ANDHRA PRADESH PUBLIC SERVICE COMMISSION :: VIJAYAWADA

ASSISTANT MOTOR VEHICLE INSPECTORS IN A.P. TRANSPORT SUBORDINATE SERVICE

PAPER-2 AUTOMOBILE ENGINEERING

FINAL KEY

1. Which of the following is true for open system?

   Mass can transfer, energy can transfer

2. A piston cylinder contains air at 600 kPa, 290 K and a volume of 0.01m^3. A constant pressure process gives 60 kJ of work out. Find the final volume of the air.

   0.11 m^3

3. As per kinetic theory of gases, value of gamma for monoatomic gases, diatomic gases and polyatomic gases are

   $$\frac{5}{3}, \frac{7}{5}, \frac{4}{3}$$

4. _____ is the compression ratio for positive ignition (PI) engine.

   6 to 10

5. The ratio of specific heat at constant volume (cv) and specific heat at constant pressure (cp) is

   < 1

6. One kg of hydrogen requires _____ kg of oxygen to produce ---- kg water.

   8,9

7. The value of 1 cm of Hg is equal to

   1333 N/m^2

8. Which of the following is correct pressure co-relation?

   Absolute pressure = Gauge pressure + Atmospheric pressure

9. Availability of a system is depending on the

   State of a system and surrounding

10. Calculate the enthalpy of 25 kg of fluid that occupies a volume of 12000 litre, if the internal energy is 28000000 J /kg and the pressure is 0.3 MN/m^2

    703.6 MJ

11. The process of cleaning the cylinder, after the expansion stroke, is called

    Scavenging

12. Which of the following is an advantage of a compression swirl?

    All of the given options

13. In a 4- stroke compression ignition (CI), the fuel is injected about

    15° before top dead centre

14. A cetane number of $C_{10}H_7CH_3$is _____

    0

15. In S.I. engine, Raising the coolant temperature_____

Decreases delay period

16. The ratio of the actual volume of gas taken into the cylinder during suction stroke to the piston displacement volume is called

Volumetric efficiency

17. Morse test is used to calculate _____

Brake Power

18. _____ is not an integral part of a carburettor

Fuel Pump

19. Usually crankcase is made of -------

both Aluminium and Cast iron

20. Inside a cylinder, dissociation is _____ temperature.

Increases with

21. _____ is used to connect non-intersecting and non-parallel shafts

Spiral gears

22. _____ is the advantage of gear drive as compared to belt, rope and chain drives

All of the given options

23. The diametral pitch of a gear is given by,
Where, D=Pitch circle diameter T= Number of teeth,

T/D

24. Contact ratio is known as _____

Length of arc of contact / the circular pitch of a gear

25. Mitre gears are used for

equal speed

26. In worm and wheel, the shaft axes are

Perpendicular to each other

27. The number of teeth on each of the two equal spur gears in mesh are 35 and the module is 6 mm then, _____ is the circular pitch.

18.8

28. The following is the chemical formula of is o-octane

C_8H_{18}

29. Fluid friction between two lubricated surfaces are due to

Viscosity and Oiliness

30. Coefficient of Friction is,_____

limiting friction (F) / Normal reaction (R_N) between the two bodies

31. Nominal diameter and core diameter of the screw thread is denoted by d_0 and dc respectively, then the mean diameter of the screw is given by _____

$$\frac{(\mathbf{d0 + dc})}{\mathbf{2}}$$

32. In a screw jack, the effort required to lift the load S is _____

Where, A = Helix angle, and B = Angle of friction

P = S tan (A+ B)

33. The capacity of a brake depends upon _____

All of the given options

34. A vehicle's brake efficiency is affected by

Both Vehicle weight and braking effort

35. The Indicated power of an engine is _____ the brake power

>

36. Petrol car engine has four cylinders of 75 mm bore and 85 mm stroke with 8 compression ratios, _____ is the cubic capacity of the engine

376

37. The calorific value of diesel is about

42.5 MJ/kg

38. 4 cylinder in-line engine has a _____ firing order

1-3-4-2

39. _____is known as entropy principle

Second law of thermodynamics

40. The specific gravity of the engine lube oils varies between _____

0.85 to 0.96

41. _____ torque is required to produce 500 HP at 3000 rpm

1187 N-m

42. In a vehicle, Permeation through the walls of plastics tanks is controlled by _____

All of the given options

43. Diesel NO_X is _____ with cetane number and _____ as aromatic content is lowered

increases, decreases

44. _____ (TBFI) are a substitution of electromechanical replacement for the carburettor

Throttle Body Fuel Injector

45. Complete a catalytic reaction: NO + CO = _____ + CO_2

½ N_2

46. Which of the following material is not used in three way catalytic converter as a catalyst?

Iron

47. _____ is used to control the particulates from a diesel engine

Diesel Particulate Filter

48. An Isobaric process is a

Constant pressure process

49. 1 MPa (Mega Pascal): _____ N/mm^2

1 ×10^0

50. _____ is correct expression for Poisson's ratio

Lateral strain / Longitudinal strain

51. Hook's law holds good up to

Elastic Limit

52. Normal Strain may be

All of the given options

53. Which of the following property is dependent on a mass of a thermodynamic system?

Volume

54. Law: "The change of internal energy of a perfect gas is directly proportional to the change of temperature" is known as

Joule's law

55. Which of the following is the correct expression to corelate gas constant (R) and constant volume specific heat (CV)?

$$\gamma = 1 + R/CV$$

56. Efficiency of a cycle is considered as

$$\frac{\text{Workdone}}{\text{Heat Supplied}}$$

57. The volumetric efficiency of the SI engine is comparatively

Lower than CI engine

58. Working cycle of a 4- stroke engine is complete in

Two revolution of the crankshaft

59. Stoichiometric fuel- air ratio of a gasoline is

1: 15

60. Which of the following is not a types of cast iron?

Permanent cast iron

61. _____ has a maximum ductility

Copper

62. Medium carbon steel is used to make

Crankshafts

63. _____ property is necessary in stamping images on coins

Plasticity

64. _____ is a measure of the ability of a material to absorb energy up to fracture

Toughness

65. Carburettor is commonly used in

Spark Ignition (S.I.)

66. The end of the connecting rod is attached to the piston using

Wrist pin and Piston pin

67. _____ is the angle between the vertical axis of the wheels used for steering and the vertical axis of the vehicle when viewed from the front or rear.

Camber Angle

68. For a Tyre designation- P265/70 R17, 265 stands for

Section width

69. Tyre provides a cushion between

Vehicle and road

70. Which of the following is a type of tyre tread designs?

All of the given options

71. The carbon black is added to the rubber during tyre construction to

Increase strength and Increase Toughness

72. Incomplete combustion is responsible for

Unburned Hydrocarbon

73. For a Lead acid battery: $PbO_2 + Pb + 2H_2SO_4 =$ _____ $+ 2H_2O$

$2PbSO_4$

74. Which of the following is a not a Diesel smoke?

Green smoke

75. Researcher wants to decrease a NOx in SI engine then, Air fuel ratio is

< 13:1 and >17:1

76. Commonly, source of pollutants from a vehicle is

All of the given options

77. The inherent oxygen content in gasoline is

0 %

78. Match list I with List II and select the correct answer according to it.

List I		List II
a. Two constant volumes and two adiabatics	P	Ericsson
b. Two constant pressure and two adiabatics	Q	Stirling
c. Two constant volumes and two isothermals	R	Joule
d. Two constant pressures and two isothermal	S	Otto

a-S, b-R, c-Q, d-P

79. Thermometer works on

Zeroth law of thermodynamics

80. For same maximum pressure and output, which of the following sequence of cycle is correct?

Diesel cycle, Dual cycle, Otto cycle

81. Which of the following parameter changes during throttling process?

Pressure

82. 1 Kcal = _____

4.184 KJ

83. The term N.T.P stands for

Normal Temperature and Pressure

84. Work is called a _____ and Heat is called a _____

Path functions, Path functions

85. The equation $(p + (a/v^2))(v-b) = R$ is known as

Van der Waal's equation

86. Carnot cycle is a hypothetical cycle in which all cycles are

Reversible

87. Efficiency of a Carnot engine with $T_1 = 200\ ^0C$, $T_2 = 30\ ^0C$ is

36 %

88. Brayton cycle is used in?

Gas turbines

89. In a four stroke SI engine --------- is compressed.

Air and Fuel

90. Incomplete combustion is a result of?

Cool metal surfaces of the combustion chamber and Imperfect mixture ratio

91. Cloud point of a fuel is

Temperature at which it solidifies

92. Bad Scavenging gives

Low mean indicated pressure

93. Viscosity of a lubrication oil is

decreases with increase in temperature

94. Which of the following statement is correct for Opposed piston diesel engine?

Combustion chamber is located between the pistons

95. The delay period in petrol engine is _____ compared to diesel engine

Long

96. The firing order in an inline six-cylinder engine is

1-5-3-6-2-4

97. Exhaust have 2000 ppm NOx concentration then, NO_X in % is

0.2

98. Which of the following is not the unit of a power?

kcal/kg sec

99. Friction between unlubricated surfaces

None of the given options

100. Factor of safety is defined as

Ultimate stress / Permissible stress

101. _____ is the property by virtue of which certain material return back to their original position after the removal of the external force

Elasticity

102. The dimensions of Young's modulus of elasticity are given by

$M^1L^{-1}T^{-2}$

103. Modulus of rigidity is defined as the ratio of

Shear stress to shear strain

104. The relationship between modulus of elasticity E, bulk modulus K and Poisson's Ratio μ = is,

E = 3K (1 - 2μ)

105. Two shafts A and B are made of the same material. The diameter of the shaft A is twice as that of shaft B. The power transmitted by the shaft A will be _____ of shaft B.

Eight times

106. Section modulus Z is expresses as, where, I = Moment of inertia of the cross-section about the neutral axis, Y = Distance from the neutral axis to the extreme fibre

I/Y

107. The maximum energy that can be stored in a body due to external loading up to the elastic limit is called

proof resilience

108. The stable form of Pure iron at room temperature is

Ferrite

109. Case hardening is a technique whereby both _____ and _____ is enhanced for steel alloys

Surface hardness, fatigue life

110. The path taken by the petrol is

Fuel tank- Float Chamber-Jets- Throat

111. SAE stands for

Society of Automotive Engineers

112. Which of the following is a method to determine the friction power of an engine?

All of the given options

113. Which of the following is an important function of a lubrication system?

All of the given options

114. NO_X can be control by

All of the given options

115. Relative fuel air ratio is?

Actual F/A to Stoichiometric F/A

116. EGR stands for

Exhaust Gas Recirculation

117. Which of the following is a function of detergent engine oil additive?

Control of high temperature deposits

118. During suction stroke, the in-cylinder pressure is

< 1.013 bar

119. Choke is used to provide

Rich mixture during idling condition

120. Shock absorber is also known as

Damper

121. Which of the following is not a component of primary circuit of a battery ignition system?

Ignition cables

122. The Ackerman steering gear mechanism is preferred to the Davis steering gear mechanism, because

DELETED

123. The brake power of an IC engine having speed 1500 rpm with torque 20 Nm is:

1000 π watts

124. _____ mean a mechanism that links the wheel directly to the body or to a frame attached to the it.

Suspension

125. Transmission system provides:

All of the given options

126. In engine _____ requires lubrication

All of the given options

127. Methods of Water Cooling is

All of the given options

128. Which of the following is a component of a Fuel supply system of diesel engine?

All of the given options

129. A relay can be thought of as a:

remote controlled switch

130. In addition to electricity, fuel cells produce ----------

All of the given options

131. The ignition component that is used to steps up voltage is ---------

DELETD

132. Cruising conditions require the ignition timing to be:

advanced

133. An injector pulse width, in milliseconds, is commonly:

2.0–3.50

134. Exhaust gas products in case of complete combustion are:

carbon dioxide and water

135. The type of fuel injection system in which fuel is injected at each intake port

multi-point system

136. At temperature higher than _____ nitrogen reacts with oxygen and forms NO_X

1000 ^{0}C

137. Measurement of exhaust emissions, just after starting the engine from cold, gives a higher than specification reading. The reason for this is:

the temperature of the catalyst is low

138. The instrument which uses pulses from the ignition primary circuit is a:

Both Speedometer and Tachometer (Option 1 and option 2)

139. One characteristic of a thermal type fuel gauge is its:

slow moving needle

140. Which of the following is not an essential part of a refrigeration system?

Fuel injector

141. NMHC stands for

Non-methane hydrocarbon

142. General formula of olefin is

C_nH_{2n}

143. Increase in jacket water temperature _____ the delay period

Decreases

144. _____ are designed to engage and disengage the transmission system as per driver requirement

Clutches

145. Clutch friction materials must have

All of the given options

146. Road resistance opposing the motion of the vehicle is

All of the given options

147. Ratio span for gear box is

Road speed in highest gear / Road speed in lowest gear

148. One-side tyre wear is caused by----------

excessive camber

149. For wheel balancing, Centrifugal force is calculated by

((Out of balance mass) * (Linear wheel speed) ^2) / (radius from the axis of rotation)

150. As per Suspension terminology contact patch is

Flattened crown area of a tyre which contacts the ground