remove air bubbles in the brake line
 - 2. draw out excess brake fluid
 - 3. remove dirt from the brake fluid
 - 4. recirculate brake fluid back into the master cylinder
142. The clutch is used for
- 1. slowing down the vehicle
 - 2. disconnecting the engine shaft from the gearbox shaft in order to stop the engine
 - 3. increasing the speed of the engine
 - 4. disconnecting the engine shaft from the gearbox shaft in order to change gears
143. The rear tyre pressure of a car is usually
- 1. higher than the front tyre pressure
 - 2. same as the front tyre pressure
 - 3. less than the front tyre pressure
 - 4. higher or same as the front tyre pressure
144. For an automobile the most common steering mechanism is
- 1. worm and wheel
 - 2. screw and nut
 - 3. rack and pinion
 - 4. cam and roller
145. A fountain pen while writing is
- 1. an open system
 - 2. a closed system
 - 3. an isolated system
 - 4. not a system
146. Which of the following is an intensive property?
- 1. Mass
 - 2. Specific gravity
 - 3. Volume
 - 4. Surface area
147. In an irreversible closed cycle, the entropy
- 1. increases
 - 2. decreases
 - 3. remains constant
 - 4. initially increases and then remains constant
148. Charcoal is derived from
- 1. nature
 - 2. coal
 - 3. wood
 - 4. waste
149. The stoichiometric air-fuel ratio of methanol (methyl alcohol) is
- 1. 6.5 : 1
 - 2. 12.0 : 1
 - 3. 14.7 : 1
 - 4. 16.8 : 1

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150. A radiation pyrometer is sighted on an exposed object whose emissivity is 0.75. The reading on the radiation pyrometer is 1000° C. The true temperature of the object is
1. 1333° C
 2. 1095° C
 3. 1000° C
 4. 750° C
151. With reference to the analogy between heat flow and flow of electricity, the electrical quantity analogous to heat flux is
1. voltage
 2. current
 3. resistance
 4. capacitance
152. During analysis of the absorption of solar energy passing through earth's atmosphere, air mass indicates
1. the angle at which the solar energy passes through the atmosphere
 2. the mass of air affected by this absorption
 3. mass flow rate of the wind
 4. the height of the atmosphere above the earth's surface
153. By providing subcooling of the refrigerant in a vapour compression refrigeration cycle,
1. compressor work increases
 2. compressor work decreases
 3. coefficient of performance (COP) increases
 4. coefficient of performance (COP) decreases
154. A 10 m x 12 m, room with 5 m height requires, for comfort air conditioning, an air conditioner of capacity
1. 5 tons
 2. 15 tons
 3. 1 ton
 4. 30 tons
155. The cetane number of diesel fuel available in India is approximately
1. 20
 2. 45
 3. 87
 4. 93
156. In a spark ignition engine, increasing spark advance will
1. decrease peak pressure
 2. increase peak pressure
 3. have a slight effect on peak pressure
 4. have no effect on peak pressure
157. In a diesel engine if the fuel injection pressure is increased
1. dispersion of the fuel spray becomes uneven
 2. maximum penetration of the spray is decreased
 3. atomization of the spray is improved
 4. turbulence is increased
158. In a closed cycle gas turbine plant the gas which provides the highest cycle efficiency is
1. helium
 2. carbon dioxide
 3. air
 4. hydrogen
159. Which one of the following is not a positive displacement type compressor ?
1. Reciprocating compressor
 2. Vane compressor
 3. Axial flow compressor
 4. Screw compressor
160. The degree of reaction in a five-stage impulse turbine with pressure compounding is
1. 0.5
 2. 0.75
 3. 1.0
 4. 0
161. The efficiency of a centrifugal pump is highest with a
1. radial tipped impeller
 2. backward tipped impeller
 3. forward tipped impeller
 4. pure radial bladed impeller
162. The motion of the piston in a slider-crank mechanism with uniformly rotating crank can be simple harmonic type motion if the connecting rod is
1. very small
 2. infinite
 3. equal to crank length
 4. equal to twice the stroke of the piston
163. The overall efficiency of an actual single shaft gas turbine plant
1. decreases as peak cycle temperature increases
 2. increases as peak cycle temperature increases
 3. is dependent on peak cycle temperature only
 4. is independent of peak cycle pressure and temperature
164. The reading of a pressure gauge fitted on a vessel is 25 bar. The atmospheric pressure is 1.03 bar and the value of g is 9.81 m/s². The absolute pressure in the vessel is
1. 23.97 bar
 2. 25.00 bar
 3. 26.03 bar
 4. 34.84 bar

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165. A mixture of gases expands from 0.03 m^3 to 0.06 m^3 at a constant pressure of 1 MPa and absorbs 84 kJ of heat during the process. The change in internal energy of the mixture is
1. 30 kJ
 2. 54 kJ
 3. 84 kJ
 4. 114 kJ
166. In a steam condenser, the partial pressures of steam and air are 0.06 and 0.007 bar respectively. The condenser pressure is
1. 0.067 bar
 2. 0.060 bar
 3. 0.053 bar
 4. 0.007 bar
167. A Carnot engine receiving heat at 400 K has an efficiency of 25% . The C.O.P. of a Carnot refrigerator working between the same temperature limits is
1. 1
 2. 2
 3. 3
 4. 4
168. A simple Rankine cycle has
1. two isentropic processes and two isobaric processes
 2. two isobaric and two isothermal processes
 3. two isentropic processes and two isothermal processes
 4. two adiabatic, one isothermal and one isobaric processes
169. The C.O.P. of a simple vapour compression refrigeration cycle can be increased by
- A. subcooling the refrigerant before it enters the expansion valve
 - B. allowing the refrigerant to be superheated in the evaporator before it enters the compressor
 - C. allowing the refrigerant to be superheated in the intake before it enters the compressor
 - D. increasing the condenser temperature
- Of these statements,
1. A and B are correct
 2. A, C and D are correct
 3. B, C and D are correct
 4. A, B, C and D are correct
170. At a particular time of day, if the dry bulb temperature is equal to the wet bulb temperature, then it can be safely concluded that
1. specific humidity of the air is 0.010 kg/kg dry air
 2. dew point is less than 20° C
 3. relative humidity of air is 100%
 4. atmospheric air is free from moisture
171. Desert coolers are suitable for hot and very dry outside conditions because
1. water is recirculated in the spray
 2. heat is neither added nor removed from the cooler
 3. wet bulb depression ($t-t'$) is very large
 4. a large quantity of air can be conditioned
172. Consider the following statements :
- A. Low value of the by-pass factor for an air-conditioning equipment signifies higher performance of the equipment
 - B. By-pass factor for an air-conditioning equipment signifies the fraction of ambient air mixed with the air to be conditioned
 - C. By-pass factor for an air-conditioning equipment signifies the fraction of the air to be conditioned coming in contact with the conditioned surface
- Of these statements,
1. A and C are correct
 2. A and B are correct
 3. C alone is correct
 4. B alone is correct
173. Consider the following statements :
- A. Boilers rated above 500 MW are not necessarily supercritical boilers
 - B. Powerplant boilers are generally once through boilers
 - C. Blow-down at regular intervals is done to remove solids
- Of these statements,
1. A, B and C are correct
 2. A and B are correct
 3. B and C are correct
 4. A and C are correct

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174. The degree of reaction of a turbine is the ratio of
1. enthalpy drop in moving blades to enthalpy drop in the stage
 2. enthalpy drop in fixed blades to enthalpy drop in the stage
 3. enthalpy drop in moving blades to enthalpy drop in fixed blades
 4. enthalpy drop in fixed blades to enthalpy drop in moving blades
175. Consider the following statements :
- A. Almost all flow losses take place in the diverging part of a nozzle
 - B. Normal shocks are likely to occur in the converging part of a nozzle
 - C. Efficiency of reaction turbines is higher than that of an impulse turbine
- Of these statements,
1. A, B and C are correct
 2. B and C are correct
 3. A and B are correct
 4. A and C are correct
176. In the case of a centrifugal pump, cavitation will occur if
1. it operates above the minimum net positive suction head
 2. it operates below the minimum net positive suction head
 3. the pressure at the inlet of the pump is above the atmospheric pressure
 4. the pressure at the inlet of the pump is equal to the atmospheric pressure
177. The isothermal efficiency of a reciprocating compressor is defined as
1. $\frac{\text{actual work done during compression}}{\text{isothermal work done during compression}}$
 2. $\frac{\text{adiabatic work done during compression}}{\text{isothermal work done during compression}}$
 3. $\frac{\text{isothermal work done during compression}}{\text{actual work done during compression}}$
 4. $\frac{\text{isothermal work done during compression}}{\text{actual work done during adiabatic compression}}$
178. The efficiency of Rankine cycle approaches that of Carnot cycle if the number of
1. regenerators is increased
 2. regenerators is decreased
 3. reheaters is increased
 4. reheaters is decreased
179. In an impulse turbine steam expands
1. only in nozzles
 2. only over the rotor blades
 3. partly in nozzles and partly over the rotor blades
 4. in nozzles, over rotor blades and in the exhaust diffuser
180. In Parsons' turbine the relative velocity at
1. inlet is equal to the relative velocity at outlet
 2. outlet is less than the relative velocity at inlet
 3. outlet is greater than the relative velocity at inlet
 4. outlet is independent of the relative velocity at inlet