सहायक मोटार वाहन निरीक्षक परीक्षा-२००३

दि. १४.३.०४

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प्रश्नपुस्तिका क्रमांक
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स्वयंचल अभियांत्रिकी

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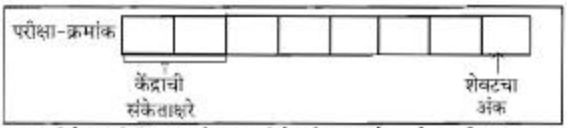
एकूण प्रश्न : १५०
एकूण गुण : 300

सूचना

1) सदर प्रश्नपुस्तिकेत १५० 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.



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 निळ्या वा 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 येईल. 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. वास्तव 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 केलेल्य "परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचा अधिनियम -82" यातील 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-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 तरतुदीनुसार 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.

10) प्रस्तुत प्रश्नपुस्तिकेतील प्रश्नांमध्ये काही दोष आढळल्यास, त्यासंबंधी उमेदवाराने अधिप्रमाणित (Authentic) स्पष्टीकरण/संदर्भ देऊन आपले लेखी निवेदन आयोगाच्या परीक्षा नियंत्रकांकडेच स्वत:च्या तपशीलासह टपालाने पाठवावे. याबाबत पर्यवेक्षक/समवेक्षक इत्यादींकडे विचारणा करू नये.आयोगाकडे सदर परीक्षेच्या दिनांकापासून 8 दिवसांपर्यंत पोहोचलेल्या लेखी निवेदनाची फक्त दखल घेतली जाते. तद्नंतर आलेली निवेदने विचारात घेतली जात नाहीत. तसेच प्राप्त झालेल्या निवेदनाबद्दल कोणताही पत्रव्यवहार केला जात नाही.

नमुना प्रश्न

प्र.क्रं.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 करून दाखविणे आवश्यक आहे.

प्र. 201. [1] [2] ■ [4]

अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तरक्रमांक हा तुम्हाला स्वतंत्ररीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित कंस पूर्णपणे छायांकित करून दाखवावा. **हयाकरिता फक्त निळ्या वा काळ्या शाईचे बॉलपेन वापरावे. पेन्सिल वा शोईचें पैन वापरू नये.**

पर्यवेक्षकांच्या सूचनेविना हे पृष्ठ उलटू नये

कच्च्या कामासाठी जागा
SPACE FOR ROUGH WORK

AUTOMOBILE ENGINEERING

1. What is the sequence of processes in Otto Cycle ?
   (1) Adiabatic compression – constant volume heat addition – Adiabatic expansion – constant volume heat rejection
   (2) Adiabatic compression – constant pressure heat addition – Adiabatic expansion – constant volume heat rejection.
   (3) Adiabatic compression – constant volume heat addition – Adiabatic expansion – constant pressure heat rejection
   (4) Adiabatic compression – constant volume and constant pressure heat addition – Adiabatic expansion – constant volume heat rejection.

2. Two types of engines used in automobiles are
   (1) Steam engines and C.I. engines
   (2) Steam turbines and S.I. engines
   (3) C.I. engines and S.I. engines
   (4) Gas turbines and steam turbines

3. The correct order in which the four operations occur in four stroke engine is
   (1) suction, compression, power, exhaust
   (2) suction, power, compression, exhaust
   (3) compression, power, suction, exhaust
   (4) exhaust, compression, suction, power

4. Stroke means piston movement from
   (1) BDC to TDC (2) TDC to BDC
   (3) Both (1) and (2) (4) Neither (1) nor (2)

5. The fuel in the float chamber is kept at a constant level by the action of
   (1) Float and needle valve (2) Main jet
   (3) Fuel pump (4) Opening of throttle valve

6. Stalling of S.I. Engine after high speed driving can be caused by
   (1) Vapour lock
   (2) Incorrect ignition timing
   (3) Malfunctioning of carburettor
   (4) Malfunctioning of spark plug

7. A : knock occurs in II phase of combustion in diesel engine
   R : Because of longer delay period
   (1) A – true, R – not true
   (2) A – not true, R – true
   (3) Both are not true
   (4) A – true and R is the reason of A

8. When air-fuel mixture ignites before the spark, the phenomenon is called as
   (1) Detonation (2) Normal Ignition
   (3) Pre-ignition (4) Auto-ignition

9. The stoichiometric A/F ratio for combustion in S.I. engine is
   (1) 4 : 1 (2) 12 : 1
   (3) 15 : 1 (4) 7 : 1

10. How many stages are there in C.I. Engine combustion ?
   (1) Four (2) Five
   (3) Three (4) Two

11. Antiknock quality of gasoline is measured in
   (1) Oxidation number
   (2) Vaporization number
   (3) Octane number
   (4) Cetane number

12. Which part of engine is having connection with pinion of starting motor ?
   (1) Crankshaft (2) Cam shaft
   (3) Damper pulley (4) Fly wheel

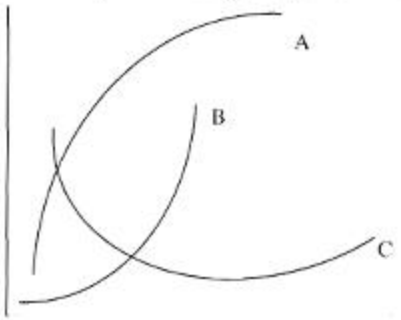
13. Why wet battery is required to supply current to starter motor ?
   (1) To have high voltage
   (2) To have low voltage and very high current
   (3) To have smooth operation
   (4) To reduce cost

14. The automotive electrical system does all the following **EXCEPT**
   (1) produces electric energy
   (2) stores electrical energy in alternator
   (3) stores electrical energy in chemical form
   (4) delivers electrical energy on demand to other electrical accessories

15. The voltage required at spark plug is
   (1) 6 – 12 V
   (2) 1000 – 2000 V
   (3) 10,000 – 20,000 V
   (4) 1,00,000 – 2,00,000 V

16. Why flash point and fire point of fuel is determined ?
    (1) For knowing how safe it is when stored
    (2) For knowing combustion characteristic of fuel
    (3) For knowing self-ignition temperature of fuel
    (4) For knowing vapour lock tendency of fuel

(For Q. No. 17 – 19) Refer the diagram given below and answer the three questions :



17. The curve A in the given diagram represents
    (1) engine fuel consumption
    (2) engine brake specific fuel consumption
    (3) engine brake torque
    (4) engine brake power

18. The curve B in the given diagram represents
    (1) engine fuel consumption
    (2) engine brake specific fuel consumption
    (3) engine brake torque
    (4) engine brake power

19. The curve C in the given diagram represents
    (1) engine fuel consumption
    (2) engine brake specific fuel consumption
    (3) engine brake torque
    (4) engine brake power

20. Idling co-emission for all two and three wheeled petrol vehicles should not exceed ..... by volume
    (1) 3.0 % (2) 4.5 %
    (3) 5.0 % (4) 6.0 %

21. Maximum torque multiplication in a torque converter is
(1) 2.8 (2) 8.2
(3) 1.5 (4) 5.1

22. Clutch slips due to
(a) Oil on friction plate
(b) Worn-out clutch lining
(c) Weak pressure springs
(1) (a) alone is correct
(2) (a) and (b) are correct
(3) (a) and (c) are correct
(4) All (a), (b) and (c) are correct

23. The purpose of the sliding joint in a propeller shaft is to
(1) adjust the distance between gear box and differential
(2) avoid whirling motion of propeller shaft
(3) transfer power from gear box and differential
(4) allow easy disassembly of the propeller shaft for repairs

24. Rear axle of HCVs is equipped with the following arrangement :
(1) semi-floating (2) three quarter-floating
(3) fully-floating (4) a quarter-floating

25. Limited slip differential is essential in
(1) Cars (2) Trucks
(3) MUV (4) Tractors

26. The camber angle is normally kept upto
(1) 06° (2) 04°
(3) 05° (4) 02°

27. The following are the reasons for hard steering
(a) excessive castor may be there
(b) incorrect wheel alignment
(c) tyre pressure may be too high
(d) steering-gear may be adjusted too tightly
(1) All are correct
(2) (a), (b) & (d) are correct
(3) (b), (c) & (d) are correct
(4) (a), (b) & (c) are correct

28. In a simple planetary gear set, the output member used in order to increase torque is always
(1) Sun gear (2) Ring gear
(3) Planet carrier (4) Planet

29. The brake system which is the most efficient among the given, is
(1) Mechanical brake system
(2) Hydraulic brake system
(3) Vacuum servo brake system
(4) Air brake system

30. Select the better arrangement of shoes for manually operated hydraulic brake system
(1) one leading, one trailing shoe
(2) both leading shoes
(3) both trailing shoes
(4) Any of the arrangement

31. The purpose of tyre rotation on automobiles is to
(1) avoid ply separation
(2) get better ride
(3) equalise wear
(4) decrease heat dissipation in tyre

32. Which of the following pair(s) is/are correctly matched ?
(a) Spark plug - 1 mm
(b) C.B. point - 0.3 mm
(c) condenser - 12 V - 0.2 μF
(d) L. T. - 12 V
(1) (a), (b) & (c) (2) (a), (b) & (d)
(3) (a) & (b) (4) (a) & (d)

33. Which of the following pair(s) is NOT properly matched ?
(1) Head light - 12 V, 60W/60W
(2) Blinkers - 12 V, 18W / 18W
(3) Brake light - 12 V, 3W
(4) Parking light - 12 V, 6W

34. The distance between the front axle and the rear axle measured along the length of the vehicle is called
(1) Wheel track (2) Wheel base
(3) Front overhang (4) Vehicle length

35. Which resistance depends upon wind velocity, speed, shape and size of the body of the vehicle ?
(1) Frictional resistance (2) Rolling resistance
(3) Air resistance (4) Tractive resistance

36. While cornering, centrifugal force produces a movement of vehicle about a longitudinal axis, which is called as
(1) Bouncing (2) Pitching
(3) Rolling (4) Gyroscopic effect

37. Maruti 1000 passenger car is having following layout :
(1) Front Engine Rear Wheel Drive
(2) Rear Engine Rear Wheel Drive
(3) Front Engine Front Wheel Drive
(4) Rear Engine Front Wheel Drive

38. Which of the following car body shapes has the largest internal dimensions ?
(1) Coupe (2) Saloon
(3) Convertible (4) Estate

39. In conventional layout, clutch is mounted between
(1) Engine and Gear box
(2) Gear box and propeller shaft
(3) Propeller shaft and final drive
(4) Final drive and differential

40. Worn-out piston rings cause
(a) excessive oil consumption (b) loss of power
(c) loss of torque (d) loss of compression
(1) only (a) & (b) are correct (2) only (a), (c) & (d) are correct
(3) All are correct (4) only (a) is correct

41. Which piston ring wears faster than the other ring ?
(1) Top compression ring (2) Lower compression ring
(3) Oil control ring (4) Oil scraper ring

42. Pitch and tone of electric horn is adjusted by
(1) air gap
(2) contact gap
(3) air gap and contact gap respectively
(4) contact gap and air gap respectively

43. Vapour lock occurs in the
(1) Fuel line or pump (2) Fuel pump or tank
(3) Carburettor and tank (4) Tank or gauge pipe

44. To remove cylinder liners from engine block, use
(1) Wooden hammer and chisel
(2) Pullers
(3) Pressure screw, pusher and twister
(4) Mallet and vice grip

45. A bent wheel of the car should be
(1) welded (2) heated
(3) straightened (4) discarded

46. The process of removing all of the old brake fluid from the hydraulic system is called
(1) bleeding (2) cleaning
(3) changing (4) flushing

47. A warped pressure plate should be :
(1) retempered (2) straightened
(3) replaced (4) refaced

48. Painting cracks occur due to
(1) thin layer of paint
(2) thick layer of paint
(3) improper paint viscosity
(4) wrong setting of air pressure during painting

49. Front wheel alignment is adjusted by altering
(1) angle of track arm
(2) length of track arm
(3) distance between king pins
(4) position of the drag link

50. Firing order of six cylinder inline engine fitted with right hand crankshaft is
(1) 1 – 5 – 3 – 6 – 2 – 4 (2) 1 – 6 – 2 – 5 – 3 – 4
(3) 1 – 6 – 5 – 4 – 3 – 2 (4) 1 – 4 – 2 – 5 – 3 – 6

51. A motor vehicle designed for physically handicapped person is called
(1) contract carriage (2) stage carriage
(3) invalid carriage (4) articulate carriage

52. LCV have gross vehicle weight range as
(1) 1. 5 – 6.0 tonnes (2) 5.0 – 8.5 tonnes
(3) 8.0 – 10.0 tonnes (4) 10.0 – 16.0 tonnes

53. Secretary of Regional Transport Authority is
(1) R.T.O. (2) Transport Minister
(3) Transport Commissioner (4) I.M.V.

54. CMVR revised in the year _____is being enforced today.
(1) 1988 (2) 1956
(3) 1979 (4) 1989

55. CRRI is situated at
(1) Pune (2) Mumbai
(3) Ahmednagar (4) Delhi

56. Who is the administrative in-charge at State Transport Depot ?
(1) Depot Controller
(2) Asst. Traffic Supdt.
(3) Depot Manager
(4) Asst. Workshop Supdt.

57. The proto-type of every vehicle to be mechanically fit to drive in public place is certified by :
(1) CIRT (2) ARAI
(3) VRDI (4) CRRI

58. Third party insurance safeguards the interest of
(1) third party only
(2) owner only
(3) owner and third party
(4) owner, third party and vehicle

59. Temporary registration of a motor cycle remains valid for a period not exceeding
(1) 15 days (2) one month
(3) six months (4) one year

60. Minimum educational qualifications for driving goods carriage carrying dangerous goods is
(1) Fourth Std. (2) Fifth Std.
(3) Ninth Std. (4) Tenth Std.

61. If material expands freely due to heating, it will develop
(1) Thermal stresses (2) Tensile stresses
(3) Compressive stresses (4) No stress.

62. The total strain energy stored in a body is termed as
(1) Resilience (2) Proof resilience
(3) Modulus of resilience (4) Toughness

63. According to Euler's theory, the strength of a column against buckling is dependent upon
(1) Modulus of elasticity (2) Bulk modulus
(3) Cross-section area of column (4) None of above

64. In a beam at a place where the shear force is maximum, the bending moment will be
(1) Maximum (2) Minimum
(3) Zero (4) Neither maximum nor minimum

65. A beam is said to be of uniform strength if
(1) Bending moment is same throughout the beam
(2) Shear stress is same throughout the beam
(3) Deflection is same throughout the beam
(4) Bending stress is same at every section along its longitudinal axis.

66. Maximum shear stress in Mohr's circle is
(1) Equal to radius of Mohr's circle
(2) Greater than radius of Mohr's circle
(3) Less than radius of Mohr's circle
(4) None of above

67. The constant term 'a' for Rankine's formula is called Rankine's constant and is given by :
where f_c = Yield stress in component, E = Modulus of elasticity
(1) $a = \frac{f_c}{\pi^2 E}$ (2) $a = \frac{f_c}{\pi E}$
(3) $a = \frac{f_c^2}{\pi E}$ (4) $a = \frac{f_c \pi^2}{E}$

68. What is the angle between plane of maximum shear with principal plane ?
(1) 90° (2) 45°
(3) 60° (4) 0°

69. If a shaft is designed to take combined bending moment (M) and torsion (T), then the equivalent torque will be
(1) $\sqrt{M^2 + T^2}$ (2) $\frac{1}{2}[M + \sqrt{M^2 + T^2}]$
(3) $\frac{1}{2}\sqrt{M^2 + T^2}$ (4) $M + \sqrt{M^2 + T^2}$

70. Hoop stress 'σ' in a thin cylinder is given by the formula,
where D = Diameter of cylinder
P = Load applied
t = Thickness

(1) $\sigma = \frac{PD}{2t}$ (2) $\sigma = \frac{PD}{4t}$

(3) $\sigma = \frac{PD}{t}$ (4) $\sigma = \frac{PD}{8t}$

71. Working of metals at temperature below their recrystallisation temperature is defined as
(1) Hot working (2) Cold working
(3) Hot spinning (4) Cold spinning

72. Hollow cylindrical bodies like water pipes, gun barrels etc., can be manufactured by
(1) Investment casting (2) Die casting
(3) Centrifugal casting (4) Shell moulding

73. Split nut in lead screw mechanism of lathe has ..... threads.
(1) Vee (2) Square
(3) Buttress (4) Acme

74. Work holding device used for hollow cylindrical bar on lathe is
(1) Chuck (2) Arbour
(3) Mandrel (4) Magnetic chuck

75. The main difference between a shaper and a planer is
(1) A shaper is smaller in size
(2) A shaper is hydraulically operated while a planer is mechanically operated
(3) Number of cutting tools is more in planer
(4) Cutting tool is stationary in planer while cutting tool moves in shaper.

76. Thermoplastic material such as cellulose nitrate, polystyrene are cast by
(1) Continuous casting (2) Centrifugal casting
(3) Injection moulding (4) Die casting

77. Milling of curved irregular surfaces is possible with
(1) shaper
(2) vertical column and knee milling machine
(3) plane milling
(4) None of the above

78. Shock resisting steel is mainly used for _____
(1) Leaf and coil spring (2) Hammers and chisels
(3) Cranks and piston rods (4) Loco wheels and rails

79. What are the changes of metal structure dimension in hot rolling process as the metal passes through the rolls ?
(1) Reduced in thickness and increased in length
(2) Reduced in thickness and in length
(3) Increased in thickness and reduced in length
(4) Increased in thickness and in length

80. Which process is used to produce tools, gear blanks, crankshafts, connecting rods, gears etc. ?
(1) Forging (2) Smithing
(3) Swaging (4) Fullering

81. Which is the process of removing thick layers of metal by means of Cold Chisel ?
(1) Cutting (2) Sawing
(3) Chipping (4) None of the above

82. Drill size before tapping is derived from the formula _____, where 'D' is diameter of tap drill size, 'T' is diameter of tap to be used and 'd' is depth of cut
(1) $D = T + 2d$ (2) $D = T - 2d$
(3) $D = T + 3d$ (4) $D = T - 3d$

83. What are conditions which tend to promote the formation of built-up edge of cutting tool ?
(1) Low cutting speed, low rake angle and high speed.
(2) High cutting speed, low rake angle and high speed.
(3) High cutting speed, high rake angle and high feed.
(4) Low cutting speed, high rake angle and low feed.

84. Which cutting tool is used for enlarging or finishing a hole previously drilled, bored or cored to give a good finish and an accurate dimension ?
(1) Parallel shank twist drill
(2) Taper shank core drill
(3) Reamer
(4) Multi-tooth twist cutter

85. Precision grinders are those that finish parts to a very accurate dimensions. One of the grinders is _____
(1) Swing frame grinder (2) Abrasive belt grinder
(3) Surface grinder (4) Portable and flexible shaft grinder

86. Which is a process that is used to produce geometrically true surface, correct minor surface imperfections, improve dimensional accuracy or provide a very close fit between two contact surfaces ?
(1) Honing (2) Polishing
(3) Lapping (4) Buffing

87. The purpose of annealing is to
(1) refine structure (2) reduce softness
(3) improve machinability (4) None of the above

88. Choose the wrong statement from the following :
(1) The shaper in comparison to planer is easier to operate and about three times quicker in action.
(2) In shaper, the metal is removed during forward stroke.
(3) The shaper is best suited for cutting keyways and splines on shafts.
(4) In case of planer, reciprocating motion is given to the cutting tool.

89. The orthogonal cutting takes place when cutting face of tool is at one of the angles mentioned below to the line of action of tool.
(1) 45° (2) 60°
(3) 90° (4) 120°

90. Which one of the following is most suitable to hold the job for drilling hole on the curved surface ?
(1) Angle plate (2) Table with T-slot
(3) Vee-block (4) None of these

91. A body of weight 1000 N is moved on a horizontal plane having coefficient of friction $\frac{1}{\sqrt{3}}$. The minimum force applied parallel to the horizontal plane to move the body is
(1) $1000\sqrt{3}$ (2) 1000
(3) $\frac{1000}{\sqrt{3}}$ (4) 500

92. The efficiency of screw jack
(1) depends on load on jack
(2) depends on the pitch of the screw threads of the jack
(3) depends on both (1) and (2)
(4) does not depend combinedly on (1) and (2)

93. A dynamometer fitted on internal combustion engine measures
(1) the brake horse power (2) the brake torque
(3) the indicated horse power (4) the indicated torque

94. The size of the cam depends upon
(1) Base circle (2) Prime circle
(3) Pitch circle (4) Pitch curve

95. The magnitude of 'Coriolis' component of acceleration of sliding block relative to link is _____,
where V = velocity of sliding block on link, ω = angular velocity of link
(1) $V\omega$ (2) $\frac{V\omega}{2}$
(3) $2V\omega$ (4) $V\omega^2$

96. In an engine mechanism, at what position of Crank angle, the angular velocity of connecting rod is zero ?
(1) 180° (2) 90°
(3) 45° (4) 0°

97. Contact ratio of spur gear pair is the ratio of
(a) Angle of action to pitch angle
(b) Length of line of action to base of pitch of teeth
(c) Length of line of action to circular pitch of teeth
(d) Arc of contact to circular pitch of teeth.
Which of these statements are correct ?
(1) (a), (b) and (c) are correct (2) (a), (b) and (d) are correct
(3) (b), (c) and (d) are correct (4) All are correct

98. The angle between the common tangent to the base circle of gear pair and common tangent to their pitch circle is called as _____
(1) Cone angle (2) Helix angle
(3) Spiral angle (4) Pressure angle

99. No force is required for the downward motion of the load on screw jack if _____
(α = pitch angle and ϕ = Friction angle)
(1) $\alpha < \phi$ (2) $\alpha > \phi$
(3) $\alpha = 0$ (4) None of the above

100. In case of Pivot bearing, the wear is
(1) Maximum at the centre of the contact area
(2) Zero at the centre of the contact area
(3) Uniform throughout the contact area
(4) Zero at the maximum radius of the contact area

101. Specific speed of the hydraulic turbine is given by following equation :

(1) $N_S = \frac{NP}{\sqrt{H}}$ (2) $N_S = \frac{N\sqrt{P}}{H}$

(3) $N_S = \frac{N\sqrt{P}}{H^{3/4}}$ (4) $N_S = \frac{N\sqrt{P}}{H^{5/4}}$

102. Falling drops of rain acquire spherical shape on account of

(1) Viscosity (2) Surface Tension

(3) Adhesion and cohesion (4) Compressibility

103. The standard atmospheric pressure of air is

(a) 760 mm of mercury

(b) 10.33 metres of water column

(c) 1.0332 atm

(d) 101.325 KN/m^2

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

(3) (a), (b) & (c) are correct (4) All are correct

104. The centre of gravity of the volume of the liquid dispersed by an immersed body is called as

(1) Centre of pressure (2) Meta-centre

(3) Centre of buoyancy (4) Centre of gravity

105. Which of the following represents steady uniform flow ?

(1) Flow through a diverging duct at increasing rate

(2) Flow through a diverging duct at any decreasing rate

(3) Flow through a long pipe at constant rate

(4) Flow through a long pipe at decreasing rate

106. Cavitation in hydraulic turbine results in

(1) Noise and vibration (2) Reduction of discharge

(3) Drop in output and efficiency (4) All of the above

107. For pumping viscous oil, the pump used is _____

(1) Centrifugal pump (2) Reciprocating pump

(3) Turbine pump (4) Screw pump

108. A pump which does not come in category of positive displacement pump is

(1) Reciprocating pump (2) Gear pump

(3) Vane pump (4) Centrifugal pump

109. The water turbine selected for head varying from 50 m to 150 m is

(1) Bulb Turbine (2) Propeller Turbine

(3) Pelton Wheel (4) Francis Turbine

110. Airy vessels are provided in reciprocating pump to
(1) store air discharged by pump
(2) obtain continuous discharge from the pump
(3) increase the pressure of water
(4) safeguard the pump

111. Petroleum can be classified as
(1) A renewable form of energy source
(2) A non-renewable form of energy source
(3) A non-conventional form of energy source
(4) None of the above

112. The disadvantage of using solar energy for power production is
(1) Energy available in daytime only
(2) Initial cost is high
(3) Requirement of large area for harnessing solar energy
(4) All of the above

113. Solar cells are made of
(1) Silica (2) Antimony
(3) Carbon (4) Steel

114. Which of the following devices can be used to harness solar energy ?
(1) Photo-voltaic cell (2) Wind mill
(3) Gas turbine (4) Steam turbine

115. When can we have windmill for power ?
(1) When high velocity wind (not cyclonic) for long duration of day is available
(2) Cyclonic wind is available
(3) Low velocity wind is constantly available
(4) Movement of air occurs

116. Which one of the following is correct statement ?
(1) Latent heat is the heat that does not follow first law of thermodynamics.
(2) Latent heat is the heat that is required to change the substance from solid to gaseous state
(3) Latent heat is the heat that can be detected
(4) Latent heat is the heat required to change a state of substance from liquid to gaseous state.

117. In steam power plant, thermodynamic cycle used is _____
(1) Brayton (2) Rankine
(3) Carnot (4) Joule

118. Match List-I correctly with List-II and select your answer using the code given below :

List-I		List-II	
(A)	Steam engine	I	Spark plug
(B)	Steam turbine	II	Eccentric
(C)	Otto cycle engine	III	Manhole
(D)	Boiler	IV	Fixed and moving blades

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

119. The fuel mostly used in steam boilers is
(1) Peat (2) Coking bituminous coal
(3) Non-coking bituminous coal (4) Brown coal

120. In a four stroke engine, we get one power stroke in _____
(1) 270° of crank rotation (2) 360° of crank rotation
(3) 540° of crank rotation (4) 720° of crank rotation

121. Morse test is carried out to determine the IP of a _____
(1) Single cylinder petrol engine
(2) Single cylinder diesel engine
(3) Multi cylinder engine
(4) Double acting steam engine

122. The device for smoothing out the power impulses from the engine is called _____
(1) Fly wheel (2) Clutch
(3) Torque convertor (4) Differential

123. Which one of the statement is correct ?
(i) Petrol engine is a reciprocating engine
(ii) Petrol engine is high speed engine
(iii) Petrol engine uses petrol as fuel
(iv) Petrol engine is internal combustion engine
(1) All four are correct (2) only (i) is correct
(3) only (iv) is correct (4) All are wrong

124. To develop high voltage for spark plug of petrol engine
(1) Distributor is installed (2) Carburettor is installed
(3) Battery is installed (4) Ignition coil is installed

125. Standard firing order for four cylinder, four stroke petrol engine is
(1) 1 – 4 – 3 – 2 (2) 1 – 3 – 4 – 2
(3) 1 – 3 – 2 – 4 (4) 1 – 2 – 3 – 4

126. In compression ignition four stroke cycle engine, Cam shaft runs at
(1) half the speed of crankshaft
(2) same the speed of crankshaft
(3) twice the speed of crankshaft
(4) any speed irrespective of crankshaft speed.

127. The actual volume of fresh charge taken into four stroke-petrol engine is
(1) Less than stroke volume
(2) Equal to stroke volume
(3) Equal to stroke volume + clearance volume
(4) Does not depend upon stroke volume

128. A two stroke IC engine is identified by
(1) the size of the engine (2) size of the flywheel
(3) type of cooling system (4) absence of valves

129. Within a carburettor, the velocity of air is maximum at
(1) outlet (2) inlet
(3) throat of venturi (4) central point of total length

130. The diesel engine is identified by the presence of
(1) air cleaner (2) radiator
(3) fuel injector (4) starter

131. In a heat engine which of the following energy conservation occurs ?
(1) Work is converted into heat.
(2) Heat energy is converted into electrical energy.
(3) Heat energy is converted into work.
(4) Electrical energy is converted into heat energy.

132. What is thermal efficiency of a heat engine ?
(1) It is the ratio of brake power to indicated power
(2) It is the ratio of work output to heat supplied
(3) It is the ratio of heat rejected to heat supplied
(4) It is the ratio of work output to heat rejected

133. Compression ratio of a petrol engine is
(1) Higher than that of diesel engine (2) Lower than that of diesel engine
(3) Equal to that of diesel engine (4) None of the above

134. In a condensing steam engine,
(1) the pressure in condenser is above atmospheric pressure
(2) the pressure is below atmospheric pressure
(3) the pressure is equal to atmospheric pressure
(4) the complete vacuum exists in condenser

135. With increase in compression ratio, the thermal efficiency of the Otto cycle
(1) Decreases
(2) Does not change
(3) Cannot be predicted unless 'γ' (adiabatic index) is known
(4) Increases

136. As the compression ratio increases, the volumetric efficiency of compressor
(1) decreases (2) increases
(3) remains same (4) becomes unpredictable

137. Rotary compressor can supply
(1) large volumes of air at low pressure
(2) small volumes of air at high pressure
(3) large volumes of air at high pressure
(4) small volumes of air at low pressure

138. Which one of the following is not a safety device on Compressor ?
(1) Relief valve (2) Over-pressure shut down
(3) Strainer (4) Over-speed shut down

139. The axial flow compressor and centrifugal compressor represent
(1) Positive and non-positive type of rotary compressor respectively
(2) Positive type compressors
(3) Non-positive and positive type of rotary compressor respectively
(4) Non-positive type of compressors

140. In multistage compression, intercooling is done to
(1) Reduce the volume of air (2) Minimise the work of compression
(3) Cool the air (4) All of the above

141. Refrigeration is based on
(1) First law of thermodynamics (2) Second law of thermodynamics
(3) Dalton's law (4) Boyle's law

142. In domestic refrigerator, following compressor is used :
(1) Rotary (2) Reciprocating
(3) Centrifugal (4) None of the above

143. Freezing point of Brine is
(1) Below 0 centigrade (2) Above 0 centigrade
(3) Equal to 0 centigrade (4) None of the above

144. Function of thermostat in a domestic refrigerator is to maintain

(1) Temperature constant (2) Pressure constant

(3) Volume constant (4) None of the above

145. Air conditioning is control of

(1) Temperature of air

(2) Relative humidity of air

(3) Temperature, relative humidity and motion of air

(4) None of the above

146. In comfort air conditioning, the required comfort conditions are

(1) 15° C DBT and 75% R. H.

(2) 20° C DBT and 80 % R. H.

(3) 15° C DBT and 35% R. H.

(4) 24° C DBT and 60% R. H.

147. Human body dissipates heat in the form of

(1) Sensible heat only

(2) Latent heat only

(3) Both sensitive and latent heat

(4) None of the above

148. The method commonly used for dehumidifying air is ....

(1) Heating (2) Cooling

(3) Heating and Cooling (4) To spray steam in the air

149. Refrigerant used in vapour absorption refrigerator is

(1) Freon-12 (2) Water

(3) Ammonia (4) F-11

150. If window air conditioner is kept at the centre of closed room, then temperature of the room will

(1) increase (2) decrease

(3) not change (4) unpredictable