

INSTRUCTIONS

1. Answer all questions.
2. All questions carry equal marks.
3. Only one answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as 1, 2, 3, 4. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.
6. 1/3 part of the mark(s) of each question will be deducted for each wrong answer. (A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
7. The candidate should ensure that Series Code of the Question Paper Booklet and Answer Sheet must be same after opening the envelopes. In case they are different, a candidate must obtain another Question Paper of the same series. Candidate himself shall be responsible for ensuring this.
8. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt as per rules.
9. Please correctly fill your Roll Number in O.M.R. Sheet. 5 marks will be deducted for filling wrong or incomplete Roll Number.

**Warning :** If a candidate is found copying or if any unauthorised material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted under Section 3 of the R.P.E. (Prevention of Unfairmeans) Act, 1992. Commission may also debar him/her permanently from all future examinations of the Commission.

निर्देश

1. सभी प्रश्नों के उत्तर दीजिए ।
2. सभी प्रश्नों के अंक समान हैं ।
3. प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा ।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर-पत्रक पर नीले बॉल प्वाइंट पेन से गहरा करना है ।
6. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है । किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।
7. प्रश्न-पत्र पुस्तिका एवं उत्तर पत्रक के लिफाफे की सील खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि उसके प्रश्न-पत्र पुस्तिका पर यही सीरीज अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से प्रश्न-पत्र की ही सीरीज वाला दूसरा प्रश्न-पत्र का लिफाफा प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।
8. मोबाईल फोन अथवा इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानी पूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांकों में से अनिवार्य रूप से काटे जाएंगे।

**चेतावनी :** अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराई जायेगी और आर. पी. ई. (अनुचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

- 1 The mechanism used in internal combustion engine is
- (1) crank mechanism (2) slider mechanism  
(3) slider crank mechanism (4) circular mechanism
- 2 The rectilinear motion of a piston is converted into rotary motion by
- (1) piston (2) piston rod  
(3) crank (4) connecting rod
- 3 Dynamics of machines deals with
- (1) relative motion between parts neglecting the consideration of forces  
(2) forces acting on the parts of machine  
(3) apparatus for applying mechanical power  
(4) number of interrelated parts each having a definite motion
- 4 In a kinematic chain the minimum number of kinematic pairs required is
- (1) one (2) two  
(3) three (4) four
- 5 In simple harmonic motion the acceleration is proportional to
- (1) displacement  
(2) linear velocity  
(3) angular velocity  
(4) rate of change of angular velocity
- 6 Two parallel shafts, the distance between whose axes is small and variable may be connected by
- (1) gear drive (2) universal joint  
(3) knuckle joint (4) Oldham's coupling
- 7 In an automobile the power is transmitted from gear box to differential through
- (1) knuckle joint (2) universal joint  
(3) Hooke's joint (4) bevel gears

- 8 If there are L number of links in a mechanism, then the number of possible inversions would be
- (1) L (2) L/2  
(3) L+1 (4) L+2
- 9 Cam size depends upon
- (1) pitch circle (2) base circle  
(3) prime circle (4) outer circle
- 10 Coriolis component is encountered in
- (1) slider crank mechanism (2) four bar chain mechanism  
(3) quick return mechanism (4) circular mechanism
- 11 Idler pulley is used for
- (1) maintaining belt tension  
(2) changing direction of rotation  
(3) for stopping motion frequently  
(4) for running during idling periods only
- 12 Slip in belt drive is
- (1) loss of power  
(2) difference between velocities of two pulleys  
(3) difference between angular velocities of two pulleys  
(4) difference between linear speed of the rim of pulley and the belt on it
- 13 The pulley in a belt drive acts as
- (1) rolling pair (2) sliding pair  
(3) turning pair (4) cylindrical pair
- 14 Sum of the tensions when the belt is running on the pulley is
- (1) less than initial tension  
(2) more than initial tension  
(3) more than twice initial tension  
(4) half of initial tension

- 15 Function of a governor is to :
- (1) control the engine speed
  - (2) maintain the speed of engine constant
  - (3) store energy and give up whenever required
  - (4) adjust variation of speed by varying the input to the engine
- 16 Rope brake dynamometer uses
- (1) oil as lubricant
  - (2) water as lubricant
  - (3) grease as lubricant
  - (4) no lubricant
- 17 The brake commonly used on train boggies is
- (1) internal expanding
  - (2) band brake
  - (3) band and block brake
  - (4) shoe brake
- 18 Power transmitted by belt is maximum when maximum tension in the belt compared to centrifugal tension is
- (1) 2 times
  - (2) 3 times
  - (3) 4 times
  - (4) 5 times
- 19 The ratio of number of teeth and pitch circle diameter in a gear is called
- (1) pitch
  - (2) circular pitch
  - (3) diametral pitch
  - (4) module
- 20 Gear train in which the first and last gear are on the same axis is known as
- (1) simple gear train
  - (2) compound gear train
  - (3) epicyclic gear train
  - (4) reverted gear train
- 21 Critical speed of shaft depends on
- (1) mass
  - (2) stiffness
  - (3) mass and stiffness
  - (4) mass, stiffness and eccentricity
- 22 Maximum magnitude of the unbalanced force in a line perpendicular to the line of stroke is known as
- (1) swaying couple
  - (2) hammer blow
  - (3) unbalanced force
  - (4) resultant force

- 23 Usually following fraction of reciprocating masses is balanced in case of reciprocating engines
- (1) full (2) half  
(3) one-quarter (4) two-thirds
- 24 If damping factor in a vibrating system is unity, then the system will be
- (1) not damped (2) highly damped  
(3) under damped (4) critically damped
- 25 A vibrating beam has following degrees of freedom
- (1) 0 (2) 1  
(3) 2 (4) 3
- 26 In a damped vibration system, the damping force is proportional to
- (1) displacement (2) velocity  
(3) acceleration (4) applied force
- 27 Which of the following effects is more dangerous for a ship
- (1) rolling (2) waving  
(3) pitching (4) steering
- 28 For steady state forced vibrations, phase lag at resonance condition is
- (1) 0 degree (2) 45 degree  
(3) 90 degree (4) 180 degree
- 29 The rate of decay of oscillations is known as
- (1) logarithmic decrement (2) critical damping  
(3) damping coefficient (4) transmissibility
- 30 In forced vibrations, magnitude of damping force at resonance equals
- (1) inertia force (2) impressed force  
(3) infinity (4) spring force

- 31 For a heat engine operating on Carnot cycle, the work output is 25% of heat rejected to the sink. The thermal efficiency of the engine would be
- (1) 10% (2) 20%  
(3) 30% (4) 50%
- 32 Three engines A, B and C operating on Carnot cycle respectively use air, steam and helium as the working fluid. If all the engines operate within the same high and low temperature limits, then which engine will have the highest efficiency?
- (1) Engine A  
(2) Engine B  
(3) Engine C  
(4) All engines will have the same efficiency
- 33 In a four stroke cycle engine, the four operations suction, compression, expansion and exhaust are completed in the number of revolutions of crankshaft equal to
- (1) 1 (2) 2  
(3) 3 (4) 4
- 34 In a four stroke cycle S.I. engine the camshaft runs at
- (1) same speed as crankshaft  
(2) half the speed of crankshaft  
(3) twice the speed of crankshaft  
(4) any speed irrespective of crankshaft speed
- 35 The ratio of brake power to indicated power of an I.C. engine is called
- (1) mechanical efficiency (2) thermal efficiency  
(3) volumetric efficiency (4) relative efficiency
- 36 Specific fuel consumption of a diesel engine as compared to that for petrol engine is
- (1) lower  
(2) higher  
(3) same for same power output  
(4) may be lower or higher

- 37 Compression ratio of diesel engines is in the range of
- (1) 8 to 10
  - (2) 10 to 15
  - (3) 16 to 20
  - (4) 21 to 30
- 38 In case of petrol engines, at starting
- (1) rich fuel-air ratio is needed
  - (2) weak fuel-air ratio is needed
  - (3) chemically correct fuel-air ratio is needed
  - (4) any fuel-air ratio will do
- 39 Voltage developed to strike spark in the spark plug is in the range
- (1) 6 to 12 volts
  - (2) 100 to 200 volts
  - (3) 1000 to 2000 volts
  - (4) 20000-25000 volts
- 40 In a 4-cylinder petrol engine the standard firing order is
- (1) 1-2-3-4
  - (2) 1-4-3-2
  - (3) 1-3-2-4
  - (4) 1-3-4-2
- 41 Torque developed by the engine is maximum at
- (1) minimum speed of engine
  - (2) maximum speed of engine
  - (3) maximum volumetric efficiency speed of engine
  - (4) maximum power speed of engine
- 42 Knocking in petrol engines get reduced by
- (1) increasing compression ratio
  - (2) retarding spark advance
  - (3) increasing inlet air temperature
  - (4) increasing cooling water temperature
- 43 Ignition quality of fuels for petrol engines is determined by
- (1) cetane number rating
  - (2) octane number rating
  - (3) calorific value rating
  - (4) volatility of fuel

- 44 In automobile engines a thermostat is provided for
- (1) regulating the temperature of suction air
  - (2) regulating the temperature of lubrication oil
  - (3) controlling the temperature of the cooling system
  - (4) regulating the temperature of exhaust gases
- 45 The dynamo in an automobile
- (1) converts mechanical energy into electrical energy
  - (2) continually recharge the battery
  - (3) acts as a reservoir of electrical energy
  - (4) supplies electric power
- 46 What is wheel base of a vehicle ?
- (1) it is width of tyres
  - (2) it is distance between front tyres
  - (3) it is distance between front and rear axles
  - (4) it is extreme length of the vehicle
- 47 Stoichiometric ratio is
- (1) chemically correct air-fuel ratio by volume
  - (2) chemically correct air-fuel ratio by weight
  - (3) theoretical mixture of air for complete combustion
  - (4) actual ratio of air to fuel for maximum efficiency
- 48 During idling a petrol engine requires
- (1) rich mixture
  - (2) lean mixture
  - (3) chemically correct mixture
  - (4) variable mixture
- 49 An air-fuel ratio 8 will have
- |                            |                      |
|----------------------------|----------------------|
| (1) chemically correct air | (2) excess fuel      |
| (3) excess air             | (4) any of the above |



- 50 Purpose of supercharging an engine is to
- (1) increase power output of engine
  - (2) reduce specific fuel consumption
  - (3) reduce noise of engine
  - (4) improve cooling of cylinders
- 51 In order to achieve maximum possible fuel economy the design features which will be affected are
- (1) volumetric efficiency
  - (2) compression ratio
  - (3) method of charging
  - (4) atomization
- 52 For same power output and same compression ratio four stroke S.I. engine as compared to two stroke engine has
- (1) higher fuel consumption
  - (2) lower thermal efficiency
  - (3) higher thermal efficiency
  - (4) higher exhaust temperature
- 53 Thermal efficiency of standard Otto cycle for a compression ratio 5.5 will be
- (1) 20%
  - (2) 35.4%
  - (3) 47.5%
  - (4) 50%
- 54 In spark ignition engines, knocking tendency is reduced by
- (1) reduction of compression ratio
  - (2) advancing ignition timing
  - (3) increasing exhaust temperature
  - (4) adding dope like tetra ethyl lead to the fuel
- 55 Highest useful compression ratio is the compression ratio at which
- (1) engine can be safely operated
  - (2) engine gives maximum thermal efficiency
  - (3) engine operates smoothly
  - (4) detonation first becomes audible

- 56 Efficiency of a jet engine is higher at  
(1) lower altitude (2) higher altitude  
(3) low speed (4) high speed
- 57 Turbo-charger is used  
(1) in gas turbines for compression of air  
(2) for supercharging diesel engine  
(3) in jet propulsion units  
(4) in rockets for producing air fuel mixture
- 58 For the same maximum pressure and heat input, the most efficient cycle is  
(1) Brayton (2) Otto  
(3) Diesel (4) Dual
- 59 If performance of S.I. engines of different manufacturers having different capacities, sizes and systems are to be compared, the common parameter would be  
(1) engine cylinder diameter (2) brake power  
(3) mean effective pressure (4) weight of engine
- 60 In naturally aspirated engine, pressure inside cylinder at the end of suction stroke is  
(1) less than atmospheric  
(2) same as atmospheric  
(3) more than atmospheric  
(4) depends on atmospheric conditions
- 61 In a ball bearing, a ball is subjected to  
(1) compressive stress (2) tensile stress  
(3) shear stress (4) cyclic stress or fatigue
- 62 Resistance to fatigue of a material is measured by  
(1) Young's modulus (2) modulus of rigidity  
(3) elastic limit (4) endurance limit

- 63 Resilience of material should be considered when it is subjected to
- (1) shock load (2) constant load  
 (3) fluctuating load (4) wear and tear
- 64 Which process will improve the fatigue life of a part ?
- (1) shot peening (2) electroplating  
 (3) chemical coating (4) polishing
- 65 While designing a shaft, pulley and key for a system
- (1) shaft is the weakest member  
 (2) pulley is the weakest member  
 (3) key is the weakest member  
 (4) all are designed for equal strength
- 66 In case of brittle materials, the theory of elastic failure generally applied is
- (1) maximum principal stress theory  
 (2) maximum shear stress theory  
 (3) maximum strain theory  
 (4) maximum total strain energy theory
- 67 The maximum efficiency of a screw jack provided with square threads and angle of friction  $30^\circ$  will be
- (1) 25% (2) 33%  
 (3) 40% (4) 50%
- 68 When large quantities of bolts are to be purchased the quantity is usually specified in terms of
- (1) number (2) volume  
 (3) weight (4) packets
- 69 Oldham's coupling is used to connect two shafts which
- (1) have lateral misalignment  
 (2) have two axes intersecting  
 (3) have lateral movements during power transmission  
 (4) changes axes during power transmission

- 70 Crowning of flat pulleys is generally done
- (1) to reduce belt friction
  - (2) to prevent belt joint from damaging the belt surface
  - (3) to prevent belt from running off the pulley
  - (4) in case of cross belt drives only
- 71 Gears used for non-intersecting perpendicular shafts are
- (1) spur gears
  - (2) helical gears
  - (3) double helical gears
  - (4) hypoid gears
- 72 A automobile gear box has
- (1) simple gear train
  - (2) compound gear train
  - (3) epicyclic gear train
  - (4) compound epicyclic gear train
- 73 Shear stress theory is applicable to
- (1) ductile materials
  - (2) brittle materials
  - (3) elastic materials
  - (4) plastic materials
- 74 When both pinion and gear are made of the same material, then from the design point of view
- (1) pinion is the determining factor
  - (2) gear is the determining factor
  - (3) any one of the two may be taken as determining factor
  - (4) criteria is strength of any one of the teeth
- 75 Lewis equation in gears is used to evaluate
- (1) tensile stress in bending
  - (2) compressive stress in bending
  - (3) creep stress
  - (4) shear stress on flank

- 76 When a nut is tightened by placing washer below it, the bolt will be subjected to following type of loads
- (1) compression
  - (2) tension
  - (3) shear
  - (4) combined load
- 77 Resilience of a bolt may be increased by
- (1) increasing its length
  - (2) increasing its shank diameter
  - (3) increasing diameter of threaded portion
  - (4) increasing head size
- 78 If tearing efficiency of a riveted joint is 60%, then ratio of pitch to diameter of rivet is
- (1) 0.2
  - (2) 0.3
  - (3) 0.4
  - (4) 0.5
- 79 Factor of safety in design is the ratio of
- (1) yield stress/working stress
  - (2) tensile stress/working stress
  - (3) compressive stress/working stress
  - (4) bearing stress/working stress
- 80 A boiler plate thickness is 20 mm. The rivet diameter will be
- (1) 10 mm
  - (2) 20 mm
  - (3) 30 mm
  - (4) 40 mm
- 81 Which of the following steel key is usually strong in failure by shear and crushing ?
- (1) rectangular
  - (2) square
  - (3) circular
  - (4) flat
- 82 Thick cylinders are designed by
- (1) Lamé's equation
  - (2) calculating radial stress which is uniform
  - (3) thick cylinder theory
  - (4) thin cylinder theory

- 83 Sleeve of muff coupling is designed as a
- (1) thin vessel
  - (2) thick vessel
  - (3) solid shaft
  - (4) hollow shaft
- 84 The most important dimension in the design of nut is
- (1) inside diameter
  - (2) height
  - (3) pitch diameter
  - (4) thread size
- 85 Bolts are designed on the basis of
- (1) direct tensile stress
  - (2) direct shear stress
  - (3) direct compressive stress
  - (4) direct bearing stress
- 86 Diameter of washer is generally taken
- (1) equal to nut size
  - (2) less than nut size
  - (3) bigger than nut size
  - (4) any size irrespective of nut size
- 87 Which of the following is a permanent fastening ?
- (1) bolts
  - (2) keys
  - (3) screws
  - (4) rivets
- 88 The function of a washer is to
- (1) provide cushioning effect
  - (2) provide bearing area
  - (3) absorb shocks and vibrations
  - (4) provide smooth surface in place of rough surface
- 89 Gear box is used
- (1) to produce torque
  - (2) for speed reduction
  - (3) to obtain variable speeds
  - (4) to increase efficiency of system

- 90 Spring driven watches and clocks utilize
- (1) involute gears
  - (2) cycloid gears
  - (3) epicycloid gears
  - (4) straight rack gears
- 91 Economizer is used in a steam power plant to heat
- (1) air
  - (2) feed water
  - (3) flue gases
  - (4) steam
- 92 In a two stage gas turbine plant with intercooling and reheating
- (1) both work ratio and thermal efficiency improve
  - (2) work ratio improves but thermal efficiency decreases
  - (3) thermal efficiency improves but work ratio decreases
  - (4) both work ratio and thermal efficiency decrease
- 93 In case of impulse steam turbine there is
- (1) enthalpy drop in fixed and moving blades
  - (2) enthalpy drop only in moving blades
  - (3) enthalpy drop in nozzles
  - (4) no enthalpy drop
- 94 In hydraulic reaction turbine, function of the draft tube is to
- (1) increase the flow rate
  - (2) reduce water hammer effect
  - (3) convert kinetic energy of water to potential energy by a gradual expansion in divergent part
  - (4) increase efficiency of the turbine
- 95 Francis turbine is usually used for
- (1) low head installation upto 30 m
  - (2) medium head installation from 30 m to 180 m
  - (3) high head installation above 180 m
  - (4) for all heads

- 96 Overall efficiency of a thermal power plant is equal to
- (1) Rankine cycle efficiency
  - (2) Carnot cycle efficiency
  - (3) Regenerative cycle efficiency
  - (4) Boiler efficiency x turbine efficiency x generator efficiency
- 97 Pressure on two sides of impulse wheel of a steam turbine
- (1) is same
  - (2) is different
  - (3) increases from one side to the other side
  - (4) decreases from one side to the other side
- 98 In case of reaction steam turbine
- (1) there is enthalpy drop both in fixed and moving blades
  - (2) there is enthalpy drop only in fixed blades
  - (3) there is enthalpy drop only in moving blades
  - (4) there is no enthalpy drop
- 99 In a gas turbine plant, a regenerator increases
- |                        |                      |
|------------------------|----------------------|
| (1) work output        | (2) pressure ratio   |
| (3) thermal efficiency | (4) all of the above |
- 100 Operating charges for same power output are minimum for
- |                       |                         |
|-----------------------|-------------------------|
| (1) gas turbine plant | (2) hydroelectric plant |
| (3) thermal plant     | (4) nuclear plant       |
- 101 Load factor of a power station is usually
- |                     |                     |
|---------------------|---------------------|
| (1) equal to unity  | (2) less than unity |
| (3) more than unity | (4) zero            |
- 102 Water hammer is developed in
- |              |                |
|--------------|----------------|
| (1) penstock | (2) draft tube |
| (3) turbine  | (4) surge tank |



- 103 Thermal efficiency of a gas turbine plant as compared to diesel engine plant is
- (1) higher (2) lower  
 (3) same (4) un-predictable
- 104 Depreciation charges are high in case of
- (1) thermal plant (2) diesel plant  
 (3) hydroelectric plant (4) gas turbine plant
- 105 In a two stage gas turbine plant, reheating after first stage
- (1) decrease thermal efficiency  
 (2) increases thermal efficiency  
 (3) does not affect thermal efficiency  
 (4) none of the above
- 106 For the safety of a steam boiler the number of safety valves fitted are
- (1) One (2) Two  
 (3) Three (4) Four
- 107 Load centre in a power station is
- (1) centre of coal fields  
 (2) centre of maximum load of equipments  
 (3) centre of gravity of electrical load  
 (4) centre of power station
- 108 In steam power station, the choice of high temperature steam is for
- (1) increasing the efficiency of boiler  
 (2) increasing the efficiency of turbine  
 (3) increasing the efficiency of condenser  
 (4) increasing the overall efficiency
- 109 Compounding of steam turbine is done for
- (1) reducing the work done  
 (2) increasing the rotor speed  
 (3) reducing the rotor speed  
 (4) balancing the turbine

110 Diversity factor is always

- (1) equal to unity
- (2) less than unity
- (3) more than unity
- (4) zero

111 High load factor indicates that

- (1) cost of generation per unit power is increased
- (2) total plant capacity is utilized for most of the time
- (3) total plant capacity is not properly utilized for most of the time
- (4) load on the plant is high

112 CANDU reactor uses

- (1) only fertile material
- (2) highly enriched uranium
- (3) natural uranium as fuel and heavy water as moderator and coolant
- (4) plutonium as fuel

113 Fast breeder reactors are best suited for India because of

- (1) large thorium deposits
- (2) large uranium deposits
- (3) large plutonium deposits
- (4) all of the above

114 Thermal shielding is provided to

- (1) protect the walls of the reactor from radiation damage
- (2) prevent meltdown of the core of the reactor
- (3) protect the operating personnel from exposure to radiation
- (4) all of the above

115 The function of a moderator in a nuclear reactor is to

- (1) slow down the fast moving electrons
- (2) speed up the slow moving electrons
- (3) start the chain reaction
- (4) transfer heat produced inside the reactor to a heat exchanger

- 116 Fission chain reaction is possible when
- (1) fission produces the same number of neutrons which are absorbed
  - (2) fission produces more electrons than are absorbed
  - (3) fission produces less electrons than are absorbed
  - (4) none of the above
- 117 In a nuclear reactor the function of a reflector is to
- (1) reduce the speed of the neutrons
  - (2) stop the chain reaction
  - (3) reflect the escaping neutrons back into the core
  - (4) all of the above
- 118 Which material is the most commonly used moderator ?
- (1) Graphite
  - (2) Sodium
  - (3) Deuterium
  - (4) any of the above
- 119 In a pressurized water reactor
- (1) coolant water is pressurized to work as moderator
  - (2) coolant water boils in the core of the reactor
  - (3) coolant water is pressurized to prevent boiling of water in the core
  - (4) no moderator is used
- 120 The conversion ratio of a breeder reactor is
- (1) equal to unity
  - (2) more than unity
  - (3) less than unity
  - (4) none of the above
- 121 The size of a lathe is expressed by
- (1) diameter of chuck
  - (2) maximum speed of chuck
  - (3) swing of lathe
  - (4) height of centres from ground

- 122 A sprue hole is
- (1) an eccentric hole
  - (2) a blind hole
  - (3) an opening in a mould into which molten metal is poured
  - (4) a thorough hole drilling through two mating parts
- 123 Power is transmitted by lead screw to carriage through
- (1) gear system
  - (2) pulley drive
  - (3) rack and pinion arrangement
  - (4) half nut
- 124 In which operation on a workpiece on lathe the spindle speed will be least?
- (1) plain turning
  - (2) taper turning
  - (3) finishing
  - (4) thread cutting
- 125 Which method is used for turning internal tapers only ?
- (1) compound rest
  - (2) tailstock off set
  - (3) taper attachment
  - (4) reamer
- 126 A mandrel is
- (1) a slightly tapered hardened steel shaft that supports works which cannot be otherwise
  - (2) a tapered gauge used for inspection of tapered holes
  - (3) auxiliary chuck used on lathe for holding small loads
  - (4) is used in lathe work to hold castings
- 127 Precision is
- (1) repeatability of a measurement process
  - (2) agreement of the result of a measurement with the true value of the measured quantity
  - (3) ability of a measuring device to detect small differences in a quantity being measured
  - (4) error of judgement in reading an observation

128 Accuracy is

- (1) repeatability of a measuring process
- (2) error of judgement in recording an observation
- (3) ability of an instrument to reproduce same reading under identical situations
- (4) agreement of the result of a measurement with the true value of the measured quantity

129 Which one of the following measuring instruments is supposed to be most accurate

- |                        |                       |
|------------------------|-----------------------|
| (1) micrometer         | (2) vernier caliper   |
| (3) vernier dial gauge | (4) optical projector |

130 Knurling is an operation

- (1) of cutting smooth collars
- (2) of under cutting
- (3) of generally roughing the surface for hand grip
- (4) done prior to screw cutting

131 Resistance wire strain gauge works on the principle

- (1) that resistance changes in proportion to strain on material
- (2) the resistance of wire changes with load
- (3) that conductivity is directly proportional to load on member
- (4) due to elongation length increases and diameter reduces, thereby resistance changes

132 A rotameter is used to measure

- (1) rpm of engine
- (2) rotation of shafts
- (3) twist due to torque applied on shafts
- (4) flow of liquids and gases

133 Hot wire anemometer is used to

- (1) measure pressure of liquid
- (2) measure velocity of air stream
- (3) measure temperature of moving fluid
- (4) measure thermal conductivity of solid

- 134** Principal materials used in soldering are
- |                     |                     |
|---------------------|---------------------|
| (1) tin and lead    | (2) copper and tin  |
| (3) zinc and copper | (4) copper and lead |
- 135** A 30 ton press means
- (1) gross weight of the press is 30 tons
  - (2) weight of die is 30 tons
  - (3) pressure exerted by slide is 30 tons
  - (4) flywheel of the press weighs 30 tons
- 136** Steel balls are required in large quantities. Which process would you select for the manufacture ?
- (1) turning on capstan or turret lathe
  - (2) turning on automatic lathe
  - (3) cold heading
  - (4) casting
- 137** A rack is a gear of
- |                       |                              |
|-----------------------|------------------------------|
| (1) infinite pitch    | (2) infinite module          |
| (3) infinite diameter | (4) infinite number of teeth |
- 138** Profile of a gear tooth is to be checked. Which one of the following device would you choose ?
- |                       |                       |
|-----------------------|-----------------------|
| (1) optical pyrometer | (2) optical projector |
| (3) bench micrometer  | (4) telescopic gauge  |
- 139** Which of the following is a single point cutting tool ?
- |                    |                      |
|--------------------|----------------------|
| (1) milling cutter | (2) parting off tool |
| (3) hacksaw blade  | (4) grinding wheel   |
- 140** Swab is
- |                            |                   |
|----------------------------|-------------------|
| (1) a welding defect       | (2) a gear cutter |
| (3) a tool used in foundry | (4) a forging die |

- 141 Tolerances are specified
- (1) to obtain desired fits
  - (2) because it is not possible to manufacture a size exactly
  - (3) to obtain high accuracy
  - (4) to have proper allowance
- 142 Which of the following is the most important characteristic of a measuring instrument ?
- (1) precision
  - (2) accuracy
  - (3) repeatability
  - (4) sensitivity
- 143 A feeler gauge is used to check
- (1) radius
  - (2) surface roughness
  - (3) thickness of clearance
  - (4) unsymmetrical shape
- 144 Thickness of light gauge sheet steel can be best checked with a
- (1) finely divided steel scale
  - (2) depth gauge
  - (3) micrometer
  - (4) thickness measuring machine fitted with dial gauge
- 145 Which of the following gives an idea about the ability of the equipment to detect small variation in the input signal (quantity being measured) ?
- (1) readability
  - (2) accuracy
  - (3) sensitivity
  - (4) precision
- 146 The least count of a vernier caliper having 25 divisions on vernier scale, matching with 24 divisions of main scale (1 main scale division = 0.5 mm) is
- (1) 0.001 mm
  - (2) 0.01 mm
  - (3) 0.02 mm
  - (4) 0.05 mm
- 147 V-block is used in workshop to check
- (1) roundness of a cylindrical job
  - (2) surface roughness
  - (3) dimensions of oval job
  - (4) tape on a job

- 148 The term "traceability" in engineering metrology is concerned with
- (1) measuring machines
  - (2) standards
  - (3) pneumatic comparators
  - (4) optical instruments
- 149 The term "allowance" in limits and fits is usually referred to
- (1) minimum clearance between shaft and hole
  - (2) maximum clearance between shaft and hole
  - (3) difference of tolerances of hole and shaft
  - (4) difference between maximum size and minimum size of hole
- 150 Surface roughness on a drawing is represented by
- (1) triangles
  - (2) circles
  - (3) squares
  - (4) rectangles
- 151 The diameter of finished turned shaft can best be checked with a
- (1) combination set
  - (2) slip gauge
  - (3) height gauge
  - (4) micrometer screw gauge
- 152 In limits and fits system, basic shaft system is one whose
- (1) lower deviation is zero
  - (2) upper deviation is zero
  - (3) minimum clearance is zero
  - (4) standard tolerance is zero
- 153 It is desirable to handle the slip gauges with a cloth or chamois leather in order to
- (1) avoid injury to hands
  - (2) protect the surfaces of slip gauges
  - (3) insulate them from the heat of the hand
  - (4) ensure that the varnish applied on gauges does not come out



154 Polygons in metrology are concerned with

- (1) method of circular dividing
- (2) testing of parallelism
- (3) testing of circularity
- (4) interferometry measurements

155 Bevel protractor is used for

- (1) linear measurements
- (2) angular measurements
- (3) flatness measurements
- (4) parallelism measurements

156 Universal surface gauge is used for

- (1) checking straightness
- (2) checking flatness
- (3) checking parallelism
- (4) layout work and inspection

157 Wear allowance is provided on

- (1) go gauge
- (2) no go gauge
- (3) both go and no go gauges
- (4) when both are combined in one gauge

158 Profilometer is an instrument used to measure

- |                       |                      |
|-----------------------|----------------------|
| (1) gear involute     | (2) thread profile   |
| (3) surface roughness | (4) surface flatness |

159 Two slip gauges in precision measurement are joined by

- |              |              |
|--------------|--------------|
| (1) sliding  | (2) adhesion |
| (3) wringing | (4) slipping |

- 160** Plug gauges are used to
- (1) measure the diameter of workpieces
  - (2) measure the diameter of the holes in workpieces
  - (3) check the diameter of the holes in workpieces
  - (4) check the outside diameter of workpieces
- 161** Statistical quality control techniques are based on the theory of
- (1) quality
  - (2) statistics
  - (3) probability
  - (4) control
- 162** Gantt charts provide information about
- (1) break even point analysis
  - (2) production schedule
  - (3) material handling layout
  - (4) value analysis
- 163** Queuing theory deals with problems of
- (1) material handling
  - (2) reducing waiting time or idle time
  - (3) better utilization of man services
  - (4) effective use of machines
- 164** Routing prescribes the
- (1) flow of material in the plant
  - (2) proper utilization of man power
  - (3) proper utilization of machines
  - (4) inspection of final product
- 165** Most popular type of organization used for civil engineering constructions is
- (1) line organization
  - (2) line and staff organization
  - (3) functional organization
  - (4) effective organization

- 166 Work study is concerned with
- (1) improving present method and finding standard time
  - (2) motivation of workers
  - (3) improving production capability
  - (4) improving production planning and control
- 167 Basic tool in work study is
- (1) graph paper
  - (2) process chart
  - (3) planning chart
  - (4) stop watch
- 168 Material handling and plant location is analyzed by
- (1) Gnatt chart
  - (2) bin chart
  - (3) activity chart
  - (4) travel chart
- 169 Which of the following layout is suited for mass production ?
- (1) process layout
  - (2) product layout
  - (3) plant layout
  - (4) functional layout
- 170 Graphical method, simplex method and transportation method are concerned with
- (1) break-even analysis
  - (2) value analysis
  - (3) linear programming
  - (4) queing theory
- 171 Merit rating is the method of determining worth of
- (1) a job
  - (2) an individual employee
  - (3) a particular division in workshop
  - (4) overall quality
- 172 Motion study involves analysis of
- (1) actions of operator
  - (2) layout of work place
  - (3) tools and equipments
  - (4) all of the above
- 173 In which of the following layouts, the lines need to be balanced ?
- (1) Process layout
  - (2) product layout
  - (3) plant layout
  - (4) functional layout

174 Current assets include

- (1) manufacturing plant
- (2) manufacturing plant and equipments
- (3) inventories
- (4) common stock held by the company

175 CPM has following time estimate

- (1) one time estimate
- (2) two time estimate
- (3) three time estimate
- (4) four time estimate

176 PERT and CPM are

- (1) techniques to determine project status
- (2) decision making techniques
- (3) aids to determine cost implications of project
- (4) aids to the decision maker

177 Work study comprises following main techniques

- (1) method study and work measurement
- (2) method and time study
- (3) time study and work measurement
- (4) method study and job evaluation

178 Probability distribution of project completion in PERT follows following distribution

- (1) normal
- (2) beta
- (3) exponential
- (4) Gaussian

179 Critical path of a network represents

- (1) minimum time required for completion of project
- (2) maximum time required for completion of project
- (3) maximum cost required for completion of project
- (4) minimum cost required for completion of project

180 According to Pareto principle, an effective manager is one who

- (1) can manage his boss
- (2) can manage his subordinates
- (3) can manage his colleagues
- (4) pick up the vital from the trivial many things

181 According to McGregor's theory of management

- (1) all managers are complex in behaviour and it is difficult to get work done
- (2) X managers in an organization will not work and Y managers will work. The ratio X/Y depends on the organizational set up
- (3) the ratio X/Y is always 0.5 for any organization
- (4) X theory managers presume that the average human being has an inherent dislike of work and will avoid it if he can

182 A public sector undertaking

- (1) is fully owned by public through shareholders
- (2) is jointly owned by private parties
- (3) is jointly owned by private parties and government
- (4) fully owned by government

183 F.W. Taylor introduced a system of working known as

- |                             |                                 |
|-----------------------------|---------------------------------|
| (1) line organization       | (2) line and staff organization |
| (3) functional organization | (4) effective organization      |

184 Salvaging means

- (1) writing off the assets
- (2) throwing away the assets
- (3) selling the assets
- (4) disposing off property which is no longer useful in present situation

185 Capital gains are

- (1) unanticipated increase in income
- (2) income through interest earned on investment
- (3) income on dividends received from companies
- (4) unanticipated changes in value of property relative to goods

- 186** In break even analysis the total cost consists of
- (1) fixed cost
  - (2) variable cost
  - (3) fixed cost + variable cost
  - (4) fixed cost + variable cost + profit
- 187** Bin cards are used in
- (1) machine loading
  - (2) accounts
  - (3) stores
  - (4) preventive maintenance
- 188** The financial position of a company is considered to be sound if
- (1) sufficient funds are available under reserve and surplus
  - (2) company has declared good dividends in the past
  - (3) sales are increasing
  - (4) gross profit is reasonable
- 189** The law of demands states that
- (1) when prices rise demand rises
  - (2) when prices fall demand rises
  - (3) when income rise demand rises
  - (4) when income and prices rise demand rises
- 190** The best source of revenue for states in India is
- (1) sales tax
  - (2) customs duty
  - (3) excise duty
  - (4) entertainment tax
- 191** Indicate the group of persons who gain from inflation
- (1) stock holders
  - (2) bond holders
  - (3) debenture holders
  - (4) fixed deposit holders
- 192** Economic development of a country depends more on
- (1) natural resources
  - (2) capital formation
  - (3) availability of market
  - (4) entrepreneurs

- 193 Performance of a company can be judged by its
- (1) share capital
  - (2) total production
  - (3) number of employees
  - (4) profits
- 194 During inflation
- (1) prices rise
  - (2) prices drop
  - (3) prices remain unchanged
  - (4) prices fluctuates heavily
- 195 Budget is the major instrument of
- (1) fiscal policy
  - (2) monetary policy
  - (3) economic policy
  - (4) export policy
- 196 Devaluation affects imports by making it
- (1) costlier
  - (2) cheaper
  - (3) competitive
  - (4) prohibitive
- 197 Law of demands correlates
- (1) quality and quantity
  - (2) quality and price
  - (3) quantity and price
  - (4) price and profit
- 198 The term "balance of trade" is associated with
- (1) imports and exports
  - (2) taxation
  - (3) gross profits of a company
  - (4) budgeting
- 199 Mixed economy is identified by
- (1) lack of competition
  - (2) coexistence of public and private sectors
  - (3) vigorous competition
  - (4) rising trend in prices
- 200 Which of the following is not a feature of developed economy ?
- (1) predominance of industries
  - (2) high per capita income
  - (3) predominance of indirect taxes
  - (4) high rate of capital formation

SPACE FOR ROUGH WORK

---



*[Handwritten scribbles and marks along the right edge of the page]*