

These are sample MCQs to indicate pattern, may or may not appear in examination

University of Mumbai

Online Examination 2020

Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Final Year Semester VIII

Course Code: MEC803 and Course Name: Power Engineering

Time: 1hour

Max. Marks: 50

Note to the students:- All the Questions carry equal marks .

- Q By volume the percentage of oxygen and nitrogen are
A 21% Oxygen & 79% Nitrogen
B 79% Oxygen & 21% Nitrogen
C 23.3% Oxygen & 76.7% Nitrogen
D 76.7% Oxygen & 23.3% Nitrogen
- Q Mixture strength is ratio of
A $((\text{Actual A/F ratio})/(\text{Stoichiometric A/F ratio}))$
B $((\text{Stoichiometric A/F ratio})/(\text{Actual A/F ratio}))$
C $((\text{Actual A/F ratio} - \text{Stoichiometric A/F ratio})/(\text{Stoichiometric A/F ratio}))$
D $((\text{Actual A/F ratio} - \text{Stoichiometric A/F ratio})/(\text{Actual A/F ratio}))$
- Q The theoretical A/F ratio for the combustion of octane on mass basis is
A 15.05
B 5.15
C 5.95
D 59.5
- Q The smallest particle which can take part in a chemical change is called
A Atom
B Molecule
C Electron

- D Compound
- Q A chemical fuel is a substance which releases _____ on combustion
- A Chemical Energy
- B Heat Energy
- C Sound Energy
- D Magnetic Energy
- Q Enthalpy of formation is defined as enthalpy of compound at
- A 25° C & 10 atmospheres
- B 25° C & 1 atmospheres
- C 0° C & 1 atmospheres
- D 100° C & 1 atmospheres
- Q Choose the correct statement:
- A Number of atoms of each constituents are not conserved in chemical reaction
- B The mass of all the substances on one side of the equation may not be equal to the mass of all the substances on the other side
- C Number of atoms of each constituents are conserved in chemical reaction
- D The number of moles of the reactants in a chemical equation are equal to the number of moles of the product
- Q If the mixture strength is less than one then the mixture is said to be
- A Rich
- B Lean
- C Chemically corrected
- D Strong
- Q In a reaction turbine when the degree of reaction is zero, then there is
- A No heat drop in moving blades
- B No heat drop in fixed blades
- C Maximum heat drop in moving blades
- D Maximum heat drop in fixed blades

- Q The capacity of induced draft fan compared to forced draft fan in a boiler
is
- A Same
B More
C Less
D Same
- Q 1 kg.m is equal to
- A 9.81 Joules
B 10 Joules
C 11.1 Joules
D 9.8 Joules
- Q Steam turbines are used for
- A Large marine propulsion
B Electric power generation
C Direct drive of fans, compressors, pumps
D Large marine propulsion, Electric power generation & Direct drive of fans, compressors, pumps
- Q The maximum heat loss in a boiler occurs due to
- A Moisture in fuel
B Dry flue gases
C Steam formation
D Unburnt carbon
- Q A steam nozzle converts
- A Heat energy of steam into kinetic energy
B Kinetic energy into heat energy of steam
C Heat energy of steam into potential energy
D Potential energy into heat energy of steam
- Q In a reaction turbine, when steam flows through the fixed blades,
- A Pressure increases while velocity decreases
B Pressure decreases while velocity increases
C Pressure and velocity both decreases
D Pressure and velocity both increases

- Q Which of the following boilers is best suited to meet fluctuating demands?
- A Babcock and Wilcox
- B Locomotive
- C Lancashire
- D Cochran
- Q In a 50% reaction turbine stage, tangential component of absolute velocity at rotor inlet is 537 m/s and the blade velocity is 454 m/s. The power output in kW of steam will be
- A 260 kW
- B 282 kW
- C 296 kW
- D 302 kW
- Q The action of steam in a steam turbine is
- A Static
- B Dynamic
- C Static and dynamic
- D Neither static nor dynamic
- Q For water, at pressures below atmospheric;
- A Melting point rises slightly and boiling point drops markedly
- B Melting point rises markedly and boiling point drops markedly
- C Melting point drops slightly and boiling point drops markedly
- D Melting point drops slightly and boiling point drops slightly
- Q The safety valve on boiler drum compared to safety valve on superheater is set at
- A Same value
- B Higher value
- C Lower value
- D Lower/higher depending on steam flow
- Q An air preheater is installed
- A Before the economiser
- B Before the superheater
- C Between the economiser and chimney

- D After the superheater
- Q Efficiency of Rankine cycle can be increased by
- A Decreasing initial steam pressure and temperature
- B Increasing exhaust pressure
- C Decreasing exhausts pressure
- D Increasing the expansion ratio
- Q Which of the following is a water tube boiler?
- A Locomotive boiler
- B Cochran boiler
- C Cornish boiler
- D Babcock and Wilcox boiler
- Compounding is a method for reducing the of the impulse turbine
- Q to practical limit
- A velocity and pressure
- B velocity
- C pressure
- D rotational speed
- Q The example of pressure compounded impulse turbine is....
- A Curtis turbine
- B Rateau turbine
- C de Laval turbine
- D Parson's turbine
- In a single stage of an impulse turbine the peripheral velocity of the blade ring is 125 m/s and the velocity of whirl is 293 m/s. What is power
- Q developed in the blade if the mass is 9 kg/s.
- A 329.62 kW
- B 320.62 kW
- C 429.62 kW
- D 229.62 kW
- What is the boiler efficiency if the heat utilised by the feed water is 25000
- Q kJ/kg and the calorific value of coal is 30000 kJ/kg.
- A 83.33%
- B 63.33%

C 73.33%

D 93.33%

Q The term boiler power which is used to measure the capacity of a boiler is recommended by..

A ASME

B ISME

C ISTE

D SAE

Q There are.....types of safety valves used in boiler

A 3

B 4

C 5

D 6

Q The function of the.....is to allow the feed water under pressure to pass into the boiler and to prevent simultaneously any water escaping back from the boiler.

A Feed Check Valve

B Feed Pump

C Blow-off Cock

D Fusible plug

Q Following one is not the objective of boiler trial to determine the thermal efficiency of the boiler

B to estimate evaporative capacity of boiler

C to determine the boiler power

D to draw up the heat balance sheet of the boiler

Q Steam issues from the nozzles of a steam turbine with a velocity of 1200 m/s.

The mass of steam flowing through turbine per hour is 900 kg. What is the tangential force on the blade if the velocity of whirl is 1320 m/s

A 230 N

B 330 N

C 430 N

D 530 N

Q What is the degree of reaction if the isentropic heat drop in the moving blade is 10 kJ/kg and isentropic heat drop in the fixed blades is 25 kJ/kg

- A 28.57%
- B 23.57%
- C 18.57%
- D 30.57%

Q The compression ratio in a gas turbine is

- A 1
- B 6
- C 8
- D 4

Q Thermal efficiency of open cycle gas turbine can be improved using:

- A Reheating
- B Regeneration
- C Intercooling
- D Reheating and Regeneration

Q Capital cost of a gas turbine plant.....than that of a steam power plant of same capacity

- A Equal to
- B less than
- C Higher than
- D Cant decide

Q In a gas turbine plant, a regenerator increases.....

- A Work output
- B Pressure ratio
- C Thermal efficiency
- D work input

Q For a gas turbine the pressure ratio in the range of.....

- A 1 to 2
- B 3 to 5
- C 16 to 18

D 18 to 22
Q In a two stage gas turbine plant, reheating after first stage.....
A Increase the thermal efficiency
B Decrease the thermal efficiency
C Does not effect the thermal efficiency
D Increases workdone
Q What is the air standard cycle for a Gas-Turbine called?
A Reheat cycle
B Rankine cycle
C Brayton cycle
D Diesel cycle
Q A Gas Turbine is which type of combustion plant?
A external
B open
C internal
D C I
Q The gas turbines are mainly used in?
A Locomotives.
B Aircrafts.
C Automobiles.
D Pumping stations.
Q For the same maximum pressure and heat input, the most efficient cycle is?
A Brayton cycle
B Carnot cycle
C Rankine cycle
D Dual cycle
Q The propulsive efficiency is given by
A work done by engine / propulsive power
B propulsive power / work done by engine
C energy input rate / propulsive power
D propulsive power / energy input rate
Q Jet engines are classified into..... Types

- A 5
- B 4
- C 3
- D 2

Q For speed above 3000 km/hour, it is more advantageous to use

- A turbo-jet engine
- B ram-jet engine
- C propellers
- D rockets

Q In air breathing jet engine, the jet is formed by expading

- A gases
- B solids
- C liquid
- D highly heated atmospheric air.

Atmospheric jet engine require..... from atmospheric air for

combustion of the fuel

- A Nitrogen
- B Oxygen
- C Hydrogen
- D Helium

.....represents the energy required to change the momentum of the mass flow of gas and may be expressed as the difference between the rate of kinetic energy of the entering air and the exit gases

- Q
- A Propulsive Efficiency
- B Thrust
- C Thrust Power
- D Propulsive Power

Q Artillery barrage and bazooka are the examples of.....

- A Turbofan engine
- B Rocket engine
- C Turbo jet

- D Atmospheric jet engine
- Q The fan pressure ratio in turbofan is in the range of...
- A 2 to 4
- B 4 to 6
- C 6 to 8
- D 8 to 10
- Q Atmospheric jet engines are also called as....
- A Breathing engines
- B Non-breathing engines
- C Liquid propellant
- D Solid propellant
- Q Which of the following is not the advantage of jet propulsion
- A High specific weight
- B Low specific weight
- C No unbalanced force
- D Small frontal area
- The frontal area of the propulsion is less than.....the frontal area of the reciprocating engines which decreases nacelle drag greatly and hence makes available greater power.
- Q
- A one third
- B one fourth
- C one half
- D one fifth
- Q Which of the following is not the merit of turboprop engine
- A Low specific weight
- B High specific weight
- C Small frontal area
- D Lower vibration
- Q The effective (or net) head at the turbine is
- A the sum of gross head plus head loss in penstock and the velocity head at the turbine exit.
- B the difference between gross head minus the head loss in penstock

- C the difference between the gross head minus head loss in penstock and
 D the velocity head at the turbine exit
- D the sum of gross head plus the head loss in the penstock.
- Q The difference between the power obtained from the turbine shaft and
 power supplied by water at its entry to the turbine is equal to
- A sum of hydraulic and mechanical losses
 B sum of mechanical and volumetric losses
 C mechanical losses
 D hydraulic losses.
- Q Which of the following statements is a definition of the hydraulic
 efficiency of a turbine?
 A The ratio of power available at the turbine shaft to that supplied to it by
 runner.
 B The ratio of the power supplied by the runner to the power available at
 the shaft.
 C The ratio of power utilized by runner to that supplied by the water at
 entry to the turbine.
 D The ratio of power supplied by water at entry to the power utilized by
 runner.
- Q The water leaves the turbine at atmospheric pressure
 A Francis
 B Kaplan
 C Propeller
 D Pelton.
- Q Specific speed of a turbo-machine
- A relates the shape rather than the size of the machine
 B remains unchanged under different conditions of operation
 C has the dimensions of rotational speed
 D is the speed of a machine having unit dimensions.
- Q If coefficient of velocity & net head for a hydraulic turbine are 0.985 & 350
 m respectively, then find jet velocity in m/s
 A 91.62

- B 81.62
C 71.62
D 51.52
- Q Low specific speed of turbine implies to
- A propeller turbine
B francis turbine
C impulse turbine
D reaction turbine
- Q A surge tank is used to
- A prevent occurrence of hydraulic jump
B smoothen the flow
C relieve the pipeline of excessive pressure transients
D avoid reversal of flow.
- Q Which of the following turbines is most efficient at partload opqration?
- A Kaplan
B Propeller
C Francis
D Pelton wheel.
- Q Cavitation damage in turbine runner occurs near the
- A inlet on the convex side of blades
B outlet on the convex side of blades
C inlet on the concave side of blades
D outlet on the concave side of blades.
- Q A Kaplan turbine is
- A an inward flow impulse turbine
B low head axial flow turbine
C high head axial flow turbine
D high head mixed flow turbine.
- Q An impulse turbine requires
- A high head and small quantity of flow
B low head and small quantity of flow
C low head and high rate of flow

D Medium head and low rate of flow

Q Which of the following surge tank is also called a throttled surge tank?

A inclined surge tank.

B Expansion chamber surge tank.

C Restricted orifice surge tank.

D Spill way tank

Q Jet ratio is defined as the ratio of

A diameter of jet of water to diameter of Pelton wheel

B velocity of vane to the velocity of jet of water

C velocity of flow to the velocity of jet of water

D diameter of Pelton wheel to diameter of the jet of water

Q speed ratioSpeed ratio for Pelton wheel varies from

A 0.45 to 0.50

B 0.60 to 0.70

C 0.30 to 0.40

D 0.80 to 0.90

Q Radial discharge means the angle made by absolute velocity with the tangent on the wheel is..... and the component of the whirl velocity is zero.

A 0 degree

B 45 degree

C 90 degree

D 180 degree

Q An inward flow reaction turbine has external and internal diameters as 1 m and 0.5 m respectively. The velocity of flow through the runner is constant and is equal to 1.5 m/s. Determine the discharge through the runner if the width of the turbine at inlet is 200 mm

A 0.9425 cubic meter per second

B 0.9124 cubic meter per second

C 0.8425 cubic meter per second

D 0.7425 cubic meter per second

- Q A Kaplan turbine runner is to be designed to develop 9100 kW. The net available head is 5.6 m. What is the discharge through the runner if the overall efficiency is 86 %
- A 179.2 cubic meter per second
- B 190.5 cubic meter per second
- C 182.5 cubic meter per second
- D 192.5 cubic meter per second
- Q Which of the following statement is correct?
- A Pelton wheel is a reaction turbine
- B Pelton wheel is a radial inward flow turbine
- C Pelton wheel is a impulse turbine
- D Pelton wheel is a radial outward flow turbine
- Q Unit speed is the speed of a turbine when it is working
- A under unit head and develops unit power
- B under unit head and discharge one cubic meter per second
- C under unit head
- D under unit discharge
- Q Unit discharge is the discharge of a turbine when
- A the head on turbine is unity and it develops unit power
- B the head on turbine is unity and it moves at unit speed
- C the head on the turbine is unity
- D the discharge on the turbine is unity
- Q Which one is not the classification of the hydraulic turbines according to the direction of flow through runner
- A Zero specific speed turbine
- B High specific speed turbine
- C Medium specific speed turbine
- D Low specific speed turbine
- Q Which one of the following is not a main part of Pelton wheel
- A Runner and bucket
- B Breaking jet
- C Casing
- D Draft tube

Q The shape of bucket of Pelton wheel is
A single hemispherical cup or bowl
B double hemispherical cup or bowl
C double spherical cup or bowl
D single spherical cup or bowl

Q Which one of the following is not a main parts of a centrifugal pump

A Impeller
B Casing
C Delivery pipe
D Runner with buckets

Q To produce a high head by multistage centrifugal pump, the impellers are connected

A in parallel
B in series
C in parallel and in series both
D neither series nor parallel

Q Cavitation will take place if the pressure of the flowing fluid at any point is

A more than vapour pressure of the fluid
B equal to vapour pressure of the fluid
C less than vapour pressure of the fluid
D equal to atmospheric pressure of the fluid

Q In order to have cavitation free operation of centrifugal pump, the available NPSH should bethan the required NPSH

A smaller
B greater
C equal
D both smaller & equal

Q If the suction height of the pump is , then vaporization of liquid at inlet of pump will take place and there will be a possibility of cavitation

A equal

- B less
C more
D zero
- Q The pressure of water in any part of the hydraulic system should not be allowed to fall below of water.
A 2.5 m
B 2.4 m
C 2.6 m
D 2.3 m
- Q The important characteristic curve for centrifugal pumps are
A main characteristic curves
B operating characteristic curves
C variable efficiency curves
D both main & operating characteristic curves
- Q Which of the following is NOT a type of positive displacement pumps?
A Reciprocating pump
B Rotary displacement pump
C Centrifugal pump
D gear pump
- Q Reciprocating pumps operate by drawing _____ into the chamber
A Liquid
B Pressure
C Heat
D Electricity
- Q Slip of a reciprocating pump is negative, when
A suction pipe is short and pump is running at low speeds
B delivery pipe is long and pump is running at high speeds
C suction pipe is short and delivery pipe is long and the pump is running at low speeds
D suction pipe is long and delivery pipe is short and the pump is running at high speeds

- Q the work requirement of a reciprocating pump with increase in
A acceleration head
B increases
C decreases
D remains same
- Q A double acting reciprocating pump compared to single acting pump will
A have nearly
B double efficiency
C double head
D double flow
- Q Which of the following statement is correct
A Centrifugal pump converts mechanical energy into hydraulic energy by sucking liquid into chamber
B Reciprocating pumps converts mechanical energy into hydraulic energy by means of centrifugal force
C Centrifugal pumps converts mechanical energy into hydraulic energy by means of centrifugal force
D Reciprocating pumps converts hydraulic energy into mechanical energy
- Q What is the use of Air vessel is used in a reciprocating pump
A Reduction of suction heat
B Rise in delivery head
C Continuous supply of water at uniform rate
D Increase in supply of water
- Q The difference in the total head of the pump is called
A Manometric head
B Euler head
C Pressure head
D Shaft head
- Q Priming is necessary in
A Centrifugal pumps to lift water from a greater depth

- B Centrifugal pumps to remove air in the suction pipe and casing
C Hydraulic turbine to remove air in the turbine casing
D Hydraulic turbine to-increase the speed of turbine and to generate more
- Q During suction stroke of a reciprocating pump, the separation may take place
A at the end of the suction stroke
B in the middle of the suction stroke
C in the beginning of the delivery stroke
D at the end of the delivery stroke
- A centrifugal pump delivers water against a net head of 10 m and the tangential velocity of the impeller at the outlet is 15 m/s. What is the velocity of whirl at the outlet if the manometric efficiency of centrifugal pump is 90 %
Q
A 7.266 m/s
B 6.66 m/s
C 8.66 m/s
D 5.66 m/s
- Q During delivery stroke of a reciprocating pump, the separation may take place
A at the end of the suction stroke
B in the middle of the suction stroke
C in the beginning of the delivery stroke
D at the end of the delivery stroke
- A centrifugal pump delivers water against a net head of 10 m and the velocity of whirl at the outlet is 20 m/s. What is the tangential velocity of the impeller if the manometric efficiency of centrifugal pump is 90 %
Q
A 6.45 m/s
B 4.45 m/s
C 5.45 m/s
D 7.54 m/s

A double acting reciprocating pump running at 40 rpm is discharging 1 cubic meter of water per minute. What is the slip if the theoretical discharge is 0.01675 cubic meter per second

Q

A 0.00006 cubic meter per second

B 0.00007 cubic meter per second

C 0.00008 cubic meter per second

D 0.00009 cubic meter per second