BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Diploma in Electrical Engineering

Course Name – Elements of Mechanical Engineering

Course Code - DEE305

Semester / Year - Semester III

Time allotted : 85 Minutes Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 70=70

1. *(Answer any Seventy)*

(i) The characteristic of a material or a body which is taken to be an indication of change in temperature is known as

a) Thermodynamics property b) Thermostatic property

c) Thermometric property d) none of these

(ii) Clausius statement is related to

a) heat engine operating in a cycle b) heat pump operating in a cycle

c) both heat engine operating in a cycle and heat pump operating in a cycle d) none of these

(iii) Considering relation between Kelvin-Planck and Clausius statement, if one statement between the two is violated then

a) other one may be or may not be violated b) other one is also violated

c) other one must be correct d) none of these

(iv) How are the efficiencies of any heat engine (?) and reversible heat engine (?R) compared, when both are operating between same heat source and same heat sink?

a) ? = ?R b) ? >?R

c) ? <?R d) Cannot say

(v) What is the entropy change (dSiso) of a reversible isolated (dQ=0) process?

a) dSiso = 0
b) dSiso> 0
c) dSiso< 0
d) none of these

(vi) Which condition is correct according to the entropy principle?

a) the entropy of an isolated system
b) the entropy of a system remains constant only when the process is reversible
c) the entropy of a system increases when the process is irreversible
d) all of these

(vii) What is the state, in which saturated liquid line with respect to vaporization and saturated vapor line on p-v diagram of pure substance, meet called?

a) saturation state
b) critical state
c) vaporization state
d) superheated vapor state

(viii) Which is the affecting factor for the fact that turbine work output is more than pump work input in vapor power cycle for the same pressure ratio?

a) specific heat added to the working fluid
b) specific volume of working fluid
c) both specific heat added to the working fluid and specific volume of working fluid
d) none of these

(ix) Which loss does present in actual vapour power cycle at the exit of the boiler and at the entry of the turbine?

a) friction loss
b) constant pressure heat loss
c) both friction loss and constant pressure heat loss
d) none of these

(x) How can we differentiate Rankine cycle from Carnot cycle?

a) Heat addition process of Rankine cycle is reversible isothermal whereas heat addition process of Carnot cycle is reversible
b) Heat addition process of Rankine cycle is reversible isobaric whereas heat addition process of Carnot cycle is reversible

isobaric

isothermal

c) Heat addition process of Rankine cycle is reversible isentropic whereas heat addition process of Carnot cycle is reversible isothermal

d) both cycles are identical except the working fluid used

(xi) What is the relation between efficiencies of Rankine cycle and Carnot cycle for the same pressure ratio?

a) (?Rankine) = (?Carnot)

b) (?Rankine) > (?Carnot)

c) (?Rankine) < (?Carnot)

d) none of these

(xii) How is the efficiency of the SI engine affected by change in specific heat ratio (?) of the working fluid?

a) the efficiency of the engine increases with increase in specific heat ratio (?) of the working fluid

b) the efficiency of the engine decreases with increase in specific heat ratio (?) of the working fluid

c) the efficiency of the engine does not affected by change in specific heat ratio (?) of the working fluid

d) none of these

(xiii) The heat required to melt 1 tone of ice in 12 hours is equivalent to

a) one tone of refrigeration

b) two tone of refrigeration

c) half tone of refrigeration

d) four tone of refrigeration

(xiv) What is the main reason behind sub-cooling of liquid refrigerant at the condenser outlet in vapor compression refrigeration system?

a) to increase the refrigerating effect

b) to reduce the mass of vapor formed during expansion process

c) to reduce vapor bubbles which obstruct the flow of liquid refrigerant

d) all of the above

(xv) Which expansion device is capable of regulating the flow of refrigerant according to the load on the evaporator?

a) capillary tube
b) throttle valve
c) both capillary tube and throttle valve
d) none of these

(xvi) Which compressor is used, when volume flow rate of refrigerant is very large?

a) rotary compressor
b) reciprocating compressor
c) centrifugal compressor
d) none of these

(xvii) A heat pump

a) extracts energy at low temperature heat source
b) gives energy to high temperature heat source
c) both of the mentioned
d) none of the mentioned

(xviii) Which of the following is true for a heat pump and a refrigerator?

a) a refrigerator removes heat to achieve cooling
b) a heat pump supplies heat at high temperature
c) both of the mentioned
d) none of the mentioned

(xix) The ideal gas refrigeration cycle is same as

a) the Brayton cycle
b) reversed Brayton cycle
c) the Rankine cycle
d) reversed Rankine cycle

(xx) Which device maintains a body at a temperature lower than the temperature of the surroundings?

a) PMM1
b) PMM2
c) refrigerator
d) heat pump

(xxi) Coefficient of performance(COP) is defined as

a) heat leakage/work input
b) work input/heat leakage
c) latent heat of condensation/work input
d) work input/latent heat of condensation

(xxii) Which of the following statements are true?

a) a heat pump provides a thermodynamic advantage over direct heating

b) COP for both refrigerator and pump cannot be infinity

c) work input for both refrigerator and pump is greater than zero

d) all of the mentioned

(xxiii) Which device is used for the expansion of refrigerant in vapour compression refrigeration cycle?

a) throttling valve

b) capillary tube

c) either throttling valve or capillary tube

d) none of these

(xxiv) How is the condensation process carried out in vapour compression refrigeration cycle?

a) at constant volume

b) at constant pressure

c) at constant enthalpy

d) all of these

(xxv) In evaporation process of vapour compression refrigeration system

a) heat is rejected from refrigerant to surroundings

b) heat is rejected from surroundings to refrigerant

c) only pressure change takes place

d) none of these

(xxvi) The boiler in which the tubes are surrounded by hot gases is called as

a) fire tube boiler

b) water tube boiler

c) both fire tube boiler and water tube boiler

d) none of these

(xxvii) How is the natural draught produced for exhaust gases?

a) by using fan

b) by using chimney

c) by using gravity

d) none of these

(xxviii) The natural draught in the steam generator depends upon

a) the air condition outside the chimney

b) the temperature of exhaust gases

c) both the air condition outside the chimney and the temperature of exhaust gases

d) none of these

(xxix) Which device used to separate condensate from the steam without letting steam escape?

a) condenser

b) steam valve

c) steam trap

d) none of these

(xxx) What is the pH value of water permissible for boiler?

a) 0

b) 7

c) slightly less than 7

d) slightly more than 7

(xxxi) The mechanical work required to run vapour absorption system

a) is more than the mechanical work required to run vapour compression system

b) is less than the mechanical work requiredto run vapour compression system

c) is similar to the mechanical work required to run vapour compression system

d) cannot say

(xxxii) What is the condition of refrigerant at the exit of evaporator in aqua-ammonia absorption system?

a) low pressure ammonia vapour

b) high pressure ammonia vapour

c) low pressure strong vapour mixture of ammonia and water

d) high pressure strong vapour mixture of ammonia and water

(xxxiii) The reheating of steam in a turbine.....

a) Increases the workdone through the turbine

b) Increases the efficiency of the turbine

c) Reduces wear on the blades

d) All of these

(xxxiv) Da-laval turbines are mostly used.....

a) Where low speeds are required

b) For small power purposes and and low

speeds

c) For small power purposes and and high speeds

d) Foe large power purposes

(xxxv) The degree of reaction is defined as the ratio.....

a) Heat drop in the fixed blades to the heat drop in the moving blades

b) Heat drop in the moving blades to the heat drop in the fixed blades

c) Heat drop in the moving blades to the total heat drop in the fixed blades

d) Heat drop in the fixed blades to the total heat drop in the moving blades

(xxxvi) The maximum efficiency of a Da-Lavel turbine is (where ?= nozzle angle).....

a) Sin2?

b) Cos2?

c) Tan2?

d) Cot2?

(xxxvii) The stage efficiency (?s)is given by (where ?b=blading efficiency and ?n =nozzle efficiency).....

a) ?b/?n

b) ?n/?b

c) ?b?n

d) nx/?b

(xxxviii) Aeroplane’s employee following type of compressor.....

a) Radial flow

b) Axial flow

c) Centrifugal

d) Combination of above

(xxxix) The volume of air delivered by the compressor is called.....

a) Free air delivery

b) Compressor capacity

c) Swept volume

d) None of these

(xl) Ratio of indicated HP and break HP is known as.....

a) Mechanical efficiency

b) Volumetric efficiency

c) Isothermal efficiency

d) Adiabatic efficiency

(xli) The pressure of air at the beginning of the compression stroke is.....atmospheric pressure

a) Equal to
b) Less than
c) More than
d) None of these

(xlii) The main function of nozzle is to _____

a) Varying temperatures
b) Pressure variations
c) Load variations
d) Heat variations

(xliii) Centrifugal pumps transfer energy from _____

a) Rotor to fluid
b) Fluid to rotor
c) Draft to rotor
d) Rotor to draft

(xliv) Centrifugal pumps transport fluids by converting _____

a) Kinetic energy to hydrodynamic energy
b) Hydrodynamic energy to kinetic energy
c) Mechanical energy to kinetic energy
d) Mechanical energy to Hydrodynamic energy

(xlv) The rotational kinetic energy comes from _____

a) Engine motor
b) Pump
c) Tank
d) Draft tube

(xlvi) In a diesel engine, the fuel is injected by.....

a) Spark
b) Injected fuel
c) Ignitor
d) Heat resulting from compression air that is supplied from combustion

(xlvii) Compression ratio of I.C. engine is.....

a) The ratio of volumes of air in cylinder before compression stroke and after compression ratio
b) Volume displaced by piston per stroke and clearance volume in cylinder

c) Ratio of pressure after compression and before compression

d) None of these

(xlviii) A diesel engine has.....

a) One valve

b) Two valve

c) Three valve

d) Four valve

(xlix) In a diesel engine,the fuel is injected by.....

a) Spark

b) Injected fuel

c) Ignitor

d) Heat resulting from compression air that is supplied from combustion

(l) Compression ratio of I.C. engine is.....

a) The ratio of volumes of air in cylinder before compression stroke and after compression ratio

b) Volume displaced by piston per stroke and clearance volume in cylinder

c) Ratio of pressure after compression and before compression

d) None of these

(li) A spark plug gap is kept from...

a) 0.3 to 0.7 mm

b) 0.2 to 0.8 mm

c) 0.4 to 0.9 mm

d) 0.6 to 1.0 mm

(lii) Theoretically correct mixture of air and petrol is ..

a) 0.4173611111111111

b) 0.6256944444444444

c) 0.8340277777777777

d) 1.042361111111111

(liii) If the intake air temperature of I.C. engine increses,its efficicency will.....

a) Increases

b) Decreases

c) Remain same

d) Unpredictable

(liv) An engine indicator is used to detaermine.....

a) Speed
b) m.e.p. and I.H.P.
c) Volume of cylinder
d) Volume of cylinder

(lv) A two stroke cycle engine gives.....the number of power strokes as compared to the four stroke cycle engine,at the same engine speed

a) Half
b) Same
c) Double
d) Four times

(lvi) In a four stroke engine,the working cycle is completed in.....

a) One revolution of the crankshaft
b) Two revolution of the crankshaft
c) Three revolution of the crankshaft
d) Four revolution of the crankshaft

(lvii) Supercharging is the process of.....

a) Providing the forced cooing air
b) Raising exhaust pressure
c) Suppling the intake of an engine with air at a density greater than the density of the surrounding atmosphere
d) Suppling compressed air to remove combustion product fully

(lviii) The thermodynamic cycle in which petrol engine works,is.....

a) Otto cycle
b) Joule cycle
c) Rankine cycle
d) Stirling cycle

(lix) The thermal efficiency of petrol engine is.....

a) 0.15
b) 0.3
c) 0.5
d) 0.7

(lx) The break power of an engine is always.....the indicated power

a) Equal to
b) Less than
c) Greater than
d) None of these

(lxi) If the speed of the engine is increased, the indicated power will.....

a) Increase
b) Decrease
c) Remain same
d) Remain same

(lxii) A standard ice point temperature crossponding to the temperature

a) Water at 0c
b) Ice at -4c
c) Solid and dry
d) Mixture of icc and water under equilibrium condition

(lxiii) Vapour compression refrigeration is some what like

a) Carnot cycle
b) Rankine cycle
c) Reverse carnot cycle
d) None of these

(lxiv) The boiling point of ammonia

a) -100c
b) -50c
c) -33.3c
d) Oc

(lxv) The refrigeration for a refrigerator should have

a) High sensible heat
b) High total heat
c) High total heat
d) Low latent heat

(lxvi) Rating of a domestic refrigerator is of the order of

a) 0.1 ton
b) 5 ton
c) 10ton
d) 40ton

(lxvii) Refrigeration in aeroplanes usually emplos the following

a) Co2
b) Feron-11
c) Feron-12
d) air

(lxviii) Air refrigeration operation on

a) Carnot cycle
b) Reverse cycle

c) Erricson cycle
d) Bray ton cycle

(lxix) The higher temperature in vapour compression cycle occurs at

a) Receiver
b) Expansion valve
c) evaporator
d) Compression discharge

(lxx) In a refrigeration system , heat absorbed in comparion to heat

a) More
b) less
c) same
d) None of these