06 — AUTOMOBILE ENGINEERING

(Answer ALL questions)

56. The total weight of the vehicle is 15 kN. The wheel base is 2.5m. If the front and rear reaction forces are 8.0 kN and 7.0 kN respectively, then the distance from front axle to CG and CG to rear axle are given by
    1. 1.167 m and 1.333 m respectively
    2. 1.167 m and 1.167 m respectively
    3. 1.333 m and 1.167 m respectively
    4. 1.333 m and 1.333 m respectively

57. Half car model is used to study
    1. Ride comfort only
    2. Ride comfort and rolling moment
    3. Ride comfort and yawing moment
    4. Ride comfort and pitcing moment

58. The ride rate are calculated by considering
    1. Suspension spring stiffness and tyre stiffness are in parallel
    2. Suspension spring stiffness and tyre stiffness are in series
    3. Suspension spring stiffness only
    4. Tyre stiffness only

59. When vehicle travelling over a bump, the role of spring and damper are to _____ and to _____ respectively
    1. Absorb shock, dissipate energy
    2. Absorb shock, add energy
    3. Dissipate energy, Absorb shock
    4. Add energy, Absorb shock

60. The torque at the driving wheels gives rise to a propulsive force between wheels and road, known as
    1. tractive force
    2. driving effort
    3. braking thrust
    4. rolling moment

61. If the convexity of car roof is increased the drag coefficient will
    1. Increased
    2. Remain same
    3. Decreased
    4. None of the above

62. The pressure exerted by an ideal gas is _____ of the kinetic energy of all the molecules contained in a unit volume of gas.
    1. One-Half
    2. One-Third
    3. Two-Third
    4. Three-Fourth

63. The efficiency of Diesel cycle approaches to Otto cycle efficiency when
    1. Cut-off is increased
    2. Cut-off is decreased
    3. Cut-off is zero
    4. Cut-off is constant

64. The ratio of specific heat at constant pressure (Cp) and specific heat at constant volume (Cv)
    1. Equal to one
    2. Less than one
    3. Greater than one
    4. None of these

65. If the value of n = 0 in the equation pvn = C, then the process is called
    1. Constant volume process
    2. Adiabatic process
    3. Constant pressure process
    4. Isothermal process

66. The value of gas constant (R) in S. I. units is
    1. 0.287 J/kgK
    2. 2.87 J/kgK
    3. 28.7 J/kgK
    4. 287 J/kgK

67. The efficiency of Diesel cycle increases with
    1. Decrease in cut-off
    2. Increase in cut-off
    3. Constant cut-off
    4. None of these

68. The engine cylinder are usually made of
    1. Stainless steel
    2. Cast iron
    3. Copper
    4. Mild steel

69. The rocker arm is used to actuate the inlet and exhaust valves motion as directed by the
    1. Crank shaft
    2. Crank
    3. Cam and follower
    4. None of the above

70. Maximum shear stress theory is used for
    1. Brittle materials
    2. Non-ferrous materials
    3. Plastic materials
    4. Ductile materials

71. The material used for brake lining should have ————— coefficient of friction.
    1. High
    2. Low
    3. Zero
    4. Negative

72. In leaf springs the longest leaf is known as
    1. Upper leaf
    2. Lower leaf
    3. Master leaf
    4. None of the above

73. The length of piston usually varies between (where D is the diameter of the piston)
    1. 1 D and 1.5 D
    2. 1.5 D and 2 D
    3. 2 D and 2.5 D
    4. 2.5 D and 3 D

74. The direction of tangential acceleration is
    1. Along or opposite to the angular velocity
    2. Perpendicular to the angular velocity
    3. Along the axis of rotation
    4. None of the above

75. An imaginary circle which by pure rolling action gives the same motion as the actual gear is called
    1. Dedendum circle
    2. Pitch circle
    3. Clearance circle
    4. Addendum circle

76. The pressure angle in case of gear is
    1. The angle between the line of action and the common tangent to the pitch surface in the plane of rotation
    2. The angle between the two pitch points
    3. The angle between normal to the dedendum at the path point and tangent dedendum at the same point
    4. The angle of obliquity between the tangent drawn at the point of contact of the two mating gears

77. A porter governor is classified under
    1. Spring controlled type
    2. Dead weight type
    3. Pendulum type
    4. None of the above

78. If two pulleys of different diameters are connected by means of an open belt drive, then in this case angle of contact to be considered is of
    1. Both pulleys
    2. The smaller pulley
    3. The larger pulley
    4. None of the above

79. Which of following is inversion of slider crank mechanism?
    1. Reciprocating internal combustion engine
    2. Crank and slotted lever mechanism
    3. Whitworth quick return mechanism
    4. All of the above

80. The angular gear ratio between the steering wheel and the road wheel varies from
1. 12:1 to 30:1
2. 15:1 to 40:1
3. 12:1 to 40:1
4. 15:1 to 30:1

81. The movement ratio for the rack and pinion steering gear of 5 tooth pinion, 10 mm pitch and 350 mm diameter steering-wheel is
1. 44:1
2. 11:1
3. 33:1
4. 22:1

82. The critical speed of the propeller shaft varies
1. Directly as the diameter of the tube and inversely as the square of the length
2. Inversely as the diameter of the tube and directly as the square of the length
3. Directly as the diameter of the tube and directly as the square of the length
4. Inversely as the diameter of the tube and inversely as the square of the length

83. The axle shaft of semi floating type are subjected to
1. Both bending and torsion
2. Bending only
3. Torsion only
4. None of the above

84. The distance between the point of intersection of the centre of steering axis inclination and centre of steering axis centre line is called as
1. King pin inclination
2. Scrub radius
3. Trammel wheel
4. Swivel pin inclination

85. A worm gear is used as the pinion for the rack and pinion type of steering gearbox, because it
1. Allows the steering wheel to be turned by a greater amount when steering
2. Improves steering comfort when steering wheel is turned to effect small changes in the direction of forward motion
3. Reduces the amount of kick-back for large steering angles
4. Makes the steering more responsive

86. In the transmission, the reverse idler gear always mesh with counter shaft drive gear
1. counter shaft low gear
2. main shaft reverse gear
3. counter shaft reverse gear
4. main shaft high gear

87. Wilson gear box is combination of
1. sliding gears
2. helical gears
3. Bevel gears
4. Epicycle gears

88. In a fluid coupling, power is transferred due to
1. Change in pressure of the circulating fluid
2. Change of mechanical energy to fluid energy
3. Change in kinetic energy of the circulating fluid
4. None of the above

89. The —————— flow of fluid coupling is maximum when the slip is 100%
1. Vortex
2. Rotary
3. Turbulence
4. None of the above

90. In epicycle gear train, the direct drive is obtained by
1. there is a reaction member and the planetary carrier is the input
2. clutching or locking any two members of the gear set together
3. there is a reaction member and the planet carrier is held
4. there is a reaction member and the planet carrier is the output

91. Stall torque ratio of three element torque converter is in the region of
    1. 3:1
    2. 2:1
    3. 4:1
    4. None of the above

92. The idling frequency of the lambda control should be above
    1. 0.1 Hertz
    2. 10 Hertz
    3. 100 Hertz
    4. 1000 Hertz

93. Which type of knock sensor gives extreme sensitivity variations?
    1. Knock Pressure
    2. Mechanical vibration
    3. Ion current
    4. Light intensity

94. On an engine fitted with Electronic Fuel Injection, engine load may be determined by a
    1. MAP sensor
    2. throttle position sensor
    3. lambda sensor
    4. vacuum capsule

95. The type of petrol injection system which makes use of a single injector that sprays fuel towards a throttle is termed a
    1. single point system
    2. rotary system
    3. multi-point system
    4. in-line system

96. The main ECU 'input' parameters for calculating ignition timing and injector duration are:
    1. speed and temperature
    2. speed and load
    3. pressure and temperature
    4. pressure and load

97. A throttle potentiometer provides information relating to
    1. throttle position and engine load
    2. throttle position and driver intention
    3. idle position and engine load
    4. idle position and driver intention

98. Industrial hydrogen (in bulk) is produced by
    1. Electrolysis of water
    2. Ammonia Dissociation
    3. Gasification process
    4. Pyrolysis process

99. The property of the alcohol fuel which helps in increasing the compression ratio of the engine is
    1. Low vapour pressure
    2. High octane number
    3. High volatility
    4. Low viscosity

100. The favorable properties of Vegetable oils to be used in CI engines are
    1. Low viscosity
    2. High self ignition temperature
    3. High volatility
    4. None of the above

101. The favorable property of vegetable oils to be used as fuel in CI engines is
    1. Low auto ignition temperature
    2. High cetane number
    3. Calorific value very close to diesel
    4. All the above

102. Alcohols are not suited to be used as fuel directly in diesel engines due to their
    1. High octane rating
    2. Low cetane rating
    3. High self ignition temperature
    4. All the above

103. The self ignition temperature of hydrogen is
    1. 380°C
    2. 450°C
    3. 480°C
    4. 570°C

104. In a CNC program block, N002 GO2 G91 X40 Z40 ——————, GO2 and G91 refer to
1. Circular interpolation in counter clockwise direction and incremental dimension
2. Circular interpolation in counter clockwise direction and absolute dimension
3. Circular interpolation in clockwise direction and incremental dimension
4. Circular interpolation in clockwise direction and absolute dimension

105. Which type of motor is not used in axis or spindle drives of CNC machine tools?
1. Induction motor
2. DC servo motor
3. Stepper motor
4. Linear servo motor

106. Cold working of steel is defined as working
1. At its recrystallization temperature
2. Above its recrystallization temperature
3. Below its recrystallization temperature
4. At two thirds of the melting temperature of the metal

107. Lathe bed is made of
1. Mild steel
2. Alloy steel
3. Pig iron
4. Chilled cast iron

108. In lathe work, when the tool is fed parallel to the rotation of job work, it will produce
1. Cylindrical surface
2. Spherical surface
3. Tapered surface
4. All of the above

109. Which of the following attachments can be used on Centre lathe?
1. Grinding
2. Milling
3. Copying
4. All of the above

110. One of the major exhaust emission from CI engines compared to SI engine is
1. Oxides of nitrogen
2. Unburnt hydrocarbon
3. Particulates
4. CO and CO_2

111. Decrease in air-fuel ratio in SI engines results in
1. Increase of NOx
2. Decrease of CO and UBHC
3. Increase of CO and UBHC
4. None of the above

112. NOx emission is maximum in SI engines when the air-fuel ratio is
1. Nearly stoichiometric
2. Lean
3. Rich
4. None of the above

113. Chemiluminescence technique is used to measure
1. NOx
2. CO
3. CO_2
4. Smoke intensity

114. Flame ionization detector is used for measuring
1. CO
2. HC
3. NOx
4. CO_2

115. Non-dispersive infra-red analyzer is widely accepted instrument for measuring
1. NOx
2. HC
3. CO
4. CO_2