

02/AE/CME/2012-4

Serial No. 402511

Candidate's Roll Number

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Question Booklet Series

Question Booklet

B

Paper—IV

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GENERAL ENGINEERING SCIENCE

Time Allowed : 1 Hour

SECTION—I

Maximum Marks : 100

(Objective)

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. This Question Booklet contains 50 questions in all.
2. All questions carry equal marks.
3. Attempt all questions.
4. Immediately after commencement of the examination, you should check up your Question Booklet and ensure that the Question Booklet Series is printed on the top right-hand corner of the Booklet. The Booklet contains 7 printed pages and no page or question is missing or unprinted or torn or repeated. If you find any defect in this booklet, get it replaced immediately by a complete booklet of the same series.
5. You must write your Roll Number in the space provided on the top of this page. Do not write anything else on the Question Booklet.
6. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Roll No. and other particulars on the first page of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.
7. You will encode your Roll Number and the Question Booklet Series A, B, C or D as it is printed on the top right-hand corner of this Question Booklet with Black/Blue ballpoint pen in the space provided on Page-2 of your Answer Sheet. If you do not encode or fail to encode the correct series of your Question Booklet, your Answer Sheet will not be evaluated correctly.
8. Questions and their responses are printed in English only in this Booklet. Each question comprises four responses—(A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
9. In the Answer Sheet, there are four brackets—(A), (B), (C) and (D) against each question. To answer the questions you are to mark with Black/Blue ballpoint pen ONLY ONE bracket of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. Any erasure or change is not allowed.
10. You should not remove or tear off any sheet from the Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. After the examination has concluded, you must hand over your Answer Sheet to the Invigilator. Thereafter, you are permitted to take away the Question Booklet with you.
11. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.

1. Bernoulli equation deals with
 - (A) work
 - (B) momentum
 - (C) energy
 - (D) force
2. Continuity equation for an incompressible fluid is
 - (A) $P_1 A_1 V_1 = P_2 A_2 V_2$
 - (B) $A_1 V_1 = A_2 V_2$
 - (C) $\frac{A_1 V_1}{P_1} = \frac{A_2 V_2}{P_2}$
 - (D) $\frac{P_1 A_1}{V_1} = \frac{P_2 V_2}{V_2}$
3. According to Kirchhoff's law, the ratio of emissive power to absorptivity of all bodies is equal to the emissive power of a
 - (A) grey body
 - (B) brilliant white polished body
 - (C) red-hot body
 - (D) black body
4. A reversible polytropic process can be described by the equation
 - (A) $PV^n = C$
 - (B) $(PV)^n = C$
 - (C) $\left(\frac{P}{V}\right)^n = C$
 - (D) $P^n V = C$
5. First law of thermodynamics was developed by
 - (A) Charles
 - (B) Carnot
 - (C) Joule
 - (D) Kelvin
6. The constant volume cycle is also called
 - (A) Carnot cycle
 - (B) Otto cycle
 - (C) Diesel cycle
 - (D) Rankine cycle
7. Rankine cycle consists of
 - (A) three processes
 - (B) four processes
 - (C) five processes
 - (D) six processes
8. In centrifugal pump, the fluid enters the pump
 - (A) from all sides
 - (B) through the top
 - (C) through the bottom
 - (D) through the centre

9. Francis, Kaplan and propeller turbines fall under the category of
- (A) impulse turbine
 - (B) reaction turbine
 - (C) axial-flow turbine
 - (D) mixed-flow turbine
10. The short circuit in any windings of transformer is the result of
- (A) impulsive voltage
 - (B) insulation failure
 - (C) mechanical vibration
 - (D) loose connection
11. Which of the following systems are more prone to faults?
- (A) Generators
 - (B) Underground lines
 - (C) Transformers
 - (D) Overhead lines
12. A 2-ohm resistor having 1 ampere current will dissipate power of
- (A) 2 joules
 - (B) 2 watts
 - (C) 1 watt
 - (D) 1 joule
13. The circuit whose properties are same in either direction is known as
- (A) reversible circuit
 - (B) irreversible circuit
 - (C) unilateral circuit
 - (D) bilateral circuit
14. The cells are connected in series to
- (A) increase the current output
 - (B) increase the voltage output
 - (C) decrease the internal resistance
 - (D) decrease the amount of charging voltage required
15. A magnetic compass points to the
- (A) geographical poles
 - (B) true north pole
 - (C) magnetic north pole
 - (D) agonic line of the earth field
16. The electromagnetic radiation can only be emitted or absorbed by a matter in small discrete units is called
- (A) proton
 - (B) electron
 - (C) photon
 - (D) neutron

17. One horsepower is equal to
 (A) 1.3330 kW
 (B) 1.0000 kW
 (C) 0.8000 kW
 (D) 0.7457 kW
18. If two forces, each equal to P in magnitude, act at right angles, their effect may be neutralised by a third force acting along their bisector in opposite direction whose magnitude is equal to
 (A) $2P$
 (B) $\frac{P}{2}$
 (C) $\sqrt{2}P$
 (D) $\frac{P}{\sqrt{2}}$
19. The conditions of equilibrium of a coplanar nonconcurrent force are
 (A) $\Sigma H = 0, \Sigma V = 0$
 (B) $\Sigma H = 0, \Sigma M = 0$
 (C) $\Sigma V = 0, \Sigma M = 0$
 (D) $\Sigma H = 0, \Sigma V = 0, \Sigma M = 0$
20. If the resultant of two forces $(P+Q)$ and $(P-Q)$ is equal to $\sqrt{3P^2+Q^2}$, then forces are inclined to each other at an angle of
 (A) 30°
 (B) 60°
 (C) 90°
 (D) 120°
21. A satellite launch station should be
 (A) near the pole region
 (B) on the pole axis
 (C) near the equatorial region
 (D) All the above locations are equally suitable
22. A car moving with a speed n can be stopped in minimum distance x when brakes are applied. If the speed becomes n times, the minimum distance over which the car can be stopped would have the value
 (A) $\frac{x}{n}$
 (B) nx
 (C) $\frac{x}{n^2}$
 (D) n^2x
23. A body is allowed to fall from the top of a tower. It falls through half the height in 2 sec. The total time taken by the body to reach the ground is approximately
 (A) 4.5 sec
 (B) 4.8 sec
 (C) 4.2 sec
 (D) 2.8 sec
24. The errors of instruments can be determined by
 (A) calibration
 (B) optical projector
 (C) slip gauges
 (D) None of the above

25. Some substances generating voltage when they are subjected to mechanical forces or stresses along specific planes are known as
- (A) thermoelectric
 - (B) magnetoelectric
 - (C) piroelectric
 - (D) photoelectric
26. A photoelectric device in which the resistance of the metal changes directly proportional to the light striking on it is called
- (A) photocell
 - (B) photoemission cell
 - (C) photovoltaic cell
 - (D) photoconductive cell
27. The surface roughness on a drawing is represented by
- (A) circles
 - (B) squares
 - (C) zigzag lines
 - (D) triangles
28. The fact that how closely the instrument reading is following the measured variables is termed as
- (A) fidelity
 - (B) accuracy
 - (C) threshold sensitivity
 - (D) precision
29. Bevel protractor is used for
- (A) angular measurement
 - (B) linear measurement
 - (C) height measurement
 - (D) flatness measurement
30. An angle-measuring device is
- (A) trolly
 - (B) hermaphrodite caliper
 - (C) sine bar
 - (D) All of the above
31. Which of the following is not a source of power?
- (A) Solar cell
 - (B) Photoelectric cell
 - (C) Thermocouple
 - (D) Photovoltaic cell
32. The property of a material by virtue of which it can be beaten or rolled into plates is called
- (A) elasticity
 - (B) malleability
 - (C) ductility
 - (D) plasticity

33. A beam of length l , having uniform load of W kg per unit length, is supported freely at the ends. The moments at the mid-span will be
- (A) $\frac{Wl}{4}$
 (B) $\frac{Wl^2}{2}$
 (C) $\frac{Wl^2}{8}$
 (D) $\frac{Wl^2}{4}$
34. The beam is loaded as cantilever. If the load at the end is increased, the failure will occur
- (A) in the middle
 (B) at the support
 (C) at the tip below the load
 (D) anywhere
35. Unit of strain is
- (A) cm/cm
 (B) dimensionless
 (C) kg/cm²/cm
 (D) kg/cm
36. The equivalent length of a column supported firmly at one end and free at the other end is
- (A) $2l$
 (B) $0.7l$
 (C) l
 (D) $0.5l$
37. The value of J in equation $\frac{T}{J} = \frac{S_s}{y} = \frac{G\theta}{l}$ for a circular shaft of diameter d is
- (A) $\frac{\pi d^3}{32}$
 (B) $\frac{\pi d^4}{32}$
 (C) $\frac{\pi d^4}{64}$
 (D) $\frac{\pi d^3}{16}$
38. The shear stress along the principal plane subjected to maximum principal stress is
- (A) minimum
 (B) maximum
 (C) zero
 (D) negative
39. In a beam, at a place where the shear force is maximum, the bending moment will be
- (A) maximum
 (B) minimum
 (C) zero
 (D) None of the above
40. Raw material for all iron and steel products is
- (A) cast iron
 (B) wrought iron
 (C) pig iron
 (D) steel

41. Cast iron contains carbon approximately
- (A) 0.2% to 0.4%
 - (B) 1% to 1.3%
 - (C) 2% to 4%
 - (D) None of the above
42. Compressive strength of cast iron as compared to tensile strength is
- (A) more
 - (B) less
 - (C) same
 - (D) None of the above
43. In steel, main alloy causing corrosion resistance is
- (A) manganese
 - (B) vanadium
 - (C) chromium
 - (D) cobalt
44. Bronze is an alloy of
- (A) copper and zinc
 - (B) copper and tin
 - (C) copper, tin and zinc
 - (D) None of the above
45. Polyesters belong to the group of
- (A) phenolics
 - (B) thermoplastics
 - (C) thermosetting plastics
 - (D) PVC
46. Alloy used for making a resistance of electrical and heating elements is
- (A) invar
 - (B) elinvar
 - (C) magnin
 - (D) nichrome
47. Break-even point shows that
- (A) sales revenue > total cost
 - (B) sales revenue < total cost
 - (C) sales revenue = total cost
 - (D) variable cost = fixed cost
48. CPM is
- (A) time-oriented technique
 - (B) event-oriented technique
 - (C) activity-oriented technique
 - (D) target-oriented technique
49. PERT is
- (A) time-oriented technique
 - (B) event-oriented technique
 - (C) activity-oriented technique
 - (D) work-oriented technique
50. All financial decisions on any project appraisal are based on
- (A) future value of money
 - (B) present value of money
 - (C) opportunity cost of money
 - (D) None of the above
