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- 8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त-उत्तरपत्रिकेवर वा इतर कागदावर कच्चे काम केल्यास ते काँपी 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 स्वतःबरोबर परीक्षाकक्षाबाहेर घेऊन जाण्यास परवानगी आहे. मात्र परीक्षाकक्षाबाहेर जाण्यापूर्वी उमेदवाराने आपली उत्तरपत्रिका समवेक्षकाकडे न विसरता परत करणे आवश्यक आहे.

नमुना प्रश्न

प्र.क्र. 201. What is the minimum number of pairs required to form a Kinematic chain ?

- | | |
|---------|-----------|
| (1) Two | (2) Three |
| (3) Six | (4) Four |

ह्या प्रश्नाचे योग्य उत्तर “ (3) Six” 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.क्र. 201. [1] [2] [3] [4]

अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तरक्रमांक हा तुम्हाला स्वतंत्र्यरीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित वर्तुळ पूर्णपणे छायांकित करून दाखवावा. ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे. इतर शाईचे बॉलपेन, पेन्सिल वा शाईचे पेन वापरू नये.

पर्यवेक्षकांच्या सूचनेविना हे पृष्ठ उलटू नये



कच्च्या कामासाठी जागा
Space For Rough Work

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MECHANICAL 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) $\tau_{\max} = \frac{16}{\pi d^3} \sqrt{M^2 + T^2}$ (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 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) $\frac{\pi d^2}{16}$ (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) $\frac{F}{I} = \frac{Y}{M} = \frac{R}{E}$
-

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

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) Babbitt 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) boring
(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
-

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
-

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 |
-



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 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 |
-



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

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

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

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

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

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

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 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 $PV^{\gamma} = C$ | (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 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

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 beginning 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. Which of the following is a single point cutting tool ?

- | | |
|--------------------|--------------------|
| (1) Milling cutter | (2) Grinding wheel |
| (3) File | (4) Parting tool |
-

92. Cost estimating may be defined as

- (1) the process of forecasting the expenses that must be incurred to manufacture a product.
 - (2) the process of determination of an actual cost of a product after adding different expenses incurred in various departments.
 - (3) the process of comparing actual cost with predicted cost.
 - (4) the process of reducing the cost.
-

93. Gantt charts are used in

- | | |
|-------------------------------|---------------------------|
| (1) Inventory control | (2) Production scheduling |
| (3) Machine utilization study | (4) Sales forecasting |
-

94. The life of a cutting tool is most sensitive to

- | | |
|------------------------------|-------------------------------|
| (1) changes in depth of cut. | (2) changes in cutting speed. |
| (3) changes in feed rate. | (4) none of the above. |
-

95. In PERT network analysis, the critical path is defined as

- (1) a path with sum of duration of all activities having positive slack values.
 - (2) a path with smallest sum of duration of activities on it.
 - (3) a path with nodes having positive slack values.
 - (4) a path with nodes having zero slack values.
-

96. Bill of materials is

- (1) a listing of all the components and / or raw materials required to make a product.
 - (2) bill of materials purchased.
 - (3) bill of materials sold.
 - (4) none of the above.
-

97. When holes are required to be drilled in several faces of a small workpiece, the jig used is

- | | |
|---------------|--------------|
| (1) Pot jig | (2) Box jig |
| (3) Latch jig | (4) Post jig |
-

98. A redundant location is said to exist, when two locators are attempting to constrain

- (1) one freedom from one location point
 - (2) one freedom from two location points
 - (3) two freedoms from one location point
 - (4) two freedoms from two location points
-

99. Constant measuring pressure in micrometer screw gauge is ensured by

- | | |
|--------------|------------------------|
| (1) Lock nut | (2) Barrel and Thimble |
| (3) Spanner | (4) Ratchet screw |
-

100. Expressing a dimension as $15.6 - 0.02 \text{ mm}$ is the case of

- | | |
|--------------------------|-------------------------|
| (1) limiting dimensions | (2) bilateral tolerance |
| (3) unilateral tolerance | (4) none of the above |
-

101. In 'Selective Assembly' method

- (1) all the parts are always interchangeable.
 - (2) size of one of the components is measured accurately and then mating component is made to match this size.
 - (3) parts of any one type are classified into several groups according to size and then assembled.
 - (4) parts in an assembly, can be replaced by a similar part without any further alteration.
-

102. A dial gauge is a

- | | |
|--------------------------|------------------------|
| (1) measuring instrument | (2) comparator |
| (3) limit gauge | (4) inspection fixture |
-

103. Slip gauge is

- | | |
|---------------------------|-----------------------|
| (1) Line standard | (2) End standard |
| (3) Line and end standard | (4) None of the above |
-

104. The term 'Allowance' in limits and fits is referred to

- (1) Minimum clearance between shaft and hole.
 - (2) Maximum clearance between shaft and hole.
 - (3) Difference of tolerances of shaft and hole.
 - (4) Difference between maximum and minimum size of hole.
-

105. The function of a commutator in a D.C. machine is

- (1) to prevent sparking.
 - (2) to reduce iron losses.
 - (3) to reduce friction.
 - (4) to change alternating voltage to direct voltage.
-

106. The function of a starter in a D.C. machine is

- (1) to control speed.
 - (2) to avoid excessive heating.
 - (3) to avoid excessive current at starting.
 - (4) to avoid armature reaction.
-

107. When B is a flux density in Wb/m^2 , I is the current in amperes, l is the length in meters, current carrying conductor in a magnetic field is subjected to a mechanical force (newton) given by

- | | |
|------------------------|-----------------------|
| (1) $F = \frac{BI}{l}$ | (2) $F = \frac{B}{I}$ |
| (3) $F = BI$ | (4) none of the above |
-

108. In a half wave rectifier the ripple factor is

- | | |
|-----------|-----------|
| (1) 0.482 | (2) 1.020 |
| (3) 1.210 | (4) 1.410 |
-

109. Thin middle layer of the transistor is called

- | | |
|-------------|-----------------------|
| (1) Emitter | (2) Collector |
| (3) Base | (4) None of the above |
-

110. An addition of impurity atoms to a pure semiconductor makes it an

- (1) intrinsic semiconductor
 - (2) extrinsic semiconductor
 - (3) diffused semiconductor
 - (4) all the above
-

111. The electron lens of a C.R.O. consists of

- | | |
|----------------------|--------------------------|
| (1) Grid and Cathode | (2) Cathode and Filament |
| (3) Shield and Grid | (4) Focussing electrodes |
-

112. Thermistors are semiconductor devices having

- (1) positive temperature coefficient of resistance
 - (2) negative temperature coefficient of resistance
 - (3) both (1) and (2)
 - (4) zero temperature coefficient of resistance
-

113. Machining on castings produces _____ chips.

- (1) continuous chips
 - (2) discontinuous chips
 - (3) slurry of fine form
 - (4) continuous chips with built-up edge
-

114. Which of the following is not produced by powder metallurgy technique ?

- | | |
|---------------------|-----------------------|
| (1) Porous bearings | (2) Grub screw |
| (3) Carbide tools | (4) Tungsten filament |
-

115. Auto collimator is a

- (1) collimating device
 - (2) small angle measuring instrument
 - (3) angle measuring instrument
 - (4) none of the above
-



116. Time study in industries is performed to

- (1) improve efficiency of workers
 - (2) set the time standard
 - (3) simplify the work method
 - (4) measure time variation in the job
-

117. For proper working of a transistor in normal circuits, the emitter-base junction and collector base junction are respectively

- (1) Reverse biased and forward biased
 - (2) Forward biased and forward biased
 - (3) Forward biased and reverse biased
 - (4) Reverse biased and reverse biased
-

118. Commercially available electronic fan regulators make use of

- (1) Single S.C.R.
 - (2) Triac and Diac
 - (3) Triac
 - (4) Anti parallel connected two S.C.R's
-

119. Identify the transistor circuit which acts as a phase inverter

- (1) Common base
 - (2) Common collector
 - (3) Common emitter
 - (4) Both common base and common collector
-

120. Intrinsic semiconductors are those which

- (1) have more electrons than holes.
 - (2) have zero energy gap.
 - (3) are made of semiconductor material in its present form.
 - (4) none of the above.
-

121. The main advantage of an ultrasonic temperature transducer is that it can measure

- (1) rapid temperature fluctuation.
 - (2) low temperatures.
 - (3) parameters other than temperature.
 - (4) stress distribution inside the heated body.
-

122. Input impedance of a FET is very large, hence it is used in

- (1) Voltage measuring instrument.
 - (2) Current measuring instrument.
 - (3) Power measuring instrument.
 - (4) None of the above.
-

123. Synchronization of C.R.O. means

- (1) controlling the frequency alone
 - (2) controlling the frequency and phase both
 - (3) controlling the phase alone
 - (4) none of the above
-

124. At the extremely high frequency stability of a quartz crystal is due to

- (1) Exhibition of piezo-electric effect by it.
 - (2) Its very high Q-factor.
 - (3) Its low temperature co-efficient.
 - (4) Both (2) and (3).
-

125. Consider the following statements related to the speed control of a D.C. motor.

- (a) Speed may be controlled by changing the pole flux.
 - (b) Speed may be changed by changing voltage across the armature.
- (1) Only (a) is correct
 - (2) only (b) is correct
 - (3) Both (a) and (b) are correct
 - (4) both (a) and (b) are not correct
-



126. What type of starter is mostly used for starting a 3-phase slip ring induction motor ?

- (1) Starter impedance starter
 - (2) Star Delta starter
 - (3) Auto transformer starter
 - (4) Rotor resistance starter
-

127. Which one of the following statements related to ideal semi-conductor diode is true ?

- (1) Unilateral device
 - (2) Linear device
 - (3) A device that has infinite resistance in the forward direction
 - (4) Device that has same resistance in either direction
-

128. One of the principal reason for the widespread use of A.C. power system is availability of

- (1) the transformer
 - (2) the moving iron instrument
 - (3) the transmission lines
 - (4) large quantity of power
-

129. A 60 watts, 250 volts lamp is operated from 125 volt, its intensity is

- (1) one fourth of original
 - (2) one half of original
 - (3) same as original
 - (4) zero value
-

130. E.M.F. equation of D.C. generator is

where ϕ — Stands for flux per pole in Wb.

Z — No. of conductors

P — Poles of machine

N — Speed in RPM

A — No. of parallel path in armature

(1) $EMF = \frac{\phi ZNP}{60 A}$

(2) $EMF = \frac{\phi NP}{60 A}$

(3) $EMF = \frac{NP}{60 A}$

(4) $EMF = \frac{N \phi}{60 A}$

131. An alternating voltage has frequency of 50 Hz, a peak amplitude of 200 V, and a value at $t = 0$ of 100 V. What is the equation of voltage ?

- (1) $v = 200 \sin 314 t$
 - (2) $v = 200 \sin (314 t + 30^\circ)$
 - (3) $v = 100 \sin (314 t + 60^\circ)$
 - (4) $v = 200 \sin (377 t + 30^\circ)$
-

132. Mutual inductance of the two magnetically coupled coils depends on

- (1) Number of turns of each coil.
 - (2) Flux produced by one and linked by the other.
 - (3) Current in the flux producing coil.
 - (4) All the above.
-

133. PERT stands for

- (1) Programme Estimation and Reporting Technique
 - (2) Process Estimation and Review Technique
 - (3) Programme Evaluation and Review Technique
 - (4) Planning Estimation and Resulting Technique
-

134. Tool Dynamometer is an equipment used for the measurement of

- (1) chip thickness
 - (2) forces during metal cutting
 - (3) deflection of cutting tool
 - (4) wear of cutting tool
-

135. The extent to which data is scattered about the zone of "Central tendency" is known as

- | | |
|---------------------|----------------------|
| (1) Dispersion | (2) Medium |
| (3) Arithmetic mean | (4) Geometrical mean |
-

136. Which is the control chart for fraction defective ?

- | | |
|----------------------|-------------|
| (1) V - chart | (2) P-chart |
| (3) $\bar{X}$ -chart | (4) C-chart |
-



137. Drill jig bush is used in drill jig for

- (1) locating and guiding the drill
 - (2) pouring the coolant
 - (3) removing the swarf
 - (4) none of the above
-

138. A plug gauge is used for measuring

- (1) cylinders
 - (2) cylindrical bores
 - (3) spherical bores
 - (4) angles
-

139. One micron is equal to

- (1) 0.1 mm
 - (2) 0.01 mm
 - (3) 0.001 mm
 - (4) none of the above
-

140. Surface roughness on a drawing is represented by

- (1) triangles
 - (2) circles
 - (3) squares
 - (4) none of the above
-

141. Profile of a gear tooth can be checked by

- (1) sine bar
 - (2) optical pyrometer
 - (3) optical projector
 - (4) none of the above
-

142. Fundamental deviation is one _____ the zero line.

- (1) as same as
 - (2) away from
 - (3) close to
 - (4) none of the above
-

143. Thread pitch of the metric screw threads is identified with

- (1) vernier
 - (2) thread pitch gauge
 - (3) micrometer
 - (4) none of the above
-

144. Permeability in a magnetic circuit corresponds to _____ in an electric circuit.

- (1) conductivity
 - (2) resistivity
 - (3) resistance
 - (4) none of the above
-

145. Ripple factor of a full wave rectifier is

- | | |
|----------|-----------------------|
| (1) 0.48 | (2) 0.84 |
| (3) 1.48 | (4) none of the above |
-

146. A SCR is a _____ switch.

- | | |
|--------------------|-----------------------|
| (1) unidirectional | (2) bidirectional |
| (3) no-direction | (4) none of the above |
-

147. A transformer in which the primary voltage is greater than the secondary voltage is called

- (1) step-up transformer
 - (2) step-down transformer
 - (3) one-to-one transformer
 - (4) none of the above
-

148. The rotor of a 3-phase induction motor always runs at

- (1) synchronous speed
 - (2) less than synchronous speed
 - (3) more than synchronous speed
 - (4) none of the above
-

149. The force which creates the pressure that causes the current to flow through a conductor is called as

- (1) Voltage
 - (2) Magneto motive force
 - (3) Electro motive force
 - (4) None of the above
-

150. Voltage gain of a FET is usually _____ than the ordinary transistors.

- | | |
|-----------|-----------------------|
| (1) more | (2) less |
| (3) equal | (4) none of the above |
-

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