सहायक मोटार वाहन निरीक्षक प[illegible]

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प्रश्नपुस्तिका क्रमांक
BOOKLET NO.   100

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 काळया 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 उलटवा)**

ताकीद

ह्या प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपेपर्यंत ही प्रश्नपुस्तिका आयोगाची मालमत्ता असून ती परीक्षाकक्षात उमेदवाराला परीक्षेसाठी वापरण्यास देण्यात येत आहे. ही वेळ संपेपर्यंत सदर प्रश्नपुस्तिकेची प्रत/प्रती, किंवा सदर प्रश्नपुस्तिकेतील काही आशय कोणत्याही स्वरूपात प्रत्यक्ष वा अप्रत्यक्षपणे कोणत्याही व्यक्तीस पुरविणे, तसेच प्रसिद्ध करणे हा गुन्हा असून अशी कृती करणाऱ्या व्यक्तीवर शासनाने जारी केलेल्या "परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचा अधिनियम-82" यातील तरतुदीनुसार तसेच प्रचलित कायद्याच्या तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एका वर्षाच्या कारावासाच्या आणि /किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

तसेच ह्या प्रश्नपत्रिकेसाठी विहित केलेली वेळ संपण्याआधी ही प्रश्नपुस्तिका अनधिकृतपणे बाळगणे हा सुद्धा गुन्हा असून तसे करणारी व्यक्ती आयोगाच्या कर्मचारीवृंदापैकी, तसेच परीक्षेच्या पर्यवेक्षकीयवृंदापैकी असली तरीही अशा व्यक्तीविरूद्ध उक्त अधिनियमानुसार कारवाई करण्यात येईल व दोषी व्यक्ती शिक्षेस पात्र होईल.

8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त-उत्तरपत्रि कागदावर कच्चे काम केल्यास ते कॉपी करण्याच्या उद्देशाने केले आहे, असे मानले जाईल व त्यानुसार उमेदवारावर शास केलेल्या "परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचे अधिनियम-82" यातील तरतुदीनुसार कारवाई करण्यात य 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 काळया शाईचे बॉलपेन वापरावे. पेन्सिल वा शाईचे पेन वापरू नये.**

पर्यवेक्षकांच्या सूचनेविना हे पृष्ठ उलटू नये

कच्च्या कामासाठी जागा
Space For Rough Work

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

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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) $\tau_{max} = \frac{16}{\pi d^3}\sqrt{M^2 + T^2}$ (2) $\tau_{max} = \frac{16}{d^3}\sqrt{M^2 + T^2}$

(3) $\tau_{max} = \frac{16}{\pi d^3}\sqrt{1 + T^2}$ (4) $\tau_{max} = \frac{16}{\pi d^3}\sqrt{M^2 + 1}$

---

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

---

7. What will be the thickness of metal required for a cast iron main 800 mm in dia water at a pressure head of 100 m if the maximum permissible tensile stress is 20 M 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) $\frac{\pi d^2}{16}$ (2) $\frac{\pi d^3}{16}$

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

---

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

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

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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) $\tan \phi = \frac{r \cos \alpha}{1 + r \sin \alpha}$

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

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

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

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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°

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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

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

(1) Babbit metal

(2) Gun metal

(3) Monel metal

(4) Muntz metal

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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)

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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 _____ 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

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

(1) tool carriage (2) job

(3) tool post (4) tail stock

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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

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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

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

(1) reaming (2) boaring

(3) broaching (4) honing

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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

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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

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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

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

(1) 45° (2) 60°

(3) 75° (4) none of these

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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

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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

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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

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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

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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)

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39. Dynamically unbalanced masses in rotating machines cause

(1) vibration (2) noise

(3) friction (4) wear

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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

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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

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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

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48. Principle of Hydraulic accumulator is similar to the principle of

(1) electrical transformer (2) electrical battery

(3) electrical generator (4) electrical motor

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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

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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

---

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

---

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 nozzle

(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

---

63. Consider the following statements

(A) : Efforts are made to harness non conventional energy sources for pow 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

---

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

where Polytropic law $PV^n = c$

U_a = Effective swept volume

P_1 = Suction pressure

P_2 = Final compressor pressure

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

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

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

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

---

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 de 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) $P_i = \frac{P_d}{P_a}$

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

---

75. Which of the following efficiency is highly sensitive to a clearance volume of recipr 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

R = Compression ratio

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

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

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

(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 imp 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

---

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

---

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

---

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

---

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

---

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

---

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

---

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
