सहाय्यक मोटार वाहन निरीक्षक परीक्षा-२००५

CODE : AYT दि. १२.११.०५

प्रश्नपुस्तिका

वेळ : दीड तास

स्वयंचल अभियांत्रिकी

एकूण प्रश्न : 150
एकूण गुण : 300

सूचना

1) सदर प्रश्नपुस्तिकेत 150 अनिवार्य प्रश्न आहेत. उमेदवारांनी प्रश्नांची उत्तरे लिहिण्यास सुरुवात करण्यापूर्वी या प्रश्नपुस्तिकेत सर्व प्रश्न आहेत किंवा नाहीत याची खात्री करून घ्यावी. असा तसेच अन्य काही दोष आढळल्यास ही प्रश्नपुस्तिका समवेक्षकांकडून लगेच बदलून घ्यावी.

2) आपला परीक्षा-क्रमांक ह्या चौकोनात
न विसरता बॉलपेनने लिहावा.

परीक्षा-क्रमांक

केंद्राची
संकेताक्षरे

शेवटचा
अंक

3) वर छापलेला प्रश्नपुस्तिका क्रमांक तुमच्या उत्तरपत्रिकेवर विशिष्ट जागी उत्तरपत्रिकेवरील सूचनेप्रमाणे **न विसरता नमूद करावा.**

4) (अ) या प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाला 4 पर्यायी उत्तरे सुचविली असून त्यांना 1, 2, 3 आणि 4 असे क्रमांक दिलेले आहेत. त्या चार उत्तरांपैकी सर्वात योग्य उत्तराचा क्रमांक उत्तरपत्रिकेवरील सूचनेप्रमाणे तुमच्या उत्तरपत्रिकेवर नमूद करावा. अशा प्रकारे उत्तरपत्रिकेवर उत्तरक्रमांक नमूद करताना तो संबंधित प्रश्नक्रमांकासमोर छायांकित करून दर्शविला जाईल याची काळजी घ्यावी, ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.

   (ब) आयोगाने ज्या विषयासाठी मराठी बरोबर इंग्रजी माध्यम विहित केलेले आहे. त्या विषयाचा प्रत्येक प्रश्न मराठी बरोबर इंग्रजी भाषेत देखील छापण्यात आला आहे. त्यामधील इंग्रजीतील किंवा मराठीतील प्रश्नामध्ये मुद्रणदोषांमुळे अथवा अन्य कारणांमुळे विसंगती निर्माण झाल्याची शंका आल्यास, उमेदवाराने संबंधित प्रश्न पर्यायी भाषेतील प्रश्नाशी ताडून पहावा.

5) सर्व प्रश्नांना समान गुण आहेत. यास्तव सर्व प्रश्नांची उत्तरे द्यावीत, घाईमुळे चुका होणार नाहीत याची दक्षता घेऊनच शक्य तितक्या वेगाने प्रश्न सोडवावेत. क्रमाने प्रश्न सोडविणे श्रेयस्कर आहे पण *एखादा प्रश्न कठीण वाटल्यास त्यावर वेळ न घालविता पुढील प्रश्नाकडे वळावे.* अशा प्रकारे शेवटच्या प्रश्नापर्यंत पोहोचल्यानंतर वेळ शिल्लक राहिल्यास कठीण म्हणून वगळलेल्या प्रश्नांकडे परतणे सोईस्कर ठरेल.

6) उत्तरपत्रिकेत एकदा नमूद केलेले उत्तर खोडता येणार नाही. नमूद केलेले उत्तर खोडून नव्याने उत्तर दिल्यास ते तपासले जाणार नाही.

7) प्रस्तुत परीक्षेच्या उत्तरपत्रिकांचे मूल्यांकन करताना उमेदवाराच्या उत्तरपत्रिकेतील योग्य उत्तरांनाच गुण दिले जातील. त्या प्राप्त गुणांतून त्यांनी उत्तरपत्रिकेत चुकीची उत्तरे नमूद केल्याबद्दल गुण वजा केले जाणार नाहीत.

8) —————————————————————————————————— ➝ (कृपया पान उलटावे)

2

AYT ▫

8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त-उत्तरपत्रिकेवर वा इतर कागदावर कच्चे काम केल्यास ते कॉपी करण्याच्या उद्देशाने केले आहे, असे मानले जाईल व त्यानुसार उमेदवारावर शासनाने जारी केलेल्या "परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचे अधिनियम-82" यातील तरतुदींनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एका वर्षाच्या कारावासाच्या आणि / किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

9) सदर प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपल्यानंतर उमेदवाराला ही प्रश्नपुस्तिका स्वत:बरोबर परीक्षाकक्षाबाहेर घेऊन जाण्यास परवानगी आहे. मात्र परीक्षाकक्षाबाहेर जाण्यापूर्वी उमेदवाराने आपली उत्तरपत्रिका समवेक्षकाकडे न विसरता परत करणे आवश्यक आहे.

नमुना प्रश्न

प्र.क्र. 201. Petrol Engine works on _____ cycle.

    (1)   Natural   (2)   Air

    (3)   Otto   (4)   Carnot

    ह्या प्रश्नाचे योग्य उत्तर " (3) Otto" असे आहे. त्यामुळे या प्रश्नाचे उत्तर "(3)" होईल. यास्तव **खालीलप्रमाणे** प्र. क्र. 201 समोरील उत्तर क्रमांक "[3]" हा कंस पूर्णपणे छायांकित करुन दाखविणे आवश्यक आहे.

प्र.क्र. 201. [1]   [2]   ■   [4]

    अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तरक्रमांक हा तुम्हाला स्वतंत्ररीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित कंस पूर्णपणे छायांकित करुन दाखवावा. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे. पेन्सिल वा शाईचे पेन वापरू नये.**

पर्यवेक्षकांच्या सूचनेविना हे पृष्ठ उलटू नये

कच्च्या कामासाठी जागा
Space For Rough Work

4

AUTOMOBILE ENGINEERING

1. The property by which a body regains its original shape after removal of force is defined as
   - (1) plasticity
   - (2) elasticity
   - (3) ductility
   - (4) malleability

2. Bending moment is maximum on a section of a beam where shear force is
   - (1) maximum
   - (2) minimum
   - (3) equal
   - (4) changing sign

3. The ratio of change in volume and original volume of the body is called as
   - (1) tensile strain
   - (2) compressive strain
   - (3) shear strain
   - (4) volumetric strain

4. A shaft of diameter (d) subject to a bending moment (M) and a twisting moment (T) at a section. The maximum shear stress is given by the equation
   - (1) $\tau_{max} = \dfrac{16}{\pi d^3} \sqrt{M^2 + T^2}$
   - (2) $\tau_{max} = \dfrac{16}{d^3} \sqrt{M^2 + T^2}$
   - (3) $\tau_{max} = \dfrac{16}{\pi d^3} \sqrt{1 + T^2}$
   - (4) $\tau_{max} = \dfrac{16}{\pi d^3} \sqrt{M^2 + 1}$

5. In case of column
   - (1) one end is hinged and other end fixed
   - (2) one end is fixed and other end free
   - (3) both ends are hinged
   - (4) both the ends are fixed rigidly

6. Slenderness ratio of a column may be defined as the ratio of its length to the
   - (1) radius of column
   - (2) minimum radius of gyration
   - (3) maximum radius of gyration
   - (4) none of the above

P.T.O.

◻

7. What will be the thickness of metal required for a cast iron main 800 mm in diameter for water at a pressure head of 100 m if the maximum permissible tensile stress is 20 MN/m^2 and weight of water is 10 kN/m^3.

    (1) 15 mm   (2) 20 mm

    (3) 25 mm   (4) 30 mm

---

8. In case of circular section, the section modulus is given by

    (1) $\dfrac{\pi d^2}{16}$ (2) $\dfrac{\pi d^3}{16}$

    (3) $\dfrac{\pi d^3}{32}$ (4) $\dfrac{\pi d^4}{64}$

---

9. If the two axes about which the product of inertia is found, are such that the product of inertia becomes zero, the two axes are called as

    (1) centroidal axes

    (2) principal axes

    (3) major and minor axes

    (4) none of the above

---

10. Which one of the basic equation of simple bending is correct

    where   I = Moment of Inertia

             E = Modulus of Elasticity

             F = Stress at any fibre at a distance of y from neutral axis

             M = Bending moment

             R = Radius of curvature

    (1) $\dfrac{M}{I} = \dfrac{F}{Y} = \dfrac{E}{R}$ (2) $\dfrac{M}{I} = \dfrac{F}{Y} = \dfrac{R}{E}$

    (3) $\dfrac{F}{I} = \dfrac{M}{Y} = \dfrac{E}{R}$ (4) $\dfrac{F}{I} = \dfrac{Y}{M} = \dfrac{R}{E}$

AYT

11. The shear angle for two dimensional cutting operation is given by an equation

    where   r = cutting ratio

             α = rake angle

             φ = shear angle

    (1) $\tan \phi = \dfrac{r \cos \alpha}{1 + r \sin \alpha}$ (2) $\tan \phi = \dfrac{r \cos \alpha}{1 - r \sin \alpha}$

    (3) $\tan \phi = \dfrac{1 - r \sin \alpha}{r \cos \alpha}$ (4) $\tan \phi = \dfrac{1 + r \sin \alpha}{r \cos \alpha}$

12. The standard point angle of drill used for drilling a wood and fibre is

    (1) 116° to 118°   (2) 130° to 140°

    (3) 60°   (4) 125°

13. Which one of the following process is preferred for improving the surface finish of a job ?

    (1) Milling   (2) Turning

    (3) Super finishing   (4) Drilling

14. Which one of the following is a type of brass?

    (1) Babbit metal   (2) Gun metal

    (3) Monel metal   (4) Muntz metal

15. In which process the principle of electrolysis is used to remove metal from workpiece ?

    (1) EDM (Electrodischarge Machining)

    (2) ECM (Electrochemical Machining)

    (3) EDG (Electrodischarge Grinding)

    (4) USM (Ultrasonic Machining)

16. Hot short phenomenon occurs in steel because of excess amount of

    (1) manganese   (2) sulphur

    (3) silicon   (4) phosphorus

17. For holding irregular shaped work and carrying out eccentric turning _____ is most suitable.

   (1) four jaw chuck   (2) three jaw chuck

   (3) collet chuck   (4) face plate

18. Recognize the type of defect in casting caused due to shift of the individual parts of a casting with respect to each other.

   (1) Blow holes   (2) Mismatch

   (3) Swell   (4) Warpage

19. Extrusion is a type of _____ operation.

   (1) Hot Working and Cold Working   (2) Welding

   (3) Casting   (4) Fitting

20. For holding work piece, which is already drilled or bored, _____ is used on lathe.

   (1) collet chuck   (2) face plate

   (3) angle plate   (4) mandrel

21. In lathe, tumbler gear mechanism is used to control motion of

   (1) tool carriage   (2) job

   (3) tool post   (4) tail stock

22. Which type of thread is generally used for split nut of lead screw of screw cutting machine ?

   (1) Square   (2) Vee

   (3) Butress   (4) ACME

23. A planer differs from shaper in one important aspect that, in planer, _____

   (1) the work is fixed while tool reciprocates

   (2) the work reciprocates while tool is fixed

   (3) the work and tool, both move

   (4) the work and tool, both do not move

24. The process of removing metal by an elongated tool having a number of successive teeth of increasing size, which cut in a fixed path is known as,

   (1) reaming   (2) boaring

   (3) broaching   (4) honing

25. The property by virtue of which sand mould is capable of withstanding high temperature of the molten metal without fusing is known as

   (1) porosity   (2) adhesiveness

   (3) cohesiveness   (4) refractoriness

26. _____ threading is generally used for gas, water or steam pipe joints.

   (1) BSW   (2) BSE

   (3) BSP   (4) None of these

27. Tool Steel (HSS) has following elements.

   (1) Tungsten, Chromium, Vanadium

   (2) Chromium – Nickel

   (3) Tungsten, Chromium, Lead

   (4) None of these

28. For marking round shaped work piece _____ can be used.

   (1) Vee block   (2) Angle plate

   (3) Try square   (4) None of these

29. _____ are used for withdrawing pattern from the mould.

   (1) Riddles   (2) Draw spikes

   (3) Vent wire   (4) Slicks

30. Included angle of the centre for heavy work in lathe is

   (1) 45°   (2) 60°

   (3) 75°   (4) none of these

31. Which one of the following is the best example of higher Kinematic Pair ?

    (1) Universal joint   (2) Shaft rotating in a bearing

    (3) Nut turning on a screw   (4) Cam and follower

32. Which one of the following relationship holds good to express angle of friction (ϕ) and coefficient of friction (μ) ?

    (1) $\tan \phi = \mu$ (2) $\sin \phi = \mu$

    (3) $\cos \phi = \mu$ (4) $\cot \phi = \mu$

33. The ratio of pitch diameter to the number of teeth, in a gear drive is termed as

    (1) circular pitch   (2) gear ratio

    (3) module   (4) none of the above

34. A load of 15 kN is raised by means of a screw jack. The mean diameter of the square threaded screw is 42 mm and the pitch is 10 mm. A force of 120 N is applied at the end of a lever to raise the load. Is the screw self locking ?

    (1) Yes

    (2) No

    (3) Insufficient data to predict the result

    (4) None of the above

35. **Assertion (A) :** Spiral cams find its use in computers.

    Reason (R) : Spiral cams have two types of surfaces, convex and concave.

    (1) Both (A) and (R) are true and (R) is the correct explanation for A

    (2) (A) is true and (R) is not the correct reason for (A)

    (3) (A) is false and (R) is true

    (4) Both (A) and (R) are false statements

36. Which one of the follower is widely used and has a cylindrical roller free to rotate about a pin joint ?

    (1) Knife-edge follower   (2) Roller follower

    (3) Mushroom follower   (4) All the above

10

AYT ☐

37. Which of the following circle is imaginary circle in study of gears ?

    (1) Pitch circle   (2) Addendum circle

    (3) Dedendum circle   (4) All of them

38. Which of the following statement is correct ?

    (1) The force of friction does not depend upon area of contact of two surfaces

    (2) The magnitude of limiting friction bears a constant ratio to the normal reaction between two surfaces

    (3) The force of friction depend upon area of contact of two surfaces

    (4) Both (1) and (2)

39. Dynamically unbalanced masses in rotating machines cause

    (1) vibration   (2) noise

    (3) friction   (4) wear

40. In a plate cam mechanism, with reciprocating roller follower, the follower has constant acceleration in case of

    (1) cycloidal motion   (2) S.H.M.

    (3) parabolic motion   (4) none of the above

41. A constant discharge passing through a conical pipe is an example of

    (1) steady uniform flow

    (2) steady non-uniform flow

    (3) unsteady uniform flow

    (4) unsteady non-uniform flow

42. Viscosity has the dimensions

    where F is force, L is length and T is time

    (1) $FL^{-2} T$ (2) $FL^{-1} T^{-1}$

    (3) FLT^{-2} (4) $FL^2 T$

43. The centre of buoyancy of a submerged body

    (1) coincides with the centre of gravity of the body.

    (2) is always below the centre of gravity of the body.

    (3) coincides with the centroid of the displaced volume of the fluid.

    (4) is always above the centroid of the displaced volume of the fluid.

44. The type of pump similar to propeller turbine is

    (1) lobe pump   (2) jet pump

    (3) injector pump   (4) axial flow pump

45. An impulse turbine

    (1) requires draft tube

    (2) is most suited for low head application

    (3) operates by initial complete conversion to kinetic energy

    (4) is not exposed to atmosphere

46. Hydraulic intensifier is a device used for

    (1) storing energy of fluid in the form of pressure energy

    (2) increasing pressure intensity of fluid

    (3) transmitting power from one shaft to other

    (4) none of the above

47. Hydraulic Ram is a pump which works on

    (1) the principle of water hammer

    (2) the principle of reciprocating action

    (3) the principle of centrifugal action

    (4) none of the above

AYT

48. Principle of Hydraulic accumulator is similar to the principle of
    (1) electrical transformer
    (2) electrical battery
    (3) electrical generator
    (4) electrical motor

49. A vertical circular cylinder is filled with water and then rotated about its vertical axis at a constant speed such that half the liquid spills out from the open top. At that instant, pressure at the centre of bottom should be
    (1) atmospheric pressure
    (2) sub-atmospheric pressure
    (3) one fourth of original value
    (4) more than atmospheric pressure

50. The fluids which have linear relationship between the magnitude of shear stress and the resulting rate of deformation are called
    (1) Ideal fluids
    (2) Non- Newtonian fluids
    (3) Newtonian fluids
    (4) Compressible fluids

51. Which of the following does not relate to a spark ignition engine ?
    (1) Ignition coil
    (2) Spark plug
    (3) Distributor
    (4) Fuel injector

52. The ideal cycle on which steam engine works is
    (1) Carnot cycle
    (2) Rankine cycle
    (3) Otto cycle
    (4) Joule cycle

53. The isentropic process on Mollier diagram is represented by
    (1) horizontal line
    (2) vertical line
    (3) inclined line
    (4) curved line

P.T.O.

□ AYT

54. The dryness fraction of steam is equal to _____

   where m_g is mass of dry steam and m_f mass of water in suspension.

   (1) $m_g / (m_g + m_f)$
   (2) $m_f / (m_g + m_f)$

   (3) m_g / m_f
   (4) m_f / m_g

55. The locus of saturated liquid line and saturated vapour line meets at

   (1) boiling point
   (2) ice point

   (3) triple point
   (4) critical point

56. The effect of under cooling the refrigerant is to

   (1) reduce the refrigerating effect

   (2) increase the super heat of vapour

   (3) reduce the C.O.P. of the cycle

   (4) increase the C.O.P. of the cycle

57. Which one of the following conditions is the most suitable condition for comfort air conditioning ?

   (1) 25 °C DBT and 100% R.H.

   (2) 20 °C DBT and 80% R.H.

   (3) 22 °C DBT and 60% R.H.

   (4) 28 °C DBT and 40% R.H.

58. Which chemical is liberated during geothermal power generation ?

   (1) Sulphur
   (2) Oxygen

   (3) Carbondioxide
   (4) Nitrogen

AYT ☐

59. **Assertion (A) :** Steam expands in nozzles of impulse steam turbine.

    Reason (R) : Pressure of steam is converted into kinetic energy of steam in the nozzles.

    (1) Both (A) and (R) are true

    (2) Only (A) is true

    (3) Only (R) is true

    (4) Both (A) and (R) are not true

60. During cut-off governing of a steam engine, which one of the following parameter changes ?

    (1) Speed

    (2) Steam pressure

    (3) Volume of steam supplied per stroke

    (4) Pressure and volume of steam supplied

61. Which calorific value of a fuel should be considered for calculation of thermal efficiency of a power plant ?

    (1) Lower calorific value

    (2) Higher calorific value

    (3) Gross heating value

    (4) None of the above

62. A refrigerant machine working on reversed Carnot cycle consumes 3 kW for producing refrigerating effect of 500 kJ/min, for maintaining region at − 40 °C, the higher temperature of the cycle will be

    (1) 317 K (2) 44 K

    (3) 44 °C (4) 233 K

P.T.O.

63. Consider the following statements

(A) : Efforts are made to harness non conventional energy sources for power generation.

(R) : The conventional energy sources will be exhausted soon.

Now select the answer from the following alternatives.

(1) Both (A) and (R) are true, but (R) is not the correct reason for (A)

(2) (A) is true, but (R) is false

(3) (R) is true, but (A) is false

(4) Both (A) and (R) are true and (R) is the correct reason for (A)

---

64. Match List-I with List-II using the correct code given below :

	List-I		List-II
A	Solar Energy	I	Ocean waves
B	Tidal Energy	II	Steam from earth
C	Geothermal Energy	III	Atomic fission
D	Gobar gas plant	IV	Flat plate collector
		V	Anaerobic digestion

	A	B	C	D
(1)	I	II	III	IV
(2)	II	III	IV	V
(3)	IV	I	II	V
(4)	V	I	II	III

---

65. **Assertion (A) :** The volumetric efficiency of Reciprocating Compressor (with clearance) is always less than 100%.

Reason (R) : The air present in the clearance volume will expand before the intake conditions are reached and it occupies some volume of cylinder.

(1) Both (A) and (R) are true and (R) is not the correct explanation for (A)

(2) Both (A) and (R) are true and (R) is true reason for (A)

(3) (A) is true, but (R) is false

(4) Both (A) and (R) are false

16

66. The equation of work (with clearance volume) for a reciprocating compressor is given by the equation

where Polytropic law $PV^n = c$

U_a = Effective swept volume

P_1 = Suction pressure

P_2 = Final compressor pressure

(1) $W = \dfrac{n}{n-1} \dfrac{P_1}{U_a} \left\{ \left(\dfrac{P_2}{P_1} \right)^{\frac{n-1}{n}} - 1 \right\}$

(2) $W = \dfrac{n-1}{n} P_1 U_a \left\{ \left(\dfrac{P_2}{P_1} \right)^{\frac{n-1}{n}} - 1 \right\}$

(3) $W = \dfrac{n}{n-1} P_1 U_a \left\{ \left(\dfrac{P_2}{P_1} \right)^{\frac{n-1}{n}} - 1 \right\}$

(4) $W = \dfrac{n}{n-1} P_1 U_a \left\{ \left(\dfrac{P_1}{P_2} \right)^{\frac{n-1}{n}} - 1 \right\}$

67. Isothermal compression for high speed compressor is achieved by the method
   (1) water jacketing   (2) inter-cooling
   (3) external fins   (4) all the above

68. Which one of the following air compressors is generally used in the gas turbines ?
   (1) Axial flow rotary compressors
   (2) Radial blowers
   (3) Sliding vane compressors
   (4) Screw compressors

69. The efficiency of vane type air compressor as compared to roots air compressor for the same pressure ratio is _____ .
   (1) more   (2) less
   (3) same   (4) may be more or less

70. In Reciprocating air compressor the method of controlling the quantity of air delivered is done by

    (1) throttle control   (2) blow-off control

    (3) clearance control   (4) all the above

71. The work input to air compressor is minimum if the compression law followed is _____

    (1) $PV^{1.35} = C$ (2) Isothermal $PV = C$

    (3) Isentropic $PV^r = C$ (4) $PV^{1.2} = C$

72. In centrifugal air compressor the pressure developed depends on

    (1) impeller tip velocity   (2) inlet temperature

    (3) compression Index   (4) all the above

73. The clearance volume in Reciprocating air compressor is provided to

    (1) reduce the work done / kg of air delivered

    (2) increase the volumetric efficiency of compressor

    (3) accommodate valves in the head of the compressor

    (4) create turbulence in the air to be delivered

74. What should be the intermediate pressure in two stage compression for minimum work of compression ?

    P_a = Suction pressure

    P_i = Intermediate pressure

    P_d = Delivery pressure

    (1) $P_i = \sqrt{P_a P_d}$ (2) $P_i = \dfrac{P_d}{P_a}$

    (3) $P_i = P_a \times P_d$ (4) $P_i = \sqrt{\dfrac{P_d}{P_a}}$

18

75. Which of the following efficiency is highly sensitive to a clearance volume of reciprocating air compressor ?

    (1) Mechanical efficiency
    (2) Isothermal efficiency
    (3) Adiabatic efficiency
    (4) Volumetric efficiency

76. If the domestic refrigerator is kept in an insulated room, with its door open

    (1) the temperature of the room shall decrease after sometime
    (2) the temperature of the room shall increase after sometime
    (3) the temperature of the room shall remain unaffected
    (4) nothing can be predicted about the temperature of the room

77. Air refrigeration system operates on

    (1) reversed Carnot cycle
    (2) reversed Brayton cycle
    (3) reversed Otto cycle
    (4) reversed Stirling cycle

78. The statement that energy can neither be created nor be destroyed but can only be converted from one form to another is known as

    (1) Avogadro's hypothesis
    (2) Gay-Lussac's law
    (3) Second Law of thermodynamics
    (4) First Law of thermodynamics

79. Match List-I with List-II and select the correct code.

	List-I		List-II
A	Heavy water	I	Diesel Engine
B	Rankine cycle	II	Gas Turbine
C	Fuel pump	III	Thermal Power Plant
D	Air compressor	IV	Nuclear Reactor

	A	B	C	D
(1)	III	I	II	IV
(2)	II	IV	III	I
(3)	I	III	II	IV
(4)	IV	III	I	II

80. Select a false statement for Spark Ignition (SI) engine.

    (1) It is based on Otto cycle

    (2) Requires an ignition system with spark plug in the combustion chamber

    (3) Compression ratio = 6 to 10.5

    (4) Low self ignition temperature of fuel is desirable

81. The thermal efficiency of the ideal diesel cycle is given by equation

    where ρ = Cut off ratio

    $\quad\quad$ R = Compression ratio

    (1) $\eta = 1 - \dfrac{1}{R^{r-1}}\left(\dfrac{\rho^r - 1}{r(\rho - 1)}\right)$

    (2) $\eta = 1 - \dfrac{1}{R^{r-1}}$

    (3) $\eta = 1 - \dfrac{1}{R^{r-1}}\left(\dfrac{r(\rho - 1)}{\rho^r - 1}\right)$

    (4) none of the above

82. In an ideal Otto cycle the air standard efficiency is 56.5%. If the heat added during the constant volume process is 1000 kJ/kg, determine the work done.

    (1) 1000 kJ/kg

    (2) 1500 kJ/kg

    (3) 565 kJ/kg

    (4) None of the above

83. The duration of the ignition lag in an engine depends on the factors like

    (1) chemical nature of fuel

    (2) mixture ratio

    (3) electrode gap

    (4) all the above

84. Select the most appropriate sentence applicable to knocking phenomena of the S.I. engine

    (1) In S.I. engine, the detonation occurs near the end of combustion.

    (2) In S.I. engine, the detonation occurs near the begining of combustion.

    (3) In S.I. engine, the detonation is of a heterogeneous mixture causing very low rate of pressure rise.

    (4) None of the above

85. _____ is a device which atomises the fuel and mixes it with air, and is the most important part of the induction system in an engine.

    (1) Spark plug
    (2) Exhaust manifold
    (3) Carburettor
    (4) Silencer

86. Which one of the following device is needed for carburettor used in aircraft application ?

    (1) Altitude mixture correction device
    (2) Automatic de-icing unit to avoid formation of ice in the choke tube
    (3) Both (1) and (2)
    (4) None of the above

87. Which one of the following method for determination of engine friction is only applicable for diesel engines and also the gross fuel consumption is plotted against brake power and it is extended backwards to zero fuel consumption ?

    (1) Morse test
    (2) Motoring method
    (3) Deceleration method
    (4) William's line method

88. In a diesel engine

    (a) fuel injection pump is used
    (b) fuel injection pump and carburettor is used
    (c) fuel injector is used
    (d) neither fuel injection pump nor injector is used

    (1) (a) alone is true
    (2) (c) alone is true
    (3) (a) and (c) both are true
    (4) (a), (b), (c), (d), all are true

89. Subcooling is a process of cooling the refrigerant at constant pressure, in a vapour compression plant

    (1) after compression
    (2) before throttling
    (3) before compression
    (4) after evaporation

90. Which of the following is a fossil fuel ?

    (1) Coal
    (2) Wood
    (3) Natural Uranium
    (4) Hydrogen

91. The two stroke cycle engine has port in the

   (1) cylinder walls   (2) pistons

   (3) piston rings   (4) cylinder head

92. In a diesel engine fuel and air mixture is ignited by the help of

   (1) a spark plug   (2) a glow plug

   (3) an injector   (4) temperature of compressed air

93. On many engines, the valve timing can be checked by means of marking on the

   (1) engine fly wheel   (2) valve guide

   (3) vibration damper   (4) valve cover

94. The purpose of chilled passage in the crank shafts is to

   (1) lubricate the main bearings

   (2) lubricate the connecting rod bearings

   (3) reduce the manufacturing cost

   (4) none of the above

95. Multiple jet compensation is a provision for

   (1) overcoming difficulties at different speeds in petrol engines

   (2) multipoint fuel injection in petrol engines

   (3) advanced electronic fuel injection system on petrol engines

   (4) efficient operation of super chargers at high altitude

96. The contact breaker points gap can be adjusted by

   (1) stroboscope   (2) tachometer

   (3) ignition tester   (4) feeler gauge

97. The radiator core is generally made up of

   (1) stainless steel   (2) nichrome

   (3) brass   (4) white metal

AYT

98. Cylinder wear is measured with

(1) vernier

(2) micrometer

(3) dial gauge

(4) bore dial gauge

99. During the power stroke in a four stroke engine, the inlet valve and exhaust valves are

(1) closed and opened respectively

(2) both closed

(3) opened and closed respectively

(4) one open and other closed

100. The part that tends to keep the valve closed is called the

(1) valve guide

(2) valve retainer

(3) valve spring

(4) valve lifter

101. The pump part that rotates and causes water circulation between the radiator and the engine is called the

(1) fan

(2) by-pass

(3) thermostat

(4) impeller

102. During high speed operation when the throttle is wide open, the fuel supplied to the engine is discharged through the

(1) low-speed port

(2) idle port

(3) main nozzle

(4) both low speed and idle port

103. The pressure in the vicinity of main jet of a carburettor remains

(1) above atmospheric pressure

(2) equal to atmospheric pressure

(3) much below atmospheric pressure

(4) very high pressure

23

P.T.O.

104. The amount of heat energy equivalent lost in overcoming engine friction is

(1) 30%   (2) 20%

(3) 15%   (4) 5%

105. Thermal efficiency of a two stroke cycle engine is _____ a four stroke cycle engine

(1) less than   (2) greater than

(3) equal to   (4) greater than or equal to

106. The firing order of an I.C. engine depends upon

(1) design of crankshaft   (2) no. of cylinders

(3) arrangement of cylinders   (4) all of the above

107. Throttle valve is used in carburettor for

(1) controlling the air admitted to venturi

(2) controlling the air admitted and oil admitted to engine

(3) controlling the air-petrol mixture admitted to engine

(4) controlling the mixture of air and fuel in the mixing chamber

108. Commonly used antifreeze solution in automobiles is

(1) Glycerine   (2) Liquid ammonia

(3) Ammonium chloride   (4) Carbon disulphide

109. What is Vapour Lock ?

(1) Phenomenon of irregular supply of petrol due to vapour formation at higher temp.

(2) Phenomenon of cut off diesel supply

(3) Phenomenon of overflow of petrol

(4) Phenomenon of icing on venturi

24

AYT □

110. Engine cranks do no start during winter because of

    (a)   battery discharge   (b)   weak spark

    (c)   worn out engine   (d)   lean mixture

    (1)   (a), (b) and (c) are correct   (2)   (b), (c) and (d) are correct

    (3)   (c), (d) and (A) are correct   (4)   (d), (a) and (b) are correct

111. When the rear wheels are jacked up and gears are in neutral, turning one rear wheel of the rear drive in anticlockwise direction, will cause the other to

    (1)   turn in clockwise direction   (2)   turn in anticlockwise direction

    (3)   turn in either direction   (4)   remain stationary

112. Torque converter can replace

    (a)   gear box

    (b)   clutch

    (c)   fluid fly wheel

    (1)   (a) alone is correct   (2)   (b) alone is correct

    (3)   (c) alone is correct   (4)   (a) and (b) are correct

113. Flywheels are used in

    (a)   bicycles

    (b)   starting motor

    (c)   gear boxes

    (1)   (a) alone is correct   (2)   (c) alone is correct

    (3)   (a) and (c) are correct   (4)   all are correct

114. Independent suspension on all four wheels is used in

    (1)   Maruti 800 car   (2)   A.C. sports car

    (3)   Morgon plus 8 car   (4)   Fiat 1100 car

115. The brake pipes in hydraulic brake system are made of

    (1)   rubber   (2)   steel

    (3)   pvc   (4)   aluminium

116. Trafficators are lights used for

    (1)   heavy traffic

    (2)   light traffic

    (3)   reversing the car in traffic

    (4)   indicating the direction in which it turns

117. Aluminium cylinder blocks requires

    (1)   no liners   (2)   aluminium liners

    (3)   brass liners   (4)   cast iron liners

118. The values of wheel lock angle and the steering lock angle respectively are about

    (1)   46° and 43°   (2)   20° and 23°

    (3)   23° and 20°   (4)   43° and 46°

119. Which of the following is correct statement ?

    (1)   The car bonnet should have a longer length

    (2)   The texture of a hard top roof is different from its body work

    (3)   Side impact can be minimized by 2 + 2 seating layout

    (4)   A reclining seat and side shift aisle seat are almost the same

120. Match List-I with List-II and choose the correct answer from the codes given below the lists.

	List-I		List-II
A.	Tachometer	1.	Bimetal electric type
B.	Odometer	2.	Decibel
C.	Fuel gauge	3.	90 kmph
D.	Pressure horn	4.	6000 rpm
		5.	3750 km

Code :

	A	B	C	D
(1)	4	5	1	2
(2)	5	4	2	1
(3)	3	4	2	1
(4)	4	2	1	3

AYT

121. The spark plug generally is to be replaced when the vehicle has run about

(1) 5000 km

(2) 10000 km

(3) 15000 km

(4) 20000 km

122. The recommended oil change schedule for cars is

(1) 15000 km

(2) one year duration

(3) 9 months duration

(4) 10000 km

[**Note :** Assume in each option other recommended schedule has not yet attained.]

123. The number of points at which the engine-clutch-gear box unit is supported on the chassis frame is

(1) one

(2) two

(3) three

(4) four

124. The most effective section of frame against bending is

(1) rectangular bar section

(2) round bar section

(3) round hollow section

(4) square hollow section

125. Why bendix drive is provided for a starter ?

(1) To restart the drive pinion from flywheel after the engine starts

(2) To start the motor

(3) To drive flywheel

(4) To operate solenoid

126. The type of commercial vehicle which connects tractor to the trailer by a fifth wheel coupling is called

(1) 6×5

(2) 8×5

(3) rigid

(4) articulated

P.T.O.

127. A clutch is usually designed to transmit maximum torque which is

    (1) equal to the maximum engine torque

    (2) 80 percent of the maximum torque

    (3) 150 percent of the maximum torque

    (4) none of the above

128. The oil flow in the torus of a torque converter is of

    (1) spiral and vortex type

    (2) steady, uniform and laminar types

    (3) vortex, rotary and spiral types

    (4) none of the above

129. Coefficient of friction between the correctly inflated tyre of a jeep and the icy surface of Srinagar in Jammu and Kashmir is about

    (1) 0.01   (2) 0.55

    (3) 111.3   (4) 0.10

130. For the best braking performance the braking effort on the front wheels and the rear wheels are in the following proportion :

    (1) 50%; 50%   (2) 40%; 60%

    (3) 60%; 40%   (4) 45%; 55%

131. Capacity of storage battery to convert chemical energy into electrical energy is tested by

    (1) hydrometer test   (2) high discharge test

    (3) specific gravity test   (4) arc test

132. Engine emits white smoke due to

    (1) excessive lean mixture

    (2) excessive rich mixture

    (3) excessive oil with fuel

    (4) worn out piston rings

28

133. Car pulls to one side while braking due to

(1)   frame misaligned   (2)   loose rear springs

(3)   unequal load in car   (4)   brake grabs

134. During battery charge, the electrolyte becomes

(1)   colder   (2)   thinner

(3)   lighter   (4)   heavier

135. Exhaust valve temperature is about

(1)   35 °C   (2)   100 °C

(3)   500 °C   (4)   1000 °C

136. Humming noise in the differential is due to improper tooth contact between

(1)   drive pinion and ring gear

(2)   axle and side gear

(3)   pinion and gears

(4)   shafts and bearings

137. Which type of rear axle is generally used in heavy commercial vehicles ?

(1)   Semi floating axle

(2)   Fully floating axle

(3)   Three quarter floating axle

(4)   Plain axle

138. An instrument called hydrometer is used for

(1)   measuring specific gravity of acid

(2)   measuring viscosity of an oil

(3)   measuring temp of water

(4)   measuring charging of battery

139. The probable cause for hard steering could be

    (1)   low tyre pressure   (2)   bent wheel spindle

    (3)   tie rod end tight   (4)   any of the above

140. The tightening torque required for cylinder head bolts in motor cycles generally lie between

    (1)   5 to 10 N-m   (2)   10 to 20 N-m

    (3)   25 to 30 N-m   (4)   40 to 60 N-m

141. Most of the mopeds in India have capacity of

    (1)   100 CC   (2)   50 CC

    (3)   150 CC   (4)   120 CC

142. In which of the following documents, the details of the vehicle tax are recorded ?

    (1)   R.C. Book   (2)   T.C. Book

    (3)   Driving licence   (4)   None of the above

143. _____ permit is provided for seasonal business.

    (1)   Goods carriage   (2)   Contract carriage

    (3)   National   (4)   Temporary

144. What is the term used for the person to whom goods are sent and to whom they are intended to be delivered ?

    (1)   Consigner   (2)   Consignee

    (3)   Operator   (4)   None of the above

145. Which data is mainly recorded in the "log book" of the vehicle ?

    (1)   Performance of the vehicle

    (2)   Running time for a trip

    (3)   Loading, unloading of vehicle

    (4)   None of the above

AYT ⬛

146. Which are the three colour lights used in traffic signal ?

    (1)   Red, Green and Black

    (2)   Blue, Green and Red

    (3)   Blue, Pink and Green

    (4)   Red, Green and Amber

147. Vehicles exempted from paying motor vehicles' tax are

    (1)   fire brigade / agricultural vehicles

    (2)   taxis

    (3)   state transport buses

    (4)   two wheelers

148. Consignment note gives the details regarding _____

    (1)   goods to be transported

    (2)   number of trips made

    (3)   purchase of the vehicle

    (4)   tax paid

149. Which organisation conducts the training programmes to the administrative and supervisory staff of MSRTC ?

    (1)   C.I.R.T.   (2)   TELCO

    (3)   V.R.D.E.   (4)   A.R.A.I.

150. Gross vehicle weight means

    (1)   weight of the load carried by the vehicle only

    (2)   total weight of the vehicle and load

    (3)   weight of the vehicle chassis only

    (4)   none of the above