Mechanical Engineering Hydraulic Machines Important MCQs

Mechanical Engineering-Hydraulic Machines Important MCQ PDF

1. Reciprocating pumps are no more to be seen in industrial applications (in comparison to centrifugal pumps) because of
(a) high initial and maintenance cost
(b) lower discharge
(c) lower speed of operation
(d) necessity of air vessel
(e) all of the above.
Ans: a

2. In a centrifugal pump casing, the flow of water leaving the impeller, is
(a) rectilinear flow
(b) radial flow
(c) free vortex motion
(d) forced vortex
(e) none of the above.
Ans: c

3. Head developed by a centrifugal pump depends on
(a) impeller diameter
(b) speed
(c) fluid density
(d) type of casing
(e) (a) and (b) above.
Ans: e

4. For starting an axial flow pump, its delivery valve should be
(a) closed
(b) open
(c) depends on starting condition and flow desired
(d) could be either open or closed
(e) partly open and partly closed.
Ans: b

5. The efficiency of a centrifugal pump is maximum when its blades are
(a) straight
(b) bent forward
(c) bent backward
(d) bent forward first and then backward
(e) bent backward first and then forward.
Ans: c

6. In a centrifugal pump casing, the flow of water leaving the
(a) radial
(b) radial
(c) centrifugal
(d) rectilinear
(e) vortex.
Ans: e

7. Centrifugal pump is started with its delivery valve
(a) kept fully closed
(b) kept fully open

(c) irrespective of any position
(d) kept 50% open
(e) none of the above.
Ans: a

8. Axial flow pump is started with its delivery valve
(a) kept fully closed
(b) kept fully open
(c) irrespective of any position
(d) kept 50% open
(e) none of the above.
Ans: b

9. When a piping system is made up primarily of vertical lift and very little pipe friction, the pump characteristics should be
(a) horizontal
(b) nearly horizontal
(c) steep
(d) first rise and then fall
(e) none of the above.
Ans: c

10. One horsepower is equal to
(a) 102 watts
(b) 75 watts
(c) 550 watts
(d) 735 watts
(e) 33000 watts.
Ans: d

11. Multistage centrifugal pumps are used to obtain
(a) high discharge
(b) high head
(c) pumping of viscous fluids
(d) high head and high discharge
(e) high efficiency.
Ans: b

12. When a piping system is made up primarily of friction head and very little of vertical lift, then pump characteristics should be
(a) horizontal
(b) nearly horizontal
(c) steep
(d) first rise and then fall
(e) none of the above.
Ans: b

13. In a single casing, multistage pump running at constant speed, the capacity rating is to be slightly lowered. It can be done by
(a) designing new impeller
(b) trimming the impeller size to the required size by machining
(c) not possible
(d) some other alterations in the impeller
(e) none of the above.
Ans: b

14. If a pump is handling water and is discharging a certain flow Q at a constant total dynamic head requiring a definite B.H.P., the same pump when handling a liquid of specific gravity 0.75 and viscosity nearly same as of water would discharge
(a) same quantity of liquid
(b) 0.75 Q
(c) Q/0.75
(d) 1.5 Q
(e) none of the above.
Ans: a

15. The horse power required in above case will be
(a) same
(b) 0.75 B.H.P.
(c) B.H.P./0.75
(d) 1.5 B.H.P.
(e) none of the above.
Ans: b

16. Low specific speed of a pump implies it is
(a) centrifugal pump
(b) mixed flow pump
(c) axial flow pump
(d) any one of the above
(e) none of the above.
Ans: a

17. The optimum value of vane exit angle for a centrifugal pump impeller is
(a) 10-15°
(b) 20-25°
(c) 30-40°
(d) 50-60°
(e) 80-90°.
Ans: b

18. In a centrifugal pump, the liquid enters the pump
(a) at the top
(b) at the bottom
(c) at the center
(d) from sides
(e) none of the above.
Ans: c

19. For small discharge at high pressure, following pump is preferred
(a) centrifugal
(b) axial flow
(c) mixed flow
(d) propeller
(e) reciprocating.
Ans: e

20. In centrifugal pumps, maximum efficiency is obtained when the blades are
(a) straight
(b) bent forward
(c) bent backward

(d) radial
(e) given aerofoil section.
Ans: c

21. Motion of a liquid in a volute casing of a centrifugal pump is an example of
(a) rotational flow
(b) radial
(c) forced spiral vortex flow
(d) forced cylindrical vortex flow
(e) spiral vortex flow.
Ans: e

22. For very high discharge at low pressure such as for flood control and irrigation applications, following type of pump is preferred
(a) centrifugal
(b) axial flow
(c) reciprocating
(d) mixed flow
(e) none of the above.
Ans: b

23. Medium specific speed of a pump implies it is
(a) centrifugal pump
(b) mixed flow pump
(c) axial flow pump
(d) any one of the above
(e) none of the above.
Ans: b

24. High specific speed of a pump implies it is
(a) centrifugal pump
(b) mixed flow pump
(c) axial flow pump
(d) any one of the above
(e) none of the above.
Ans: c

25. Indicator diagram of a reciprocating pump is a graph between
(a) flow vs swept volume
(b) pressure in cylinder vs swept volume
(c) flow vs speed
(d) pressure vs speed
(e) swept volume vs speed.
Ans: b

26. Low specific speed of turbine implies it is
(a) propeller turbine
(b) Francis turbine
(c) impulse turbine
(d) any one of the above
(e) none of the above.
Ans: c

27. Any change in load is adjusted by adjusting following parameter on turbine
(a) net head

(b) absolute velocity
(c) blade velocity
(d) flow
(e) relative velocity of flow at inlet.
Ans: d

28. Runaway speed of a hydraulic turbine is
(a) full load speed
(b) the speed at which turbine runner will be damaged
(c) the speed if the turbine runner is allowed to revolve freely without load and with the wicket gates wide open
(d) the speed corresponding to maximum overload permissible
(e) none of the above.
Ans: c

29. The maximum number of jets generally employed in impulse turbine without jet interference is
(a) 4
(b) 6
(c) 8
(d) 12
(e) 16.
Ans: b

30. Medium specific speea of turbine implies it is
(a) propeller turbine
(b) Francis turbine
(c) impulse turbine
(d) any one of the above
(e) none of the above.
Ans: b

31. High specific speed of turbine implies it is
(a) propeller turbine
(b) Francis turbine
(c) impulse turbine
(d) any one of the above
(e) none of the above.
Ans: a

32. The specific speed of turbine is defined as the speed of a unit
(a) of such a size that it delivers unit dis-charge at unit head
(b) of such a size that it delivers unit dis-charge at unit power
(c) of such a size that it requires unit power per unit head
(d) of such a size that it produces unit horse power with unit head
(e) none of the above.
Ans: d

33. Puck up the wrong statement about centrifugal pump
(a) discharge a diameter
(b) head a speed2
(c) head a diameter
(d) Power a speed3
(e) none of the above is wrong.
Ans: a

34. A turbine pump is basically a centrifugal pump equipped additionally with
(a) adjustable blades
(b) backward curved blades
(c) vaned diffusion casing
(d) inlet guide blades
(e) totally submerged operation facility.
Ans: c

35. Casting of a centrifugal pump is designed so as to minimize
(a) friction loss
(b) cavitation
(c) static head
(d) loss of kinetic energy
(e) starting time.
Ans: d

36. In reaction turbine, draft tube is used
(a) to transport water downstream without eddies
(b) to convert the kinetic energy to flow energy by a gradual expansion of the flow cross-section
(c) for safety of turbine
(d) to increase flow rate
(e) none of the above.
Ans: b

37. Guide angle as per the aerofoil theory of Kaplan turbine blade design is defined as the angle between
(a) lift and resultant force
(b) drag and resultant force
(c) lift and tangential force
(d) lift and drag
(e) resultant force and tangential force.
Ans: a

38. Francis turbine is best suited for
(a) medium head application from 24 to 180 m
(b) low head installation up to 30 m
(c) high head installation above 180 m
(d) all types of heads
(e) none of the above.
Ans: a

39. The flow rate in gear pump
(a) increases with increase in pressure
(b) decreases with increase in pressure
(c) more or less remains constant with in-crease in pressure
(d) unpredictable
(e) none of the above.
Ans: c

40. Impulse turbine is generally fitted
(a) at the level of tail race
(b) little above the tail race
(c) slightly below the tail race

(d) about 2.5 m above the tail race to avoid cavitation
(e) about 2.5 m below the tail race to avoid cavitation.
Ans: b

41. Francis, Kaplan and propeller turbines fall under the category of
(a) Impulse turbines
(b) Reaction turbines
(c) Axial flow turbines
(d) Mixed flow turbines
(e) Reaction-cum-impulse turbines.
Ans: b

42. Reaction turbines are used for
(a) low head
(b) high head
(c) high head and low discharge
(d) high head and high discharge
(e) low head and high discharge.
Ans: e

43. The discharge through a reaction turbine with increase in unit speed
(a) increases
(b) decreases
(c) remains unaffected
(d) first increases and then decreases
(e) first decreases and then increases.
Ans: b

44. The angle of taper on draft tube is
(a) greater than 15°
(b) greater than 8°
(c) greater than 5°
(d) less than 8°
(e) less than 3°.
Ans: d

45. Specific speed for reaction turbines ranges from
(a) 0 to 4.5
(b) 10 to 100
(c) 80 to 200
(d) 250 to 300
(e) none of the above.
Ans: b

46. In axial flow fans and turbines, fluid enters and leaves as follows
(a) radially, axially
(b) axially, radially
(c) axially, axially
(d) radially, radially
(e) combination of axial and radial.
Ans: c

47. Which place in hydraulic turbine is most susceptible for cavitation
(a) inlet of draft rube
(b) blade inlet

(c) guide blade
(d) penstock
(e) draft tube exit.
Ans: a

48. Air vessels in reciprocating pump are used to
(a) smoothen flow
(b) reduce acceleration to minimum
(c) increase pump efficiency
(d) save pump from cavitation
(e) increase pump head.
Ans: b

49. Saving of work done and power by fitting an air vessel to single acting reciprocating pump is of the order of
(a) 39.2%
(b) 49.2%
(c) 68.8%
(d) 84.8%
(e) 91.6%.
Ans: d

50. Saving of work done and power by fitting an air vessel to double acting reciprocating pump is of the order of
(a) 39.2%
(b) 49.2%
(c) 68.8%
(d) 84.8%
(e) 91.6%.
Ans: a

51. According to fan laws, for fans having constant wheel diameter, the air or gas capacity varies
(a) directly as fan speed
(b) square of fan speed
(c) cube of fan speed
(d) square root of fan speed
(e) none of the above.
Ans: a

52. According to fan laws, for fans having constant wheel diameter, the pressure varies
(a) directly as fan speed
(b) square of fan speed
(c) cube of fan speed
(d) square root of fan speed
(e) none of the above.
Ans: b

53. According to fan laws, for the fans having constant wheel diameters, the power demand varies
(a) directly as fan speed
(b) square of fan speed
(c) cube of fan speed
(d) square root of fan speed
(e) none of the above.

Ans: c

54. According to fan laws, at constant speed and capacity, the pressure and power vary
(a) directly as the air or gas density
(b) inversely as square root of density
(c) inversely as density
(d) as square of density
(e) as square root of density.
Ans: a

55. According to fan laws, at constant pressure, the speed capacity and power vary
(a) directly as the air or gas density
(b) inversely as square root of density
(c) inversely as density
(d) as square of density
(e) as square root of density.
Ans: b

56. According to fan laws, at constant weight of air or gas, the speed, capacity and pressure vary
(a) directly as the air or gas density
(b) inversely as square root of density
(c) inversely as density
(d) as square of density
(e) as square root of density.
Ans: c

57. Pressure intensifier increases the pressure in proportion to
(a) ratio of diameters
(b) square of ratio of diameters
(c) inverse ratio of diameters
(d) square of inverse ratio of diameters
(e) fourth power of ratio of diameters.
Ans: b

58. A hydraulic accumulator normally consists of
(a) two cylinders, two rams and a storage device
(b) a cylinder and a ram
(c) two co-axial rams and two cylinders
(d) a cylinder, a piston, storage tank and control valve
(e) special type of pump with storage device and a pressure regulator.
Ans: b

59. A hydraulic intensifier normally consists of
(a) two cylinders, two rams and a storage device
(b) a cylinder and a ram
(c) two co-axial rams and two cylinders
(d) a cylinder, a piston, storage tank and control valve
(e) special type of pump with storage device and a pressure regulator.
Ans: c

60. Hydraulic accumulator is used for
(a) accumulating oil
(b) supplying large quantities of oil for very short duration
(c) generally high pressures to operate hydraulic machines

(d) supplying energy when main supply fails
(e) accumulating hydraulic energy.
Ans: d

61. Maximum impulse will be developed in hydraulic ram when
(a) waste valve closes suddenly
(b) supply pipe is long
(c) supply pipe is short
(d) ram chamber is large
(e) supply pipe has critical diameter,
Ans: a