

Subject : MECHANICAL ENGINEERING — OBJECTIVE**Max. Time : 3 HOURS Max. Marks : 300****ROLL NO.**

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Signature of Invigilator

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1. Immediately after the commencement of the Examination, you should check that this Booklet does **NOT** have any unprinted or torn or missing pages or items, etc. If any defect is found, get it replaced by a Complete Question Booklet.
2. **DO NOT** write your Name or anything else except the actual answers to the question, anywhere on the test booklet.
3. Handle your test booklet carefully in such a manner as it may not be mutilated, folded and torn, etc.
4. This Question Booklet contains **50** questions. Each question contains four responses. Choose **only one correct answer** for each question and put a tick mark [✓] against it.
5. All the questions are compulsory and carry equal marks. Your total score will depend only on the number of correct responses marked by you in the test booklet.
6. No candidate shall be admitted to the Examination Hall 20 minutes after commencement of distribution of the Test Booklet. The Supervisor of the Examination Centre will be the time-keeper and his decision in this regard is final.
7. No candidate shall have in his possession inside the Examination Hall any book, notebook or loose paper, programmable calculator, mobile phone etc. except his admit card and other stationeries permitted by the Commission.
8. Immediately after the final bell indicating the closure of the examination, stop making any further markings. You should leave the examination hall after your test booklet is collected by the Invigilator.
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1. The first law of thermodynamics throws the light on the concept of
 - (a) entropy
 - (b) temperature
 - (c) strain
 - (d) internal Energy
2. All gases tend to ideal or perfect gas behavior at all temperatures as their pressure approaches
 - (a) atmospheric
 - (b) zero
 - (c) maximum
 - (d) critical
3. Which one of the following components is not boiler mounting?
 - (a) safety valve
 - (b) pressure gauge
 - (c) feed pump
 - (d) stop valve
4. In a regenerative feed heating cycle, the optimum value of the fraction of steam extracted for feed heating
 - (a) decreases with increase in Rankine cycle efficiency
 - (b) increases with increase in Rankine cycle efficiency
 - (c) is unaffected by increase in Rankine cycle efficiency
 - (d) none of the above
5. The effect of considering friction losses in steam nozzle for the same pressure ratio leads to
 - (a) increase in dryness fraction to exit steam
 - (b) decrease in dryness fraction to exit steam
 - (c) no change in the quality of exit steam
 - (d) none of the above
6. The reheat factor in steam turbine depends on
 - (a) exit pressure only
 - (b) stage efficiency only
 - (c) initial pressure and temperature only
 - (d) all the above
7. In a two stroke cycle engine, the four operations namely suction, compression, expansion and exhaust are completed in the number of revolutions of crank shaft equal to
 - (a) four
 - (b) three
 - (c) two
 - (d) one
8. The ignition quality of fuels for S.I. engine is determined by
 - (a) cetane number rating
 - (b) octane number rating
 - (c) calorific value rating
 - (d) volatility of the fuel
9. In reciprocating air compressor the method of controlling the quantity delivered is done by
 - (a) throttle control
 - (b) blow-off control
 - (c) clearance control
 - (d) all of the above
10. Mechanical efficiency of a gas turbine as compared to internal combustion reciprocating engine is
 - (a) higher
 - (b) lower
 - (c) same
 - (d) unpredictable
11. For a given set of operating pressure limits of a Rankine cycle, the highest efficiency occurs for
 - (a) saturated cycle
 - (b) superheated cycle
 - (c) reheat cycle
 - (d) regenerative cycle
12. Effectiveness of fins on a given heat transfer surface will be more if there are
 - (a) fewer number of thin fins
 - (b) fewer number of thick fins
 - (c) large number of thin fins
 - (d) large number of thick fins

13. In free convection heat transfer transition from laminar to turbulent flow is governed by the critical value of the

- (a) Reynold's number
- (b) Grashoff's number
- (c) Prandtl number
- (d) Grashoff's number and Prandtl number

14. The specific heat of mango juice is $3.8 \text{ KJ/Kg}^\circ\text{C}$. Heat that must be removed to cool 3.0 Kg of mango juice from 30°C to 0°C is (approximately)

- (a) 24 KJ
- (b) 38 KJ
- (c) 340 KJ
- (d) 600 KJ

15. Air at 20°C blows over a plate of $50 \text{ cm} \times 75 \text{ cm}$ maintained at 250°C . If the convection heat transfer coefficient is $25 \text{ W/m}^2 \cdot ^\circ\text{C}$, the heat transfer rate is

- (a) 215.6 kW
- (b) 2156 kW
- (c) 2.156 kW
- (d) 21.56 kW

16. The flow of water in a pipe of diameter 3000 mm can be measured by

- (a) Venturimeter
- (b) Rotameter
- (c) Pitot tube
- (d) Orifice plate

17. In laminar flow, maximum velocity at the centre of pipe is greater than the average velocity by

- (a) two times
- (b) three times
- (c) four times
- (d) none of these

18. Two forces most important in laminar flow between closely parallel plates are

- (a) inertial and viscous
- (b) viscous and pressure
- (c) gravity and pressure
- (d) pressure and inertial

19. Coefficient of performance of a domestic refrigerator as compared to that of an air conditioner is generally

- (a) more
- (b) less
- (c) same
- (d) none of these

20. In a refrigeration cycle, the moisture is to be removed before it enters the

- (a) cold side of system
- (b) evaporator
- (c) compressor
- (d) condenser

21. The sub-cooling in a refrigeration cycle

- (a) increases C.O.P.
- (b) reduces cooling
- (c) increases work of compressor
- (d) reduces condenser size

22. Two shafts A and B are made of same material. The diameter of shaft B is twice that of A. The ratio of power which can be transmitted by A to that of B is

- (a) $1/2$
- (b) $1/4$
- (c) $1/8$
- (d) $1/16$

23. For the design of a cast iron member, the most appropriate theory of failure is

- (a) Mohr's theory
- (b) Rankine's theory
- (c) maximum strain theory
- (d) none of these

24. The property of a material by virtue of which a body returns to its original shape after removal of the load is known as

- (a) ductility
- (b) plasticity
- (c) elasticity
- (d) resilience

25. The ratio of linear stress to linear strain is known as

- (a) Poisson's ratio
- (b) bulk modulus
- (c) modulus of rigidity
- (d) modulus of elasticity

26. A pair of links having surface or area contact between the members is known as a
- higher pair
 - lower pair
 - end pair
 - bottom pair
27. Quick return mechanism is an inversion of
- four bar chain
 - single slider crank chain
 - double slider crank chain
 - crossed slider crank chain
28. In involute gears, the pressure angle is
- dependant on the size of teeth
 - dependant on the size of gear
 - always constant
 - always variable
29. If speed of the Porter Governor is N , then the sensitivity is proportional to
- N^2
 - N^3
 - $1/N^2$
 - $1/N^3$
30. The component of the acceleration, parallel to the velocity of the particle, at the given instant is called
- radial component
 - tangential component
 - Coriolis component
 - none of the above
31. The property of a material which enables it to be drawn into wire with the application of tensile force is called
- plasticity
 - elasticity
 - malleability
 - ductility
32. The structure which has the highest packing of atoms is
- hexagonal closed packed lattice
 - body central cubic lattice
 - simple cubic lattice
 - none of these

33. The relative permeability of a diamagnetic material is
- zero
 - unity
 - less than unity
 - more than unity
34. The ability of a material to resist fracture due to high impact loads is called
- stiffness
 - hardness
 - ductility
 - toughness
35. In a unit cell of a BCC lattice, the number of atoms is
- six
 - nine
 - fourteen
 - none of the above
36. In normalizing process, the hypo-eutectoid steel is heated from 30°C to 50°C above to the critical temperature and then cooled in
- water
 - oil
 - air
 - first in air then in water
37. Continuous chips with built up edge are formed during machining of
- brittle material
 - ductile material
 - hard metals
 - soft metals
38. The type of tool used on lathe, shaper and planer is
- single point cutting tool
 - two point cutting tool
 - three point cutting tool
 - multi point cutting tool
39. Tool life under machining process is affected by the parameter
- depth of cut
 - cutting speed
 - chip thickness
 - all the above

40. In computer integrated manufacturing, information system involves

- (a) scheduling
- (b) master production
- (c) data base management
- (d) all of the above

41. Work study is done by means of

- (a) planning chart
- (b) process chart
- (c) stop watch
- (d) any one of the above

42. A critical activity has

- (a) maximum slack
- (b) minimum slack
- (c) zero slack
- (d) average slack

43. The mathematical technique for finding the best use of limited resources of a company in a maximum manner is known as

- (a) value analysis
- (b) network analysis
- (c) linear programming
- (d) queuing theory

44. Process layout is also known as

- (a) analytical layout
- (b) synthetic layout
- (c) product layout
- (d) none of the above

45. The method of classification of items to be adopted for spare parts inventory is

- (a) ABC analysis
- (b) XYZ analysis
- (c) VED analysis
- (d) SED analysis

46. In the PERT network analysis, the distribution of the project completion time is assumed to follow

- (a) Beta distribution
- (b) Poisson distribution
- (c) normal distribution
- (d) binomial distribution

47. The ultimate aim in just in time (JIT) production system leads to

- (a) maximum inventory
- (b) zero inventory
- (c) 100% inventory
- (d) all of the above

48. Merit rating is a method of determining

- (a) relative values of a job
- (b) worker's performance of a job
- (c) price of a machine
- (d) value of overall production

49. Gears can be best produced as mass production by

- (a) shaping
- (b) casting
- (c) forming
- (d) hobbing

50. The quenching of steel from the upper critical point results in a

- (a) fine grain structure
- (b) rough grain structure
- (c) light grain structure
- (d) elongated grain structure