1. The reason for Howling noise that increases with vehicle speeds in a differential is

(A) More Supply of Transmission Fluid
(B) Incorrect Tire Pressure
(C) Differential Gear wear or insufficient lubrication
(D) Faulty Drive shaft
(E) Answer not known

2. ———————— provides longest tread life and provide excellent grip.

(A) Bia-ply tyres
(B) Wet tyres
(C) Performance tyres
(D) Radial tyres
(E) Answer not known

3. When rotating tyres/tires, all the following are true except?

(A) Do not rotate tires/tyres if the front and rear tires/tyres are different
(B) Directional tyres must remain on the same side of the car
(C) Check tyre pressure after rotating tyres
(D) Always perform a five tyre rotation
(E) Answer not known

4. Choose the right matches.

(1) Differential – Stub axle

(2) Crown wheel – Pinion

(3) Cage – Axle half shaft

(4) Cage – Cross pin

(A) (1) and (2) are correct (B) (2) and (4) are correct

(C) (2) and (3) are correct (D) (1) and (4) are correct

(E) Answer not known

5. Final drive of vehicle is consist of

(A) Bevel pinion and sun gear

(B) Bevel pinion and crown wheel

(C) Crown wheel and sun gear

(D) Universal joint and crown wheel

(E) Answer not known

6. When the driving wheels are jacked up and gears are in neutral, turning one driving wheel forward will result in other wheel to

(A) Turn backward (B) Turn forward

(C) Turn in either direction (D) Remain stationery

(E) Answer not known

7. ———————— type of final drive gear arrangement is more adaptable for increase or decrease in ground clearance of a vehicle.

(A) Straight bevel (B) Spiral bevel

(C) Hypoid (D) Worm and wheel

(E) Answer not known

8. Critical whirling speed of propeller shaft is increased by

(A) Decreasing its length
(B) Increasing its length
(C) Decreasing its diameter
(D) Increasing its thickness
(E) Answer not known

9. In case of a four wheel driven vehicle

(A) Clutch operating linkage is simplified
(B) Cooling system is simplified
(C) The road adhesion is increased
(D) The road adhesion is decreased
(E) Answer not known

10. The purpose of using recirculating ball type steering gear box is to reduce the

(A) Operating friction
(B) Operating cost
(C) Toe-out during turns
(D) Number of parts
(E) Answer not known

11. Steering Ratio is the number of degrees the

(A) Steering wheel must turn to the pivot the front wheels one degree
(B) Front wheels must turn to turn the rear wheels
(C) Outside wheel must pivot to produce a 20 degree pivot of the inside wheel
(D) Steering wheel must turn to get full mechanical advantage
(E) Answer not known

12. Steering axis inclination provides

(A) Directional stability
(B) Easy Steering
(C) Reduced turning radius
(D) Reduced wobbling
(E) Answer not known

13. Which one of the following is not an advantage of power assisted Steering?

(A) Steering effort is reduced
(B) Excellent maneuverability
(C) Increased driver fatigue
(D) Increased safety
(E) Answer not known

14. Tilting of the front wheels away from the vertical is called

(A) Camber
(B) Caster
(C) Toe-in
(D) Toe-out
(E) Answer not known

15. The angle formed by the wheel with the vertical when the top of the wheel slants outwards is called

(A) Positive castor
(B) Negative chamber
(C) Positive chamber
(D) Negative castor
(E) Answer not known

16. Identify the wrong statement/s in view of front axle

(1) Front Axle carries the weight of the front of the vehicle

(2) Front Axle cannot manage the horizontal and vertical loads on bumpy roads

(3) Front Axle work as a cushion through its spring for a comfortable ride

(4) The Front Axle is subjected to bending stresses only

(A) (1) and (4) (B) (2) and (3)

(C) (1) and (3) (D) (2) and (4)

(E) Answer not known

17. When a vehicle is cornering the crown wheel is rotating at 500 rpm; and the outer wheel is turning at 520 rpm. The speed of the inner wheel is

(A) 20 rpm (B) 480 rpm

(C) 500 rpm (D) 540 rpm

(E) Answer not known

18. Vertical loads when the vehicle comes across a bump or hollow on one side results in

(A) Vertical Bending (B) Horizontal Bending

(C) Longitudinal Torsion (D) Lateral Bending

(E) Answer not known

19. When Diagonally opposite front and rear road wheels roll over Bump's simultaneously, the chasis experiences?

(A) Vertical Bending
(B) Longitudinal Torsion
(C) Lateral Bending
(D) Horizontal Lozenging
(E) Answer not known

20. The wheel base of a car is 2.7 m and pivot centres are at 1 m. The wheel track is 1.2 m. Calculate the turning circle radius of the outer front wheel. Assume the angle of inside lock as 40°.

(A) 3.12 m
(B) 3.63 m
(C) 5.11 m
(D) 6.31 m
(E) Answer not known

21. In the power assisted brake system, movement of the Brake Pedal

(A) Increase the hydraulic pressure which actuates the control valve
(B) Actuates the valve in the bellows through leakage
(C) Actuates the valve to admit atmospheric pressure to one side of the diaphragm
(D) Actuates the pressure from the engine system
(E) Answer not known

22. The main function of a brake fluid is

(A) Lubrication
(B) Power transmission
(C) Cooling
(D) Damping
(E) Answer not known

23. An Anti-lock braking system is a safety device designed

(A) With powerful brakes to stop the vehicle quickly

(B) To provide warning to the driver

(C) To prevent the wheels from locking up under emergency conditions

(D) To monitor the speed signals

(E) Answer not known

24. Abrasive and solid lubricants in brake linings are used to

(A) Enhance mechanical and chemical resistance

(B) Improve thermal conductivity

(C) Increase the elasticity

(D) Reduce the Brittleness

(E) Answer not known

25. Braking system is usually designed to give opined performance at an adhesion level of

(A) 0.2 (B) 0.5

(C) 0.6 (D) 0.7

(E) Answer not known

26. Brake fade is often caused by

(A) Lack of heat dissipation

(B) Quick heating of the braking components

(C) Incorrect brake fluid

(D) Pumping the brakes

(E) Answer not known

27. Choose the correctly paired

(1) EWB – Electronic Wedge Brake

(2) SBC – Sensotronic Brake Control

(3) EBA – Electric Brake Assist

(4) RBS – Reverse Braking System

(A) (1) and (3) are correct (B) (2) and (4) are correct

(C) (1) and (2) are correct (D) (3) and (4) are correct

(E) Answer not known

28. If the brakes bring a vehicle to rest from 60 km/h in a distance of 15 metres, its braking efficiency is

(A) 54% (B) 28%

(C) 96% (D) 78%

(E) Answer not known

29. During braking, the brake shoe is moved outward to force the lining against the

(A) Anchor Pin (B) Brake Drum

(C) Wheel Rim (D) Wheel Piston

(E) Answer not known

30. If brake wheels get locked before the vehicle stops, the vehicle is said to be

(A) Slipping (B) Rubbing

(C) Sliding (D) Skidding

(E) Answer not known

31. Identify the correct statement(s)

(1) The up and down movements of a shock absorber is called jounce and rebound

(2) Compression damping controls the unsprung weight of tyres, wheels and brakes

(3) Rebound damping controls excess chassis motion as the shock extends

(A) (1) only
(B) Both (1) and (2)
(C) (1), (2) and (3)
(D) (1) and (3) only
(E) Answer not known

32. The component that counteract the vehicle body to control the cornering force to make the vehicle stable is

(A) Control arm
(B) Torsion bar
(C) Strut rod
(D) Stabilizer bar
(E) Answer not known

33. Maximum room in the engine compartment is provided with

(A) Wishbone suspension
(B) McPherson strut suspension
(C) Rigid axle suspension
(D) Vertical guide suspension
(E) Answer not known

34. Consider the statements – True/False

Statement (A) : Road shocks are transmitted to all wheels, in conventional suspension system

Statement (B) : Shackle is a reciprocator connection for rear leaf spring

(A) (A) True, (B) False
(B) (A) False, (B) True
(C) (A) and (B) are True
(D) (A) and (B) are False
(E) Answer not known

35. In suspension system a front stabilizer bar is used to

(A) Increase load-carrying capacity
(B) Provide a softer ride
(C) Stiffen the suspension to control body roll
(D) Prevent sideward movement of the axle housing
(E) Answer not known

36. The function of the stabilizer in an automobile is to reduce the tendency of

(A) Roll
(B) Pitch
(C) Yaw
(D) Dip
(E) Answer not known

37. Choose the incorrect option.

(i) Wheel wobble – Worn suspension joint

(ii) Pulling to one side – Suspension misalignment

(iii) Excessive tyre wear – Broken or weak spring

(iv) Instability – Defective dampers

(A) (i) only
(B) (i) and (ii) only
(C) (iii) only
(D) (iii) and (iv) only
(E) Answer not known

38. In the coil-spring rear suspension for a rear-drive vehicle, the axle housing is kept in place by

(A) Panhard rod
(B) The stabilizer bar
(C) Control arms
(D) The shock absorbers
(E) Answer not known

39. Which one is not a type of suspension spring?

(A) Leaf spring
(B) Coil spring
(C) Torsion spring
(D) Cushion spring
(E) Answer not known

40. What occurs when a wheel hits a bump and moves up?

(A) Jounce
(B) Extension
(C) Free length
(D) Rebound
(E) Answer not known

41. A low drag co-efficient implies that the ———————— shape of the vehicle body is such as enable is more easily through the surrounding viscous air with minimum of resistance; conversely a high drag co-efficient is caused by poor stream lining of the ———————— so that there is a high air resistance when the vehicle is in motion.

(A) spoiler, bumper profile
(B) spoiler, body profile
(C) streamline, bumper profile
(D) streamline, body profile
(E) Answer not known

42. The aerodynamic drag force is not proportional to

(A) density of air medium
(B) tyre tread pattern
(C) velocity of the vehicle
(D) frontal area of the vehicle
(E) Answer not known

43. Increasing air drag is directly proportional to the square of the

(A) Engine speed
(B) Wheel speed
(C) Vehicle speed
(D) Wind speed
(E) Answer not known

44. ———————— wind tunnel is used to analyze cooling and ventilation requirements of passenger compartment.

(A) Hypersonic
(B) Climatic
(C) Transonic
(D) Tabletop
(E) Answer not known

45. The aerodynamic forces and moments are measured in a wind tunnel using

(A) wind tunnel balance
(B) pitot tube
(C) steam generator
(D) hot wire anemometer
(E) Answer not known

46. The drag coefficient of aerodynamically designed cars is about

(A) 0.32
(B) 0.2
(C) 0.4
(D) 0.38
(E) Answer not known

47. The pressure of airflow at ground stream of a car is nearly equal to

(A) upstream pressure
(B) downstream pressure
(C) roof pressure
(D) negative pressure
(E) Answer not known

48. In polisher and sander power tool

(A) emery paper of coarse grade is used for polishing
(B) emery paper of fine grade is used for polishing
(C) steel brush is used for polishing
(D) grinding wheel is used for polishing
(E) Answer not known

49. The type of wrench which can be used for all sizes of nuts without spoiling the sides of the nuts, when the nuts are tightly fastened is

(A) open and wrench
(B) socket wrench
(C) pipe wrench
(D) monkey wrench
(E) Answer not known

50. A file which has two cuts made at an angle with each other is a

(A) smooth cut file
(B) single cut file
(C) double cut file
(D) coarse cut file
(E) Answer not known

51. To accomodate 95% of the driver population with 50:50 male-to-female ratio, the foremost point and the rearmost point can be defining by determining ———— and ———— percentile H-point location from the Ball of foot (BOF)

(A) 95 and 5
(B) 97.5 and 2.5
(C) 2.5 and 97.5
(D) 5 and 95
(E) Answer not known

52. The most comfortable position of the driver's body is achieved when bulk of the body weight is taken by the

(A) ischial bones
(B) spinal cord
(C) thigh bones
(D) calf muscles
(E) Answer not known

53. Numbness in calves of legs and feet while driving may be caused by

(A) Insufficient room for legs
(B) Insufficient width for movement
(C) Acute angle between seat and backrest
(D) Seat exerting too much pressure on the lower part of the thigh
(E) Answer not known

54. Most of the car body components are

(A) Bolted
(B) Welded
(C) Riveted
(D) Moulded
(E) Answer not known

55. ———— is the curved section of the rooftop running between the flattop and rain channel in a passenger car.

(A) Body sill
(B) Fire wall
(C) Cant panel
(D) Tunnel
(E) Answer not known

56. Identify the ODD choice with respect to driver's visibility.

(A) Windscreen inclination
(B) Backlight area
(C) Quarter light area
(D) Seat height
(E) Answer not known

57. Lateral bending of the frame side members may be caused on account of

(A) Weight of passengers
(B) Engine torque
(C) Braking torque
(D) Side wind
(E) Answer not known

58. Identify the frame design, which is no longer used in automobile manufacturing

(A) Perimeter
(B) Stub
(C) Hourglass
(D) Ladder
(E) Answer not known

59. Consider the following statements – True/False

Statement (A): Flat type door panel is usually applied to high segment vehicles.

Statement (B): Pre formed door panels are used in low segment vehicles.

(A) (A)-True, (B)-False
(B) (A)-False, (B)-True
(C) (A) and (B) are true
(D) (A) and (B) are false
(E) Answer not known

60. The distributed pressure is applied for testing the roof under the static condition, would be in the range of

(A) 5 to 10 N/m^2

(B) 10 to 15 N/m^2

(C) 15 to 20 N/m^2

(D) 20 to 25 N/m^2

(E) Answer not known

61. Another name for adaptive cruise control?

(A) Adventure Cruise Control (B) Active Cruise Control

(C) Passive Cruise Control (D) Luxury Cruise Control

(E) Answer not known

62. Which type of sensor used for adaptive cruise control?

(A) Proximity Sensor (B) Optic Sensor

(C) Radar Sensor (D) IR sensor

(E) Answer not known

63. Identify the following statements True/False

Statement [A] : Adaptive cruise control can automatically adjust the vehicle speed to the current traffic situation

Statement [B] : Headway sensor is the main element in all system.

(A) [A] – True, [B] – False

(B) [A] – False, [B] – True

(C) [A] and [B] are True

(D) [A] and [B] are False

(E) Answer not known

64. In driveline modelling, the models are derived using Generalized

(A) Newton's First Law of Motion
(B) Newton's Second Law of Motion
(C) Newton's Third Law of Motion
(D) Kepler's Laws of Motion
(E) Answer not known

65. The manipulated variable in knock control is

(A) Line Pressure
(B) Injection Pressure
(C) Ignition Timing
(D) Quantity of Fuel Injected
(E) Answer not known

66. For ABS the following control system is most suitable

(A) PI
(B) PID
(C) PD
(D) Sliding mode control
(E) Answer not known

67. In a catalytic converter vehicles fresh air is added to the exhaust gases by a secondary air pump where

(A) Lambda is greater than 1
(B) Lambda is less than 1
(C) Lambda is equal to 1
(D) Lambda is not linked with the secondary air
(E) Answer not known

68. The PID controller given by $u(s) = \left[k_p + \left(\frac{k_i}{s} \right) + k_d(s) \right] E(s)$ is referred to

(A) a cascade form

(B) a decoupled form

(C) an industrial form

(D) a series form

(E) Answer not known

69. To control the knock, the knock sensors detected by _____ from engine management ECU, controls the knock by adjusting the ignition timing.

(A) Structure brone noise

(B) Position of Crankshaft

(C) Temperature

(D) Mass air flow

(E) Answer not known

70. For safety reasons, the knock control advance is limited at (where, $\alpha_k(n)$ – knock control ignition angle)

(A) $\alpha_k(n) = 0$

(B) $\alpha_k(n) \geq 0$

(C) $\alpha_k(n) \leq 0$

(D) $\alpha_k(n) \neq 0$

(E) Answer not known

71. The knocking sensitivity of engines can be reduced by a proper design of

(A) Compact combustion chamber geometry in order to avoid hot spots

(B) Central position of the spark plug in order to maximize flame propagation

(C) Decreased turbulence for faster flame propagation

(D) Increased turbulence for slower flame propagation

(E) Answer not known

72. Choose the primary factor that influencing longitudinal dynamics in vehicle motion.

(A) Steering Response

(B) Tire pressure

(C) Traction

(D) Suspension stiffness

(E) Answer not known

73. The damping ratio of underdamped second order system is

(A) Less than 1

(B) Equal to 1

(C) Equal to zero

(D) Greater than 1

(E) Answer not known

74. Which is the correct sequence for a rear-driven vehicular power train consisting of engine and driveline?

(1) Engine

(2) Transmission

(3) Final drive

(4) Clutch

(5) Drive shaft

(6) Wheel

(7) Propeller shaft

(A) (1) → (2) → (4) → (5) → (3) → (7) → (6)

(B) (1) → (4) → (2) → (5) → (3) → (7) → (6)

(C) (1) → (4) → (2) → (7) → (3) → (5) → (6)

(D) (1) → (2) → (4) → (7) → (3) → (5) → (6)

(E) Answer not known

75. What is the gain and time constant of the following transfer function?

$$G(s) = \frac{a}{bs + c}$$

(A) a, b

(B) $\frac{a}{b}, \frac{b}{c}$

(C) $\frac{a}{c}, \frac{b}{c}$

(D) $\frac{c}{a}, \frac{c}{b}$

(E) Answer not known

76. Resonance occurs in a system when

(A) $\frac{w}{w_n} = 0$

(B) $\frac{w}{w_n} = 1$

(C) $\frac{w}{w_n} < 1$

(D) $\frac{w}{w_n} > 1$

(E) Answer not known

77. The control of the vehicle's behaviour at the physical driving limit must influence _____ degrees of freedom in the plane of the road.

(A) One

(B) Two

(C) Three

(D) Neither two nor three

(E) Answer not known

78. The steady state response of a second order system to a harmonic input is given by

(A) $y(t) = MKA \sin(wt - \phi)$

(B) $y(t) = MKA^2 \sin(wt - \phi)$

(C) $y(t) = MK \sin(wt - \phi)$

(D) $y(t) = MKA \sin wt$

(E) Answer not known

79. The evaporative emission shed test consists of

(A) Driving cycle and vehicle soak
(B) Conditioning phase and test phase
(C) Driving cycle and hot soak loss test
(D) Dormant phase and active phase
(E) Answer not known

80. NDIR Analyser works on

(A) Seebuck's Principle
(B) Peltier's Principle
(C) Beer-Lambert's Principle
(D) Piezo Electric Principle
(E) Answer not known

81. Chemiluminescence Technique is used to measure

(A) NO_x
(B) CO
(C) CO_2
(D) Smoke Intensity
(E) Answer not known

82. The PCV valve is located between the

(A) Air cleaner and the carburettor
(B) Carburettor and the intake manifold
(C) Intake manifold and air cleaner
(D) Intake manifold and crankcase
(E) Answer not known

83. Which is/are the following statement(s) true about catalytic converters?

(i) A catalyst is a substance that accelerates a chemical reaction by lowering the energy needed for it to proceed.

(ii) A catalyst is consumed in the reaction and so functions indefinitely unless degraded by heat, age, contaminants

(iii) The chambers of a catalytic converter does not contain catalytic material

(iv) Catalytic converters are chambers mounted in the flow system of exhaust gas

(A) (ii) and (iii)
(B) (ii) and (iv)
(C) (i) and (iv)
(D) (i) and (iii)
(E) Answer not known

84. The function of Charcoal granules is to Absorb

(A) Water Vapour
(B) Carbon Monoxide
(C) Gasoline Vapour
(D) Liquid Gasoline
(E) Answer not known

85. The Catalyst used in the converter for oxidizing HC and CO is

(A) Copper
(B) Charcoal
(C) Rhodium
(D) Platinum
(E) Answer not known

86. Use of Diesel particular filter

(A) Increases fuel efficiency
(B) Decrease fuel efficiency
(C) Increases engine wear
(D) Decreases engine wear
(E) Answer not known

87. Soot can be oxidized inside the cylinder on reaction with

(A) O, O_2, OH
(B) CO, H_2O, NO_X
(C) CO, CO_2, NO_X
(D) N_2O_5, NO_3, O_3
(E) Answer not known

88. Allowable EGR% in SI engine is

(A) 10-20%
(B) 21-40%
(C) 41-60%
(D) 61-80%
(E) Answer not known

89. If EGR is adopted in an engine, it will

(A) Increase Engine Power
(B) Decrease Engine Power
(C) Increase Engine Speed
(D) Decrease Engine Speed
(E) Answer not known

90. Exhaust gas recirculation has the disadvantage of

(A) Decreasing Thermal Efficiency
(B) Increasing HC Emission
(C) Decreasing Thermal Efficiency and Increasing HC Emission
(D) Increasing Aldehydes and Decreasing thermal efficiency
(E) Answer not known

91. NO_x emission is maximum in SI engines when the air-fuel ratio is

(A) Lean
(B) Very lean
(C) Nearly stoichiometric
(D) Rich
(E) Answer not known

92. Black soot in the engine exhaust gas for

(A) CO_2
(B) H_2O
(C) Unburnt HC
(D) SO_2
(E) Answer not known

93. Black smoke emission of a diesel fuel

(A) Increases with increase in cetane number
(B) Increases with decrease in cetane number
(C) Smoke is not affected by the cetane number
(D) None of the above
(E) Answer not known

94. ——————— is a product of incomplete combustion.

(A) CO_2 (B) NO_x

(C) Oxides of sulphur (D) CO

(E) Answer not known

95. Particulate matter released by diesel engine exhaust gas is known as

(A) Fluorine

(B) Green house gas

(C) Environment friendly matter

(D) Toxic air contaminant

(E) Answer not known

96. The type of emissions occur in the vehicle exhaust, the engine crankcase, the fuel system and from atmospheric venting of vapours during fuel distribution and dispensing is (spark-ignition gasoline engines)

(A) Carbon monoxide

(B) Nitrogen oxides

(C) Hydrocarbon

(D) Both carbon monoxide and nitrogen oxides

(E) Answer not known

97. Fumigation technique is used to control

(A) HC (B) NO_x

(C) CO (D) Smoke

(E) Answer not known

98. The selective catalytic reduction method uses ———————— reductant to reduce the NO_x emission.

(A) Oxygen
(B) Ammonia
(C) Chlorine
(D) Flourine
(E) Answer not known

99. Oxygen present in atmospheric air by volume

(A) 21%
(B) 23%
(C) 77%
(D) 79%
(E) Answer not known

100. An automobile 4-stroke engine operates with mean speed of 10 m/sec. The piston reciprocates 0.1 m/stroke. The rotating speed of the engine will be

(A) 1000 rpm
(B) 2000 rpm
(C) 4000 rpm
(D) 5000 rpm
(E) Answer not known

101. An engine develops 176.3 Nm of torque at 2000 rpm, its brake power is

(A) 100 kW
(B) 20 kW
(C) 36 kW
(D) 150 kW
(E) Answer not known

102. Assertion [A] : The turbocharged C.I engine forces air-mass into the cylinder, therefore the power yield (output) is increased

Reasons [R] : Lower fuel consumption is achievable by increasing engine swept volume

(A) Both [A] and [R] are true and [R] is the correct explanation of [A]

(B) Both [A] and [R] are true but [R] is not the correct explanation of [A]

(C) [A] is false but [R] is true

(D) [A] is true but [R] is false

(E) Answer not known

103. The structural vibrations caused by the spontaneous ignition of unburned gas in IC engines, sometimes can be heard as a tinkling noise known as

(A) Power stroke

(B) Exhaust stroke

(C) Knocking

(D) Resonance

(E) Answer not known

104. Knock in diesel engine occurs due to

(A) Instantaneous auto-ignition of last part of the charge

(B) Reduction in delay period

(C) Delayed burning of the first part of the charge

(D) Instantaneous burning of the first part of the charge

(E) Answer not known

105. One of the effect of detonation is

(A) Delay in ignition
(B) Interruption in lubrication
(C) Loss of power
(D) Deterioration in the quality of air-fuel mixture
(E) Answer not known

106. Compression ratio of diesel engine is of the order of

(A) 5-7 (B) 7-10
(C) 10-12 (D) 14-20
(E) Answer not known

107. The principal surfaces requiring lubrication in an IC engine

(A) Cylinder head
(B) Crankcase
(C) Inlet and exhaust manifold
(D) Cylinder wall
(E) Answer not known

108. In evaporate cooling systems, heat absorbed per kg of coolant air is

(A) C_p st (B) C_v st
(C) Latent heat of coolant (D) $(C_p - C_v)$ st
(E) Answer not known

109. The friction that occurs between the layers of oil in an oil film is called

(A) Viscous friction
(B) Solid friction
(C) Boundary friction
(D) Greasy friction
(E) Answer not known

110. To protect against excessive oil pressure, the lubrication system is provided with

(A) Oil strainer
(B) Pressure relief valve
(C) Bleeding plug
(D) Oil filter
(E) Answer not known

111. Solex carburetor is called down draught carburetor, why?

(A) Air flows in downward direction
(B) Fuel flows in downward direction
(C) Air fuel mixture flows in downward direction
(D) Float moves in downward direction
(E) Answer not known

112. Which of the following statements are right about a carburetor?

(i) To mix and deliver air fuels in proper proportion

(ii) To carry fuel from the tank to the engine

(iii) To assist in hot starting

(iv) To open and heat the injectors

(A) (i) and (iii) (B) (i) and (iv)

(C) (ii) and (iii) (D) (i) only

(E) Answer not known

113. The example of a "Variable Venturi" type carburettor is

(A) Carter Carburettor (B) Solex Carburettor

(C) S.U. Carburettor (D) Zenith Carburettor

(E) Answer not known

114. The device that controls the amount of air entering the spark ignition engine is the

(A) Throttle valve (B) Air cleaner

(C) Intake manifold (D) Fuel injector

(E) Answer not known

115. The Emulsion tube in modern carburettors is for

(A) Making rich mixture (B) Making lean mixture

(C) Mixture correction (D) Shutting off A/F supply

(E) Answer not known

116. The counterweight on a crankshaft are located opposite to the

(A) Main bearings
(B) Big-end bearing
(C) Small-end bearing
(D) Vibration damper
(E) Answer not known

117. Which of the following is correctly paired?

(1) Clearance volume – Maximum volume in the combustion chamber with piston at BDC

(2) Swept volume – Volume displaced by the piston as it travels through one stroke

(3) Air-fuel ratio – Ratio of mass of fuel to mass of air input into engine

(A) (1) and (3) correct
(B) (2) and (3) correct
(C) (1) only correct
(D) (2) only correct
(E) Answer not known

118. The materials used for cylinder block are

(A) Cast Iron and Steel
(B) Cast Iron and Aluminium Alloy
(C) Steel and Aluminium Alloy
(D) Brass and Steel
(E) Answer not known

119. The intake charge in a diesel engine consists of

(A) Air alone
(B) Air and Lubricating Oil
(C) Air and Fuel
(D) Air, Fuel and Lubricating Oil
(E) Answer not known

120. The main advantages of fluid coupling are :

(1) Absence of idling drag
(2) Lower loading of engine
(3) Lower slip
(4) Elimination of clutch pedal
(5) Smooth transmission of power
(6) Less maintenance due to absence of frictional surface

(A) (1), (3), (4) and (6)
(B) (1), (2), (3) and (5)
(C) (4), (5) and (6)
(D) (2), (3) and (4)
(E) Answer not known

121. The shape of the blade in a torque converter is generally

(A) Square
(B) Round
(C) Flat
(D) Curved
(E) Answer not known

122. The Torque transmitted from power plant to the driven wheels (ie) torque at wheels is

(A) Engine torque × Gear ratio × efficiency of drive train

(B) Engine torque × Gear ratio / efficiency of drive train

(C) Engine torque + Gear ratio × efficiency of drive train

(D) Engine torque – Gear ratio – efficiency of drive train

(E) Answer not known

123. An impeller with radial vanes constituting the driving member and runner with radial vanes constituting the driven member is found in

(A) Fluid coupling

(B) Dog clutch

(C) Friction clutch

(D) Cone clutch

(E) Answer not known

124. Identify the correct answer :

(i) The torque converter involves heavy losses

(ii) The efficiency of the torque converter is maximum within a very narrow speed range

(iii) Disconnect torque converter at high speed, instead employ direct drive

(A) (i) only

(B) (ii) only

(C) (i) and (ii)

(D) (i), (ii) and (iii)

(E) Answer not known

125. The number of input and output elements of planetary gear system is

(A) one and one
(B) two and one
(C) one and two
(D) two and two
(E) Answer not known

126. Gear reduction between the starting motor and the flywheel is about

(A) 5
(B) 10
(C) 15
(D) 40
(E) Answer not known

127. Choose the right matches among the following :

(1) Sliding mesh gear box – Spur gears
(2) Constant mesh gear box – Helical gears
(3) Syncromesh gear box – Helical gears

(A) (1) and (2) are correct
(B) (1), (2) and (3) are correct
(C) (2) and (3) are correct
(D) Only (1) is correct
(E) Answer not known

128. The statement that is not right for a constant mesh gear box

(i) Constant mesh gear box is quiet in operation

(ii) The gears on the main shaft is splined

(iii) Dog clutch slides on the main shaft

(iv) The gears in the counter shaft are not fixed

(A) (i) (B) (ii)

(C) (iii) (D) (iv)

(E) Answer not known

129. Determine the speed of the vehicle if the angular speed of the engine is 100 rad/s overall gear ratio is 2, and tire effective radius is 0.3m

(A) 60 m/s (B) 10 m/s

(C) 5 m/s (D) 15 m/s

(E) Answer not known

130. The purpose of double declutching when changing down is to

(A) Slow down the lay shaft

(B) Speed up the lay shaft

(C) Slow down the main shaft

(D) Speed up the main shaft

(E) Answer not known

131. ———————— type of transmission system is employed in vehicles having independent suspension for driving wheels.

(A) Clutch, gear box and line axle
(B) Clutch, gear box and dead axle
(C) Clutch, gear box and axleless
(D) Electrical and electromagnet
(E) Answer not known

132. ———————— is used in a clutch plate to control the engagement of the clutch.

(A) clutch facing
(B) cushioning spring
(C) dog clutch
(D) torsional spring
(E) Answer not known

133. A Clutch is engaged when

(A) Idling the engine
(B) Starting the engine
(C) Shifting of gear
(D) Vehicle is to be moved and is kept engaged when the vehicle is moving
(E) Answer not known

134. Cushioning springs in clutch plate are meant to reduce

(A) Torsional vibration
(B) Jerky start
(C) Clutch Judder
(D) Clutch slip
(E) Answer not known

135. Clutch is positioned between

(A) engine and propeller shaft

(B) engine and final drive

(C) engine and gear box

(D) engine and differential

(E) Answer not known

136. The clutch plate contains grooves on both sides of the facings. This is to

(A) increase the frictional force

(B) decrease the shock of engagement

(C) smooth the power flow from the engine

(D) prevent the facings from sticking to the flywheel face and pressure plate when disengaged

(E) Answer not known

137. A multiplate clutch is to be designed for a motor cycle whose engine develops a torque of 13 Nm at 3500 RPM. Calculate the number of clutch plates if $\mu = 0.3$, effective mean radius is 80 mm and total axial force is 1200 N. Assume the maximum intensity of pressure as 0.08 N/mm^2.

(A) 6 (B) 8

(C) 10 (D) 4

(E) Answer not known

138. In the friction disk, torsional vibration is assembled by the one of

(A) Cushion bolts (B) Bearings

(C) Cushion springs (D) Friction pads

(E) Answer not known

139. In Electromagnetic clutch at low, speeds when the dynamo output is low, the clutch is

(A) firmly engaged with springs on the clutch plate
(B) firmly engaged without springs on the pressure plate
(C) firmly engaged with springs on the pressure plate
(D) firmly engaged without springs on the clutch plate
(E) Answer not known

140. Electro optical sensors are used for

(A) Lubricating oil flow measurement
(B) Cooling water flow measurement
(C) Position and speed measurement
(D) Piston temperature measurement
(E) Answer not known

141. ———————— technology introduced for saving the energy losses in vehicle during braking.

(A) Mild hybrid
(B) Micro hybrid
(C) Plug-in hybrid
(D) Fully hybrid
(E) Answer not known

142. ———————— protocol uses serial data transfer for communication.

(A) IEEE-488
(B) CAN
(C) ATA
(D) SCSI
(E) Answer not known

143. The vehicle technology which is designed to alert a driver when a vehicle is about to go out of a lane is

(A) Lane keep assist
(B) Lane departure warning
(C) Stability control
(D) Adaptive cruise control
(E) Answer not known

144. Assertion [A] : All air bag electrical terminals are gold plated.
Reason [R] : This is done in order to improve aesthetics.

(A) Both [A] and [R] are true
(B) Both [A] and [R] are false
(C) [A] is true but [R] is false
(D) [A] is false but [R] is true
(E) Answer not known

145. The order in which the temperature sensors exhibit non-linearity (highest to lowest)

(A) Thermocouple, RTD, Thermistors
(B) Thermistors, Thermocouples, RTDs
(C) RTDs, Thermocouples, Thermistors
(D) Thermistors, RTDs, Thermocouple
(E) Answer not known

146. The terminal voltage of a starter motor is 10 V whose current is 200 A. The speed of the motor is 1500 RPM. The torque is 7 Nm. The efficiency of the motor is

(A) 43 %
(B) 53 %
(C) 55 %
(D) 19 %
(E) Answer not known

147. The output of an alternator is controlled by

(A) Voltage regulator
(B) Cut out relay
(C) Current regulator
(D) Voltage booster
(E) Answer not known

148. Starter motors work on the principle that

(A) The field coils rotate in opposite direction from the armature
(B) Opposite magnetic poles repel
(C) Like magnetic poles repel
(D) The armature rotates from the strong magnetic field to weak magnetic field
(E) Answer not known

149. In the electronic ignition system, the circuit between the battery and ignition coil primary winding is closed and opened by

(A) Contact points
(B) A field relay
(C) A switch
(D) An ECU
(E) Answer not known

150. The secondary coil should have the following ratio of winding compared to primary coil to step up the voltage from 12 V to 30 kV.

(A) 1:3000
(B) 1:2700
(C) 1:2000
(D) 1:2500
(E) Answer not known

151. The heat range of a spark plug is primarily determined by

(A) The gap between the electrodes
(B) The number of ribs on the upper insulator
(C) The length of the lower insulator
(D) The depth of the electrodes enter the combustion chamber
(E) Answer not known

152. Which of the following is the disadvantage of the magneto ignition system?

(A) Magneto ignition system has a poor quality of spark during starting
(B) Magneto ignition system occupies more space
(C) Magneto ignition system has more maintenance problem
(D) Magneto ignition system is used largely in four wheels
(E) Answer not known

153. In a distributorless ignition system, piston pairs are defined as

(A) Pairs of cylinder located adjacent to each other
(B) The present and the next cylinder which is in power stroke
(C) Direction of motion of piston are opposite in nature
(D) Direction of motion of piston are similar in nature
(E) Answer not known

154. Consider the following statements in view of spark plug-ignition

Statement (A) : The spark plug must withstand severe vibration and a chemical environment.

Statement (B) : Thermal capacity of spark plug does not vary with respect to projection of the electrode.

(A) (A) – True, (B) – False

(B) (A) – False, (B) – True

(C) (A) and (B) are true

(D) (A) and (B) are false

(E) Answer not known

155. When the battery is fully discharged both the electrodes will be accumulated with the following

(A) Lead sulphate

(B) Lead oxide

(C) Lead

(D) Hydrogen sulphate

(E) Answer not known

156. The chemical reaction that takes place in a lead acid battery during discharging in the positive plate

(i) $PbO_2 + H_2SO_4 = PbSO_2 + H_2O$

(ii) $PbO_2 + H_2SO_4 = PbSO_4 + H_2O$

(iii) $Pb + SO_4 = PbSO_4$

(iv) $Pb + SO_2 = PbSO_2$

(A) (i)

(B) (ii)

(C) (iii)

(D) (iv)

(E) Answer not known

157. Battery electrolyte consists of approximately (By volume)

(A) 35% H_2SO_4 and 65% water

(B) 65% H_2SO_4 and 35% water

(C) 35% HCl and 65% water

(D) 65% HCl and 35% water

(E) Answer not known

158. Deep cycling means

(A) Over charging the battery

(B) Over filling the battery with water

(C) Fully discharging and then recharging battery

(D) Over filling the battery with acid

(E) Answer not known

159. ———————— is used to stabilize the system voltage by absorbing any abnormal transient voltages in the electrical system of the entire vehicle.

(A) Battery

(B) Container

(C) Separator

(D) Electrocyte

(E) Answer not known

160. At critical speed, the lateral acceleration gain of the vehicle becomes

(A) Zero

(B) Unity

(C) Infinite

(D) Negative

(E) Answer not known

161. The total resistance to the motion of vehicle is given by

If

R_r – Rolling Resistance

R_a – Air Resistance

R_g – Grade Resistance

(A) $R_t = R_a + R_g + R_r$

(B) $R_t = 2R_a + 0.75\ R_g + \frac{1}{7}\ R_r$

(C) $R_t = 0.77\ R_a + 0.8\ R_g + R_r$

(D) $R_t = 2\ [R_a + R_g] + 0.77\ R_r$

(E) Answer not known

162. The dynamic equation of vehicle motion along the longitudinal direction is given by

(A) Mass × acceleration = Rolling resistance + aerodynamic resistance – gradient resistance

(B) Mass × acceleration = Rolling resistance – aerodynamic resistance – Gradient resistance

(C) Mass × acceleration = Rolling resistance + aerodynamic resistance + gradient resistance

(D) Mass × acceleration = – Rolling resistance – aerodynamic + gradient resistance

(E) Answer not known

163. Ride model for a passenger car has ———————— degrees of freedom.

(A) 4 (B) 5

(C) 6 (D) 7

(E) Answer not known

164. In a typical active suspension system, the two degrees of freedom for a half car model will be ———————— and ————————. Assume the vehicle model is analysed on side view (front axle and rear axle)

(A) Yaw and bounce

(B) Bounce and roll

(C) Yaw and heave

(D) Pitch and vertical translation

(E) Answer not known

165. During high deceleration, electronic brake force distribution is required to avoid

(A) Rear wheel lock up

(B) Front wheel lock up

(C) Vehicle skidding

(D) Yaw instability

(E) Answer not known

166. For comfort of passengers in a vehicle, the suspension frequency should be between

(A) 0.5 to 1 Hz

(B) 1.5 to 2.3 Hz

(C) 20 to 200 Hz

(D) 4 to 8 Hz

(E) Answer not known

167. For a tyre, if free rolling radius is 0.3 m and the effective rolling radius is 0.29 m, then the percentage of slip is

(A) 1.33%

(B) 3.33%

(C) 5.33%

(D) 8.33%

(E) Answer not known

168. The inflation pressure of the tyre 120 Kpa to 200 Kpa is needed for

(A) Two wheeler
(B) Passenger car
(C) Bus
(D) Truck
(E) Answer not known

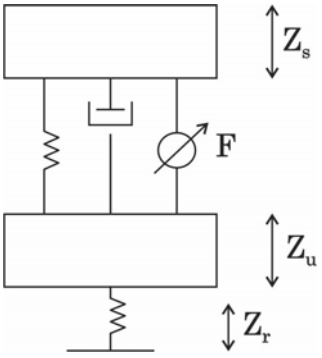
169. The moment acts parallel to the intersection of the wheel plane with the road plane is called

(A) Rolling moment
(B) Rolling resistance moment
(C) Overturning moment
(D) Aligning moment
(E) Answer not known

170. If the vehicle mass is 800 kg, what is the gradient force caused by the road gradient of 15%

(A) 500 N
(B) 600 N
(C) 800 N
(D) 1200 N
(E) Answer not known

171. Name the automotive system which is shown below



(A) Quarter car active automotive suspension
(B) Quarter car semi active automotive suspension
(C) Quarter car passive suspension system
(D) Semi car active automotive suspension
(E) Answer not known

172. The rolling resistance is considered by the displacement of

(A) Normal forces only

(B) Normal forces, representing applied forces too

(C) Tangential forces only

(D) Tangential forces, representing applied forces too

(E) Answer not known

173. For the longitudinal motion of the elastic wheel another consequence of the elasticity has to be considered and that is

(A) Aerodynamic resistance

(B) Magnification factor

(C) Transmissibility factor

(D) Rolling resistance

(E) Answer not known

174. The equation of motion for a damped viscous vibration is $3\ddot{x} + 9\dot{x} + 27x = 0$. The damping factor will be

(A) 0.25 (B) 0.5

(C) 0.75 (D) 1.00

(E) Answer not known

175. In a single degree of freedom vibration system, the undamped natural frequency is ———————— the damped natural frequency

(A) Greater than
(B) Equal to
(C) Less than
(D) Uncertain
(E) Answer not known

176. If the Damping factor for a vibrating system is unity, then the system is said to be

(A) Over damped
(B) Under damped
(C) Critically damped
(D) Undamped
(E) Answer not known

177. When there is a reduction in amplitude over every cycle of vibration, then the body is said to have

(A) Free vibration
(B) Forced vibration
(C) Damped vibration
(D) Absorber
(E) Answer not known

178. The Natural frequency of a system with mass (m) and stiffness (k) is given by

(A) $\frac{k}{m}$ (B) $\sqrt{\frac{k}{m}}$

(C) $\sqrt{\frac{m}{k}}$ (D) $\frac{m}{k}$

(E) Answer not known

179. An example of a source of vibration that cannot be altered is

(A) Hammer blow

(B) Rotating unbalance

(C) Reciprocating unbalance

(D) Engine combustion Instability

(E) Answer not known

180. The compressor runs without any difference in temperature between the low pressure line and high pressure line, this is an indication that the air conditioning system.

(A) Is filled with refrigerant at high pressure

(B) Has low or no refrigerant

(C) Is filled with refrigerant at atmospheric pressure

(D) Is functioning well

(E) Answer not known

181. Arrange the following according to the trouble shooting sequence of execution of front suspension.

(i) Check all the tyre pressure, front end alignment and tyre imbalance

(ii) Check the vehicle altitude and raise the vehicle off the floor

(iii) Check suspension bushings and steering mounts

(iv) Check ball joints, condition of struts

(A) (i), (ii), (iv), (iii)
(B) (i), (iii), (iv), (ii)
(C) (i), (iii), (ii), (iv)
(D) (ii), (iii), (iv), (i)
(E) Answer not known

182. Clutch slipping occurs out to one of the following

(A) Weak thrust springs
(B) Lining not making even contact
(C) Buckled clutch plate
(D) Bent clutch shaft
(E) Answer not known

183. Excessive clutch pedal free-play causes a

(A) Clutch vibration
(B) Dragging clutch
(C) Clutch chatter
(D) Binding clutch
(E) Answer not known

184. At the time of battery is fully charged, hydrometer reading will be

(A) 1.140 – 1.170
(B) 1.265 – 1.299
(C) 1.110 – 1.140
(D) 1.170 – 1.025
(E) Answer not known

185. Identify the function of pressure relief valve in engine lubricating system.

(A) Reduce oil pressure
(B) Increase oil pressure
(C) Limit oil pressure
(D) Set idling pressure
(E) Answer not known

186. The crank shaft bending should not generally exceed

(A) 0.008 mm
(B) 0.08 mm
(C) 0.8 mm
(D) 8 mm
(E) Answer not known

187. Under what circumstance, more rust and corrosion is found in a cooling system?

(A) A cooling system without an expansion tank
(B) A cooling system with an expansion tank
(C) A cooling system without a cross flow radiator
(D) A cooling system with a thermostat
(E) Answer not known

188. Match the following workshop safety aspects

(a)	Leaking Gasoline	1.	Spontaneous combustion
(b)	Store Gasoline	2.	Explosion
(c)	Oily rags can fire	3.	Quickly vaporizes
(d)	A spark in a closed place fill with gasoline vapor	4.	Safety container

	(a)	(b)	(c)	(d)
(A)	3	4	1	2
(B)	1	4	3	2
(C)	3	2	1	4
(D)	1	2	3	4

(E) Answer not known

189. A powerful mathematical model used to analyze the trade-offs between safety stock requirements and associated service levels for handling multi-item situations is

(A) Fourier series

(B) Lagrange Multiplier Technique

(C) Limit

(D) Runge-kutta method

(E) Answer not known

190. Failure to remove a ring or bracelet before going to work could cause a short circuit which will cause

(A) A severe burn
(B) An electric shock
(C) The engine to crank
(D) A signal of trouble in the circuit
(E) Answer not known

191. The most common cause of accidents in the shop is

(A) defective parts
(B) failure to follow instructions
(C) defective equipment
(D) faulty workmanship
(E) Answer not known

192. Most shops discourage customers from roaming around the shop work areas because the customers

(A) often want to help
(B) are not dressed properly
(C) could be in danger without realizing it
(D) may find out they are paying for warranty work
(E) Answer not known

193. If the engine cranks normally and fail to start, the

(A) Ignition system defective
(B) Battery gone down
(C) Open circuit
(D) Defective switch
(E) Answer not known

194. Identify the light which will come after amber at a traffic light.

(A) Red
(B) Green
(C) Blue
(D) Yellow
(E) Answer not known

195. If someone is abandoning public transport vehicle as a mark of protect or agitation or a kind of strike, in a public place or in any other place causing obstruction or inconvenience to the public, the following is applicable :

(A) It should be charged with only fire is attracted
(B) No fire is attracted
(C) Legitimate right of driver
(D) Driving licence is liable to be suspended or cancelled
(E) Answer not known

196. Driver's hand signal "Extend right arm and rotate it an anti-clockwise direction" indicates

(A) intend to slow down the vehicle
(B) intend to turn to driver's left
(C) intend to turn to driver's right
(D) intend to stop and overtake
(E) Answer not known

197. In case of accident, one should apply for compensation claim to

(A) Regional Transport Office
(B) Accident Claims Tribunal
(C) Technical Standing Committee
(D) Industry Standards Committee
(E) Answer not known

198. The Registration Certificate issued in any state is valid

(A) Anywhere in India
(B) Only in the State of Issue
(C) Anywhere in the World
(D) All European Countries
(E) Answer not known

199. The authority for framing regulations for the driving of motor vehicles

(A) State Government to Central Government
(B) State Government to Official Gazette
(C) Central Government to State Government
(D) Central Government to Official Gazette
(E) Answer not known

200. Top overhauling refers to

(A) Increasing the quantity of lubricant
(B) Decreasing the quantity of lubricant
(C) Maintaining the pressure of injector
(D) Decarbonising the engine
(E) Answer not known

———————————