Subject: POWER ENGINEERING & REFRIGERATION (22562)

SYLLABUS

Chapter No.	Name of chapter	Marks With Option
1	Internal Combustion Engine	16
2	Testing of IC engines and Emission Control	30
3	Air Compressor	22
4	Gas Turbine and Jet Propulsion	12
5	Refrigeration and Air Conditioning	22
	Total Marks :-	102

BOARD THEORY PAPER PATTERN FOR PER (22562)

Q.1		**Attempt any FIVE 5*2=10**
	a)	Internal Combustion Engine
	b)	Refrigeration and Air Conditioning
	c)	Testing of IC engines and Emission Control
	d)	Air Compressor
	e)	Gas Turbine and Jet Propulsion
	f)	Gas Turbine and Jet Propulsion
	g)	Internal Combustion Engine
Q.2		**Attempt any THREE3*4=12**
	a)	Internal Combustion Engine
	b)	Testing of IC engines and Emission Control
	c)	Air Compressor
	d)	Gas Turbine and Jet Propulsion
Q.3		**Attempt any THREE 3*4=12**
	a)	Testing of IC engines and Emission Control
	b)	Testing of IC engines and Emission Control
	c)	Refrigeration and Air Conditioning
	d)	Internal Combustion Engine
Q.4		**Attempt any THREE 3*4=12**
	a)	Testing of IC engines and Emission Control
	b)	Internal Combustion Engine
	c)	Refrigeration and Air Conditioning
	d)	Air Compressor
	e)	Gas Turbine and Jet Propulsion
Q.5		**Attempt any TWO 2*6=12**
	a)	Testing of IC engines and Emission Control
	b)	Air Compressor
	c)	Refrigeration and Air Conditioning
Q.6		**Attempt any TWO2*6=12**
	a)	Testing of IC engines and Emission Control
	b)	Air Compressor
	c)	Refrigeration and Air Conditioning

CLASS TEST - I
PAPER PATTERN

COURSE: - POWER ENGINEERING & REFRIGERATION (22562)

PROGRAMME: -Mechanical Engineering

Syllabus: -

Unit No.	Name of the Unit	Course Outcome (CO)
1	**Internal Combustion Engine**	**CO-337.01**
2	**Testing of IC Engine and Emission Control**	**CO-337.02& CO-337.03**

Q.1	**Attempt any FOUR 4*2=8Marks**	**Course Outcome (CO)**
a)	Internal Combustion Engine	CO-562.01
b)	Testing of IC Engine and Emission Control	CO-562.02
c)	Testing of IC Engine and Emission Control	CO-562.02
d)	Internal Combustion Engine	CO-562.01
e)	Testing of IC Engine and Emission Control	CO-562.03
Q.2	**Attempt any THREE3*4= 12Marks**	
a)	Internal Combustion Engine	CO-562.01
b)	Testing of IC Engine and Emission Control	CO-562.02
c)	Testing of IC Engine and Emission Control	CO-562.03
d)	Testing of IC Engine and Emission Control	CO-562.03

CLASS TEST - II
PAPER PATTERN

COURSE: - POWER ENGINEERING & REFRIGERATION (22562)

PROGRAMME: -Mechanical Engineering

Syllabus: -

Unit No.	Name of the Unit	Course Outcome(CO)
3	Air Compressor	CO-562.04
4	Gas Turbine and Jet Propulsion	CO-562.05
5	Refrigeration and Air Conditioning	CO-562.06

Q.1	Attempt any FOUR 4*2= 8Marks	Course Outcome (CO)
a)	Air Compressor	CO-562.04
b)	Air Compressor	CO-562.04
c)	Gas Turbine and Jet Propulsion	CO-562.05
d)	Gas Turbine and Jet Propulsion	CO-562.05
e)	Refrigeration and Air Conditioning	CO-562.06
Q.2	**Attempt any THREE3*4= 12Marks**	
a)	Air Compressor	CO-562.04
b)	Air Compressor	CO-562.04
c)	Gas Turbine and Jet Propulsion	CO-562.05
d)	Refrigeration and Air Conditioning	CO-562.06

COURSE OUTCOME (CO)

COURSE:-Power Engineering and Refrigeration (22562)

PROGRAMME: - Mechanical Engineering

CO.NO	Course Outcome
CO-562.1	Identify different components of IC engines.
CO-562.2	Study Engine Auxiliaries.
CO-562.3	Test the Performance of IC engine.
CO-562.4	Maintain Reciprocating air Compressor.
CO-562.5	Identify different components of gas turbines and Jet engines.
CO-562.6	Test the performance of Refrigeration and Air-conditioning system.

1. Internal Combustion Engines.

Position in Question Paper **Total Marks-16**

Q.1. a) 2-Marks.
Q.1. d) 2-Marks.
Q.2. a) 4-Marks.
Q.3. b) 4-Marks.
Q.3. d) 4-Marks.

Descriptive Questions

1. Name the Diagnostic Tools used for fault finding of MPFI Engine.
2. Differentiate between Two Stroke and Four Stroke I. C .Engine
3. State the purpose of Piezoelectric injector.
4. Draw the labeled Valve Timing Diagram of typical 4- stroke Diesel Engine.
5. State the any two advantages of 'Turbo Charging'.
6. Draw P-V and T-S diagram of Carnot cycle. Name the processes involved in it.
7. Represent P-V & T-S diagram for dual cycle & name the processes involved in it.
8. Classify I.C. engines on the basis of
   a) Method of cooling
   b) Method of igniting fuel
   c) Use
   d) Number of stroke
9. State the need of scavenging. Draw neat sketch of cross flow scavenging.
10. What is preignition ? State any four factors responsible for preignition.
11. Explain working of 4-stroke C.I. engine with neat sketch.
12. Explain combustion phenomenon in C.I. engine.
13. Differentiate between L-MPFI and D-MPFI system.
14. What are the effects of detonation in IC engine ?
15. Enlist the additives of lubricant used in SI engine and state their advantages.
16. State the effect of supercharging on S.I. engine with respect to following parameters :
    a) Detonation

b) Combustion
c) Fuel economy
d) Quality of fuel

17. Explain battery ignition in SI engine.
18. Explain four strokes of SI engine.
19. List advantages of MPFI engine.

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold**

1. The working cycle in case of four stroke engine is completed in following number of revolutions of crankshaft

(a) 1/2
(c) 2
(b) 1
(d) 4

2. In a diesel engine, the fuel is ignited by

(a) spark
(c) heat resulting from compressing air
(b) **injected fuel**
(d) ignition

3. Scavenging air in diesel engine means

(a) air used for combustion sent under pressure
(b) forced air for cooling cylinder
(c) burnt air containing products ofcombustion
(d) forcing burnt gases out of engine

4. Supercharging is the process of

(a) supplying intake of an engine withair
(b) providing forced cooling air
(c) injecting excess fuel for raising more
(d) supplying compressed air to remove

5. Does the supply of scavenging air at a density greater than that of atmosphere mean engine is supercharged ?

(a) yes
(c) to some extent
(b) no
(d) unpredictable

6. The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called

(a) net efficiency
(c) relative efficiency
(b) efficiency ratio
(d) overall efficiency

7. Compression ratio of LC. engines is

(a) the ratio of volumes of air in cylinder before compression stroke and after compression stroke
(b) volume displaced by piston per stroke and
(c) ratio of pressure after compression
(d) swept volume/cylinder volume

8. The air standard efficiency of an Otto cycle compared to diesel cycle for the given compression ratio is

(a) same
(b) less
(c) more
(d) more or less depending on power rating

9. The calorific value of gaseous fuels is expressed in terms of

(a) kcal
(c) kcal/m2
(b) kcal/kg
(d) kcal/n?

11. If the intake air temperature of I.C. engine increases, its efficiency will

(a) increase
(c) remain same
(b) decrease
(d) unpredictable

12. All heat engines utilize

(a) low heat value of oil
(c) net claorific value of oil
(b) high heat value of oil
(d) calorific value of fuel

13. An engine indicator is used to determine the following

(a) speed
(c) volume of cylinder
(b) temperature
(d) m.e.p. and I.H.P.

14. Fuel oil consumption guarantees for I .C.engine are usually based on

(a) low heat value of oil
(c) net calorific value of oil
(b) high heat value of oil
(d) calorific value of fuel

17. If the compression ratio of an engine working on Otto cycle is increased from 5 to 7, the %age increase in efficiency will be

(a) 2%
(c) 8%
(b) 4%
(d) 14%

18. In case of gas turbines, the gaseous fuel consumption guarantees are based on

(a) high heat value
(c) net calorific value
(b) low heat value
(d) middle heat value

19. In a typical medium speed 4-stroke cycle diesel engine the inlet valve

(a) opens at 20° before top dead center and closes at 35° after the bottom dead center

(b) opens at top dead center and closes at bottom dead center

c) opens at 10° after top dead center and closes 20° before the bottom dead center

(d) may open or close anywhere

20. The pressure and temperature at the end of compression stroke in a petrol engine are of the order of

(a) 4 – 6 kg/cm2 and 200 – 250°C
(c) 12 – 20 kg/cm2 and 350 – 450°C
(b) 6 – 12 kg/cm2 and 250 – 350°C
(d) 20 – 30 kg/cm2 and 450 – 500°C

21. The pressure at the end of compression in the case of diesel engine is of the order of

(a) 6 kg/cm
(c) 20 kg/cmz
(b) 35 kg/cm
(d) 27.5 kg/cmz

22. The maximum temperature in the I.C. engine cylinder is of the order of

(a) 500- 1000°C
(c) 1500-2000°C
(b) 1000- 1500°C
(d) 2000-2500°C

23. The thermal efficiecny of a diesel cycle having fixed compression ratio, with increase in cut-off ratio

(a) increase
(b) decrease
(c) be independent
(d) may increase or decrease depending on

25. Combustion in compression ignition engines is

(a) homogeneous
(c) both (a) and (b)
(b) heterogeneous
(d) laminar

26. The fuel in diesel engine is normally injected at pressure of

(a) 5-10 kg/cm2
(c) 60-80 kg/cm2
(b) 20-25 kg/cm2
(d) 90-130 kg/cm2

27. The specific fuel consumption per BHP hour for diesel engine is approximately

(a) 0.15 kg
(c) 0.25 kg
(b) 0.2 kg
(d) 0.3 kg

28. The temperature of interior surface of cylinder wall in normal operation is not allowed to exceed

(a) 80°C
(c) 180°C
(b) 120°C
(d) 240°C

30. Crankcase explosion in I.C. engines usuall occurs as

(a) first a mild explosion followed by a bi explosion
(b) first a big explosion followed by a mil explosion
(c) both mild and big explosions occi simultaneously
(d) never occurs

31. Compression loss in I.C engines occurs duto

(a) leaking piston rings
(c) clogged air-inlet slots
(b) use of thick head gasket
(d) all of the above.

32. The specific fuel consumption per BH hour for a petrol engine is approximately

(a) 0.15 kg
(c) 0.25 kg
(b) 0.2 kg
(d) 0.3kg

33. The air requirement of a petrol engine during starting compared to theoretical airequired for complete combustion is

(a) more
(c) same
(b) loss
(d) may be more or less

34. The inlet value of a four stroke cycle I.C engine remains open for nearly

(a) 180°
(c) 235°
(b) 125°
(d) 200°

35. Which of the following is not an interns combustion engine

(a) 2-stroke petrol engine
(c) steam turbine.
(b) 4-stroke petrol engine
(d) gas turbine

37. If one cylinder of a diesel engine receives more fuel than the others, then for that cylinder the

(a) exhaust will be smoky
(b) piston rings would stick into piston
(c) exhaust temperature will be high
(d) scavenging occur

38. The output of a diesel engine can be increased without increasing the engine revolution or size in following way

(a) feeding more fuel
(c) heating incoming air
(b) increasing flywheel size
(d) supercharging.

39. It the temperature of intake air in IC engines is lowered, then its efficiency will

(a) increase (c) remain same

(b) decrease (d) increase upto certain limit

40. In a typical medium speed 4-stroke cycle diesel engine

(a) compression starts at 35° after bottom dead center and ends at top dead center

(b) compression starts at bottom dead center and ends at top dead center

(c) compression starts at 10° before bottom dead center and, ends just before top dead center

(d) may start and end anywhere

41. For the same compression ratio

(a) Otto cycle is more efficient than the Diesel

(b) Diesel cycle is more efficient' than Otto

(c) both Otto and Diesel cycles are, equally

(d) compression ratio has nothing to do with efficiency

42. The precess of breaking up or a lipuid into fine droplets by spraying is called

(a) vaporisation (c) ionisation

(b) atomisation. (d) injection

43. As a result of detonation in an I.C. engine, following parameter attains very high value

(a) peak pressure (c) rate of rise of temperature

(b) rate of rise of pressure (d) peak temperature

44. Which of the following statements is correct?

(a) All the irreversible engines have same efficiency

(b) All the reversible engines have same efficiency

(c) Both Rankine and Caront cycles have same efficiency between same temperature limits

(d) All reversible engines working between same temperature limits have same-efficiency

45. Most high speed compression engines operate on

(a) Diesel cycle
(c) Dual combustion cycle
(b) Otto cycle
(d) Special type of air cycle

48. The accunmulation of carbon in a cylinder results in increase of

(a) clearance volume
(c) ignition time
(b) volumetric efficiency
(d) effective compression ratio

49. Which of the following medium is compressed in a Diesel engine cylinder

(a) air alone
(c) air and lub oil
(b) air and fuel
(d) fuel alone

2.Testing of IC Engines and Emission Control.

Position in Question Paper **Total Marks-16**

Q.1. c) 2-Marks.
Q.2. b) 4-Marks.
Q.4. d) 4-Marks.
Q.5. a) 6-Marks.

Descriptive Question

1. State the function of catalytic converter and explain three way catalytic converter with neat sketch.
2. Name the different components of I C Engine.
3. Define term- BSFC
4. State the effect of I C engine pollution on Environment.
5. Explain term ECU.
6. List the Methods of reducing Pollution in diesel engine as per BS6 .
7. State the effect of 'Air-Fuel Ratio' on exhaust emission.
8. List the pollutant generated from I.C. engine. State any four effects of pollutants on environment.
9. Dawlabelled diagram of battery ignition system used in S.I. engine.
10. Define following terms related to I.C. engine :
    a) Cut off ratio
    b) BSFC
    c) Mean effective pressure
    d) Thermal efficiency
11. Explain motoring test to determine frictional power of engine.
12. List any six additives in lubricant and their advantages used for I.C. Engine.
13. Define the terms for IC engine :
    a) Mechanical efficiency b) Indicated power
14. Define following terms w.r.t. compressor :
    a)Pressure ratio b) Swept volume
15. Explain with neat sketch working of non-dispersive infra red (NDIR) gas analyser.

16. Following observations were recorded during a trial on single cylinder four stroke oilengine :
    Cylinder bore = 15 cm
    Length of stroke = 25 cm
    Mean effective pressure = 7.35 bar
    Engine speed = 400 rpm
    Brake torque = 225 N.m.
    Fuel consumption = 3 kg/hr
    Calorific value of fuel = 44200 kJ/kg
    Determine
    a) Mechanical efficiency
    b) Brake thermal efficiency
    c) Brake specific fuel consumption
17. An IC engine uses 6 kg of fuel per hour having CV of 43,000 kJ/kg.
    The brake power developed is 21 kW.
    The temperature rise of cooling water is 23˚C.
    Rate of water flow is 11 kg/min.
    The temperature rise of exhaust gas is 250˚C
    Rate of flow of exhaust gases is 4.6 kg/min
    specific heat of water 4.187 kJ/kg K
    specific heat of exhaust gas are 1 kJ/kg K
    Prepare heat balance sheet on minute basis.
18. The following data is collected during a trial of four cylinder petrol engine.
    B.P. with all cylinder working = 15.8 kW
    B.P. with cylinder No. 1 cutoff = 11.14 kW
    B.P. with cylinder No. 2 cutoff = 11.2 kW
    B.P. with cylinder No. 3 cutoff = 11.36 kW
    B.P. with cylinder No. 4 cutoff = 11.3 kW
    Find mechanical efficiency of engine.
19. A four stroke petrol engine develops 5kW at 2000 R.P.M. When its mean effective pressure is 7.5 bar. If for the engine, L = 1.25 D, find its dimensions.

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold.**

1. The reason for supercharging in any engine is to

(a) increase efficiency

(b) increase power

(c) reduce weight and bulk for a given out-put

(d) effect fuel economy

2. The operation of forcing additional air under pressure in the engine cylinder is known as

(a) scavenging **(c) supercharging**

(b) turbulence (d) pre-ignition

3. Supercharging is essential in

(a) diesel engines (c) petrol engines

(b) gas turbines **(d) aircraft engine**

4. The minimum cranking speed in case of petrol engine is about

(a) half the operating speed (c) 250-300 rpm

(b) one-fourth of operating speed **(d) 60-80 rpm**

5. In a typical medium speed 4 stroke cycle diesel engine

(a) exhaust valve opens at 35° before bot-tomn dead center and closes at 20° after top dead center

(b) exhaust valve opens at bottom ‘dead center and closes at top dead center

(c) exhaust valve opens just after bottom dead center and closes just before top dead center

(d) may open and close anywhere

6. Flash point of fuel oil is

(a) minimum temperature to which1 oil is heated in order to give off inflammable vapours in sufficient quantity to ignite momentarily when brought in contact with a flame

(b) temperature at which it solidifies

(c) temperature at which it catches fire without external aid

(d) indicated by 90% distillation temperature, i.e. when 90% of sample oil has distilled off

7. The mean effective pressure obtained from engine indicator indicates the

(a) maximum pressure developed (c) instantaneous pressure at any instant

(b) minimum pressure **(d) Average pressure**

8. For the same power developed in I.C. engines, the cheaper system is

(a) naturally aspirated
(c) centrifugal pump
(b) supercharged
(d) turbo charger

9. Installation of supercharger on a four-cycle diesel engine can result in the following percentage increase in power

(a) upto 25%
(c) upto 50%
b) upto 100%
(d) upto 75%

9. Scavenging is usually done to increase

(a) thermal efficiency
(c) power output
(b) speed
(d) fuel consumption

10. Which of the following is the lightest and most volatile liquid fuel

(a) diesel
(c) fuel oil
(b) kerosene
(d) gasoline

12. The theoretically correct air fuel ratio for petrol engine is of the order of

(a) 6 : 1
(c) 12 : 1
(b) 9 : 1
(d) 15 : 1

13. Air fuel ratio for idling speed of a petrol engine is approximately

(a) 1 : 1
(c) 10:1
(b) 5 : 1
(d) 15 : 1

14. Air fuel ratio at which a petrol engine can not work is

(a) 8 : 1
(c) 15 : 1
(b) 10 : 1
(d) 20 : 1 and less

15. For maximum power generation, the air fuel ratio for a petrol engine for vehicles, is of the order of

(a) 9 : 1
(c) 15 : 1
(b) 12 : 1
(d) 18 : 1

16. The following volume of air is required for consuming 1 liter of fuel by a four stroke engine

(a) 1 m3
(b) 5 m3
(c) 5-6 m3
(d) 9-10 m3

17. Pour point of fuel oil is the

(a) minimum temperature to which oil is heated in order to give off inflammable vapours in sufficient quantity to ignite momentarily when brought in contact with a flame

(b) temperature at which it solidifies or congeals

(c) it catches fire without external aid

(d) indicated by 90% distillation temperature i.e., when 90% of sample oil has distilled off

18. A 5 BHP engine running at full load would consume diesel of the order of

(a) 0.3 kg/hr
(c) 3 kg/hr
(b) 1 kg/hr
(d) 5 kg/hr

19. Diesel engine can work on very lean air fuel ratio of the order of 30 : 1. A petrol engine can also work on such a lean ratio provided

(a) it is properly designed
(c) can not work as it is impossible
(b) best quality fuel is used
(d) flywheel size is proper

20. A diesel engine has

(a) 1 valve
(b) 3 valves
(b) 2 valves
(d) 4 valves

21. A hmh flame speed is obtained in diesel engine when air fuel ratio is

(a) uniform throughout the mixture
(c) about 3-5% rich mixture
(b) chemically correct mixture
(d) about 10% rich mixture

22. The knock in diesel engine occurs due to

(a) instantaneous and rapid burning of the first part of the charge

(b) instantaneous atuo iginition of last part of charge

(c) delayed burning of the first part of the charge

(d) reduction of delay period

23. The air-fuel ratio in petrol engines-is controlled by

(a) controlling valve opening/closing
(c) injection
(b) governing
(d) carburettion

24. Volatility of diesel fuel oil is

(a) minimum temperature to which oil is heated in order to give off inflammable vapours in sufficient quantity to
(b) temperature at which it solidifies
(c) it catches fire without external aid
(d) indicated by 90% distillation temperature, i.e., when 90% of sample oil has distilled off

25. Which is more viscous lub oil

(a) SEA 30
(c) SAE 80
(b) SAE 40
(d) SAE 70

26. In the opposed piston diesel engine, the combustion chamber is located

(a) above the piston & below the piston
(b) no where
(c) between the pistons
(d) any where

27. A stoichiometric air-fuel ratio is

(a) chemically correct mixture
(c) rich mixture for idling
(b) lean mixture
(d) rich mixture for over loads

28. In a naturally aspirated diesel engine, the air is supplied by

(a) a supercharger
(c) a vacuum chamber
(b) a centrifugal blower
(d) an injection tube

29. In loop scavenging, the top of the piston is

(a) flat
(c) slanted
(b) contoured
(d) depressed

30. In the crankcase method of scavenging, the air pressure is produced by

(a) supercharger
(c) natural aspirator
(b) centrifugal pump
(d) movement of engine piston

31. The air-fuel ratio of the petrol engine is controlled by

(a) fuel pump
(c) injector
(b) governor
(d) carburettor

32. In a typical medium speed, 4-stroke cycle diesel engine

(a) fuelinjection starts at 10° before to dead center and ends at 20° after tor dead center

(b) fuel injection starts at top dead center and ends at 20° after top dead center

(c) fuel injection starts at just before top dead center and ends just after top deac center

(d) may start and end anywhere

33. Diesel fuel, compared to petrol is

(a) less difficult to ignite
(c) more difficult to ignite
(b) just about the same difficult to ignite
(d) highly ignitable

34. In diesel engine the diesel fuel injected into cylinder would burn instantly at about compressed air temperature of

(a) 250°C
(c) 1000°C
(b) 500°C
(d) 150CPC

35. When crude oil is heated, then which of the following hydrocarbon is given off first.

(a) kerosene
(c) paraffin
(b) natural gas.
(d) diesel

36. The rating of a diesel engine, with increase in air intlet temperature, will

(a) increase linearly
(c) increase parabolically
(b) decrease linearly
(d) decrease parabolically

37. A 75 cc engine has following parameter as 75 cc

(a) fuel tank capacity
(c) swept volume
(b) lub oil capacity
(d) cylinder volume

38. A heat engine utilises the

(a) calorific value of oil
(c) high heat value of oil
(b) low heat value of
(d) mean heat value of oil

39. Gaseous-fuel guarantees are based on

(a) calorific value of oil
(c) high heat value of oil
(b) low heat value of oil
(d) mean heat value of oil

40. Fuel consumption of diesef engines is not guaranteed at one quarter load because at such low loads

(a) the friction is high
water
(b) the friction is unpredictable
(d) the engine is rarely operated
(c) the small difference in cooling

41. Polymerisation is a chemical process in which molecules of a compound become

(a) larger
(c) smaller
(b) slowed down
(d) liquid

42. The term scavenging is generally associated with

(a) 2-stroke cycle engines
(c) aeroplane engines
(b) 4-stroke cycle engines
(d) high efficiency engines.

43. In diesel engine, the compression ratio in comparison to expansion ratio is

(a) same
(c) more
(b) less
(d) variable

44. The cam shaft of a four stroke I.C. engine running at 1500 rmp will run at

(a) 1500 rpm
(d) any value independent of engine speed
(b) 750 rpm
(c) 3000 rpm

45. Engine pistons ‘are usually made of aluminium alloy because it

(a) is lighter
(c) absorbs shocks
(b) wears less
(d) is stronger

46. Most high speed compression engines operate on

(a) Otto cycle
(c) Dual cycle
(b) Diesel cycle
(d) Carnot cycle

47. The specific fuel consumption of a petrol engine compared to diesel engine of same H.P. is

(a) same
(b) more
(c) less
(d) less or more depending on operating conditions

48. A diesel engine as compared to petrol engine (both running ar rated load) is

(a) more efficient
(b) less efficient
(c) equally efficient
(d) unperdictable

49. The size of inlet valve of.an engine in comparison to exhaust valve is

(a) more
(b) less
(c) same
(d) more/less depending on capacity of engine

50. In a cycle, the spark lasts roughly for

(a) 1 sec
(b) 0.1 sec
(c) 0.01 sec
(d) 0.001 sec

3. Air Compressor

Position in Question Paper **Total Marks-14**

Q.1. d) 2-Marks.
Q.2. d) 4-Marks.
Q.3. a) 4-Marks.
Q.4. c) 4-Marks.
Q.5. b) 6-Marks.

Descriptive Question

1. Classify air compressor.
2. List different types of Rotary Compressor
3. Explain the working of 'Lobe type Air Compressor' with neat sketch.
4. Enlist any eight uses of compressed air.
5. Differentiate on any eight point between reciprocating and rotary compressor.
6. State any four advantages of multistaging of compressor.
7. State the methods to improve efficiency of air compressor. Explain two stage air compressor with perfect intercooling.
8. Explain with neat sketch working of screw compressor.
9. Define the term "Compressor capacity'.
10. Explain the effect of clearance volume on multi stage Air compressor without intercooling by using P V diagram.
11. State the methods to improve efficiency of air compressor. Explain working of Two stage air compressor with perfect intercooling with the help of P-V diagram.
12. Explain term- FAD w.r.t Air compressor
13. A single stage reciprocating air compressor has swept volume of 2000 cm3and runs at 600 rpm. It operates on pressure ratio of 8 and clearance 5% of swept volume.Assume NTP room condition at inlet (P = 101.3kPa, T = 15°C) and polytropic compression and expansion with n = 1.25 calculate :
    a) Indicated power
    b) volumetric efficiency
    c) Mass flow rate
    d) Isothermal efficiency.

14. A single stage reciprocating air compressor has swept volume of 2000 cm3 and runs at 600 rpm. It operates on pressure ratio of 8 and clearance 5% of swept volume. Assume NTP room condition at inlet (P = 101.3 kPa, T = 15 degree C) and polytropic compression and expansion with h = 1.25
calculate :
    a) Indicated power
    b) Volumetric efficiency
    c) Mass flow rate
    d) Isothermal efficiency

MCQ Question

(Total number of Question=Marks*3=14*3=42)

Note: Correct answer is marked with **bold**

1. Free air is the air at

(a) atmospheric conditions at any specific location

(b) 20°C and 1 kg/cm2 and relative humidity of 36%

(c) 0°C and standard atmospheric conditions

(d) 15°C and 1 kg/cm2

2. Standard air is the air at

(a) atmospheric conditions at any specificmlocation

(b) 20°C and 1 kg/cm2 and relative humiditynb 36%

(c) 0°C and standard atmospheric conditions

(d) 15°C and 1 kg/cm2

3. 1 m of air at atmospheric condition weighs approximately

(a) 0.5 kg **(c) 1.3 kg**

(b) 1.0 kg (d) 2.2 kg

4. Adiabatic compression is one in which

(a) temperature during compression remains constant

(b) no heat leaves or enters the compressor cylinder during cornpression

(c) temperature rise follows a linear relationship

(d) work done is maximum

5. The capacity of a compressor is 5 m /mih.5 m /min refers to

(a) standard air

(c) compressed air

(b) free air

(d) compressed air at delivery pressure

6. The overall isothermal eiffciency of compressor is defined as the ratio of

(a) isothermal h.p. to the BHP of motor

(b) isothermal h.p. to adiabatic h.p.

(c) power to drive compressor to isothermal h.p.

(d) work to compress air isothermally to work for actual compression

7. The- most efficient method of compressing air is to compress it

(a) isothermally

(c) isentropically

(b) adiabatically

(d) isochronically

8. Maximum work is done in compressing air when the compression is

(a) isothermal

(c) polytropic

(b) adiabatic

(d) any one of the above

9. The pressure and temperature conditions of air at the suction of compressor are

(a) atmospheric

(b) slightly more than atmospheric

(c) slightly less than atmospheric

(d) pressure sightly less than atmospheric and temperature slightly more than atmospheric

10. Isothermal compression effeicency can be attained by running the compressor

(a) at very high speed

(c) at average speed

(b) at very slow speed

(d) at zero speed

11. The compressor capacity with decrease in suction temperature

(a) increases

(b) decreases

(c) remains unaffected

(d) may increase or decrease depending on compressor capacity

12. Isothermal compression efficiency, even when running at high speed, can be approached by using

(a) multi-stage compression
(c) both (a) and (b) above
(b) cold water spray
(d) fully insulating the cylinder

13. Compression efficiency is compared against

(a) ideal compression
compression
(b) adiabatic compression
(d) isothermal compression
(c) botii isothermal and adiabatic

14. Aeroplanes employ following type of compressor

(a) radial flow
(c) centrifugal
(b) axial flow
(d) combination of above

15. Inter cooling in compressors

(a) cools the delivered air
(b) results in saving of power in compressing a given volume to given pressure
(c) is the standard practice for big compressors
(d) enables compression in two stages

16. An ideal air compressor cycle without clearance on p-v diagram can be represented by following processes

(a) one adiabatic, two isobaric, and one constant volume
(b) two adiabatic and two isobaric
(c) two adiabatic, one isobaric and oneconstant volume
(d) one adiabatic, one isobaric and two constant volume

17. An ideal air compressor cycle with clearance on p-v diagram can be represented by following processes

(a) one adiabatic, two isobaric, and one constant volume
(b) two adiabatic and two isobaric
(c) two adiabatic, one isobaric and one constant volume,

(d) one adiabatic, one isobaric and two constant volume

18. What will be the volume of air at 327°C if its volume at 27°C is 1.5 m3/mt

(a) 3 m3/mt .
(c) 18 m3/mt'
(b) 1.5 m3/mt
(d) 6 m3/mt

19. The work done per unit mass of air in compression will'be least when n is equal to

(a) 1
(c) 1.3
(b) 1.2 ,
(d) 1.4

20. Isothermal compression though most efficient, but is not -practicable because

(a) it requires very big cylinder
(b) it does not increase pressure much
(c) it is impossible in practice
(d) compressor has to run at very slow speed to achieve it

21. Ratio of indicated H.P. and brake H.P. is known as

(a) mechanical efficiency
(c) isothermal efficiency
(b) volumetric efficiency
(d) adiabatic efficiency

22. The ratio of work doen per cycle to the swept volume in case of compressor is called

(a) compression index
(c) compressor efficiency
(b) compression ratio
(d) mean effective pressure

23. Cylinder clearance in a compressor should be

(a) as large as possible
(c) about 50% of swept volume
(b) as small as possible
(d) about 100% of swept volume

24. Ratio of compression is the ratio of

(a) gauge discharge pressure to the gauge intake pressure
(b) absolute discharge pressure to the ab-solute intake pressure
(c) pressures at discharge and suction cor-responding to same temperature
(d) stroke volume and clearance volume

25. Clearance volume in actual reciprocating compressors is essential

(a) to accommedate Valves in the cylinder head
(b) to provide cushioning effect

(c) to attain high volumetric efficiency

(d) to provide cushioning effect and also to avoid mechanical bang of piston with cylinder head.

26. The net work input required for compressor with increase in clearance volume

(a) increases

(b) decreases

(c) remains same

(d) increases/decreases depending on com-pressor capacity

27. Ratio of indicated h.p. to shaft h.p. in known as

(a) compressor efficiency

(b) isothermal efficiency

(c) volumetric efficiency

(d) mechanical efficiency

28. Volumetric efficiency is

(a) the ratio of stroke volume to clearance volume

(b) the ratio of the air actually delivered to the amount of piston displacement

(c) reciprocal of compression ratio

(d) index of compressor performance

29. Volumetric efficiency of air compressors is of the order of

(a) 20-30%

(b) 40-50%

(c) 60-70%

(d) 70-90%

30. Volumetric efficiency of a compressor with clearance volume

(a) increases with increase in compression ratio

(b) decreases with increase in compression ratio

(c) in not dependent upon compression ratio

(d) may increase/decrease depending on compressor capacity

31. Volumetric efficiency of a compressor without clearance volume

(a) increases with increase in compression ratio

(b) decreases with increase in compression ratio

(c) is not dependent upon compressin ratio

(d) may increase/decrease depending on compressor capacity

32. The clearance volume of the air compressor is kept minimum because

(a) it allows maximum compression to be achieved

(b) it greatly affects volumetric efficiency

(c) it results in minimum work

(d) it permits isothermal compression

33. Euler's equation is applicable for

(a) centrifugal compressor

(b) axial compressor

(c) pumps

(d) all of the above

34. Out of the following, from where you will prefer to take intake for air compressor

(a) from an air conditioned room maintained at 20°C

(b) from outside atmosphere at 1°C

(c) from coal yard side

(d) from a side where cooling tower is located nearby

35. Mining industry usually employs following motive power

(a) A.C. electric motor

(b) compressed air

(c) petrol engine

(d) diesel engine

36. Which is false statement about air receivers

(a) These are used to dampen pulsations ,

(b) These act as reservoir to- take care of sudden demands

(c) These increase compressor efficiency

(d) These knock out some oil and moisture

37. An air receiver is to be placed outside. Should it be placed in

(a) sun

(b) shade

(c) rain

(d) enclosed room

48. Which is false statement about multistage compression .

(a) Power consumption per unit of air delivered is low

(b) Volumetric efficiency is high

(c) It is best suited for compression ratios naround 7:1

(d) The moisture in air is condensed in the intercooler

49. In multistage compressor, the isothermal compression is achieved by

(a) employing intercooler

(b) by constantly cooling the cylinder

(c) by running compressor at very slow speed

(d) by insulating the cylinder

40. Reciprocating air compressor is best suited for

(a) large quantity of air at high pressure

(b) small quantity of air at high pressure

(c) small quantity of air at low pressure

(d) large quantity of air at low pressure

41. Rotary compressor is best suited for

(a) large quantity of air at high pressure

(b) small quantity of air at high pressure

(c) small quantity of air at low pressure

(d) large quantity of air at low pressure

42. The capacity of compressor will be highest when its intake temperature is

(a) lowest

(b) highest

(c) anything.

(d) atmospheric

43. After-cooler is used to

(a) cool the air

(b) decrease the delivery temperature for ease in handling

(c) cause moisture and oil vapour to drop out

(d) reduce volume

44. To aviod moisture troubles, the compressed air main line should

(a) rise gradually towards the point of use

(b) drop gradually towards the point of use

(c) be laid vertically

(d) be laid exactly horizontally

4 . Gas Turbines and Jet Propulsion.

Position in Question Paper **Total Marks-08**

Q.1. g) 2-Marks.
Q.1. f) 2-Marks.
Q.3. b) 4-Marks.
Q.4. a) 4-Marks.

Descriptive Question

1. Name the essential components used in Gas turbine.
2. List the applications of Gas Turbine
3. Represent Brayton Cycle on P- V and T- S diagram.
4. List the different Solid Propellant used in Rocket engine.
5. State any four applications of gas turbine.
6. Explain with neat sketch working of turbojet engine. How it differs fromturboprop engine
   in construction & working.
7. Explain constant pressure open cycle gas turbine with regeneration andintercooling.
8. Explain with neat sketch working principle of Turbo Jet Engine.
9. Differentiate between open cycle and closed cycle gas turbine.
10. Explain with neat sketch working principle of Ram jet engine.
11. Explain with neat sketch construction and working of constant volume gas turbine.
12. State different methods for improving thermal efficiency of gas turbine and explain
    regeneration method along with P-V and T-S diagram.
13. Explain the working of 'Turbo Prop' with neat sketch.
14. List the methods to improve thermal efficiency of gas turbine and explain any one of them in detail.

MCQ Question

(Total number of Question=Marks*3=08*3=24)

Note: Correct answer is marked with **bold.**

1. Gas turbine works on

(a) Brayton or Atkinson cycle (c) Rankine cycle

(b) Carnot cycle (d) Erricsson cycle

2. The work ratio of simple gas turbine cycle depends on

(a) pressure ratio (c) minimum cycle temperature

(b) maximum cycle temperature **(d) all of the above**

3. The pressure ratio for an open cycle gas turbine compared to closed cycle gas turbine of same h.p. is

(a) low

(b) high

(c) same

(d) low/high depending on make and type

4. Open cycle gas turbine works on

(a) Brayton or Atkinson cycle (c) Carnot cycle

(6) Rankine cycle (d) Erricsson cycle

5. The fuel consumption in gas turbines is accounted for by

(a) low.er heating value (c) heating value

(b) higher heating value (d) higher calorific value

6. Gas turbines for power generaion are normally used

(a) to supply base load requirements

(b) to supply peak load requirements

(c) to enable start thermal power plant

(d) in emergency

7. Mechanical efficiency of gas turbines as compared to I.C engines is

(a) higher (c) same

(b) lower (d) depends on on odier considerations

8. The ratio of specific weighf/h.p. of gas turbin and I.C engines may be typically of the order of

(a) 1 : 6
(c) 4 : 1
(b) 2 : 1
(d) 1:2

9. The thermal efficiency of a gas turbine as compared to a diesel plant is
(a) same
(c) less
(b) more
(d) depends on other factors

10. The air-fuel ratio in gas turbines is of the order of
(a) 7 : 1
(c) 30 : 1
(b) 15 : 1
(d) 50 : 1

11. The pressure ratio in gas turbines is of the order of
(a),2:l
(c) 61: 1
(b)4:1
(d) 9 : 1

12. The hottest point in a gas turbine is
(a) at the base
(c) in the center
(b) at the tip
(d) between ~ to i of the blade height

13. The following is true for an open cycle gas turbine having exhaust heat exchanger. Atmospheric air before entering the compressor is
(a) heated
(b) compressed air before entering the combustion chamber is heated
(c) bled gas from turbine is heated and readmitted for complete expansion
(d) exhaust gases drive the compressor

14. Gas turbine blades are given a rake
(a) equal to zero
(b) in the direction of motion of blades
(c) opposite to the direction of motion of
(d) depending on the velocity

15. Efficiency of gas turbine is increased by
(a) reheating
(c) adding a regenerator
(b) inter cooling
(d) all of the above

16. Temperature of gases at end of compression as compared to exhaust gases in a gas turbine is

(a) higher
(c) equal
(b) lower
(d) can't be compare

17. The ideal efficiency of simple gas turbine cycle depends on

(a) pressure ratio
(c) minimum cycle temperature
(b) maximum cycle temperature
(d) all of the above

18. The thermal efficiency of a simple gas turbine for a given turbine inlet temperature with increase in pressure ratio

(a) increases
(c) first increases and then decreases
(b) decreases
(d) first decreases and then increases

19. Gas turbines use following type of air compressor

(a) centrifugal type
(c) lobe type
(b) reciprocating type
(d) axial flow type

20. As the turbine inlet temperature increases, the thermal efficiency of gas turbine for the optimum pressure ratio

(a) increases
(c) remains same
(b) decreases
(d) first increases and then decreases

21. There is a certain pressure ratio (optimum) for a gas turbine at which its thermal efficiency is maximum. With increase in turbine temperature, the value of pressure ratio for the peak efficiency would

(a) remain same
(c) increase
(b) decrease
(d) unpredictable

22. The material commonly used for air craft gas turbine is

a) stainless steel
(c) duralumin
(b) high alloy' steel
(d) Timken, Haste and Inconel allpys

22. It is not possible to use closed gas turbine cycle in aeronautical engines because

(a) it is inefficient

(b) it is bulky

(c) it requires cooling water for its operation

(d) it is heavy

23. The combustion efficiency of a gas turbine using perfect combustion chamber is of the order of

(a) 50%

(b) 75%

(c) 85%

(d) 99

24. The maximum combustion pressure in gas turbine as compared to I.C. engine is

(a) more

(b) less

(c) same

(d) depends on other factors

25. For an irreversible gas turbine cycle, the efficiency and work ratio both depend on

(a) pressure ratio alone

(b) maximum cycle temperature alone

(c) minimum cycle temperature alone

(d) both pressure ratio and maximum cycle temperature

5. Refrigeration and Air Conditioning

Position in Question Paper **Total Marks-12**

Q.1. c) 2-Marks.
Q.1. d) 2-Marks.
Q.4. c) 4-Marks.
Q.5. c) 6-Marks.
Q.6. c) 6-Marks.

Descriptive Question

1. State the Unit of Refrigeration.
2. Define – Comfort Air conditioning.
3. State the significance of Psychometric Chart.
4. Name different Psychometrics Processes
5. Explain the concept of following terms with respect to refrigerants
    a) GWP
    b) ODP
6. Explain with neat sketch the working of Household Refrigerator.
7. Explain following psychometric processes and represent it on Psychometrics chart :
    a) Sensible heating
    b) Sensible cooling
    c) Humidification
    d) Heating with humidification
8. State the function of (i) Drier, (ii) Oil separator in vapour compression cycle.
9. Explain with neat sketch working of vapour compression refrigeration cycle. Also draw the cycle on P-V and T-S diagram.
10. State the function of following components in simple vapour absorption refrigeration system :
    a) Generator
    b) Absorber
    c) Pump
    d) Pressure reducing valve

11. Define the term Air Conditioning. Classify various air conditioning systems.
12. Differentiate vapour compression and vapour absorption refrigeration system.
13. Define the following terms :
    a) DBT
    b) WBT
    c) DPT
    d) Relative humidity
14. Explain with neat sketch construction and working of ICE plant.
15. Enlist the four effects of subcooling on performance of VCC refrigeration cycle.
16. Draw neat sketch of window air conditioner and name the parts.
17. A simple saturation vapour compression cycle using R-12 is designed for 10 TRcapacity. The vapour is dry saturated at the start of compression. For the 268° Kevaporator temperature and 308° K condenser temperature, Represent process onP-H and T-S diagram.
    Find:
    a) Mass flow rate of refrigerant
    b) Power required in kW.
    c) C.O.P.
    Given enthalpy values:
    a) at the start of compression = 185 kJ/kg
    b) at the end of compression = 206 kJ/kg
    c) at the start of expansion = 70 kJ/kg
18. The air is at 24 ˚C DBT and40 % Relative humidity.With the help of psychrometric chart find following properties of air with units and plot the same on psychrometric chart.
    a) Dew point temperature (ii) Wet bulb temperature
    b) SP volume of air (iv) Enthalpy of air (v) SP humidity of air
19. A refrigeration system works on vapour compression cycle. Enthalpies at various points are given below.
    Compressor inlet – 1460 kJ/kg.
    Compressor outlet – 1796 kJ/kg.
    Inlet to expansion valve – 322 kJ/kg.
    Calculate:
    a) COP
    b) Power required for 1 kg of refrigerant circulated per min.

MCQ Question

(Total number of Question=Marks*3=16*3=48)

Note: Correct answer is marked with **bold.**

1. Pick up the wrong statement. A refrigerant shouldhave
   (a) Tow specific heat of liquid
   (b) **high boiling point**
   (c) high latent heat of vaporization
   (d) higher critical temperature
2. Which of the following cycles uses air as therefrigerant
   (a) Ericsson
   (b) Stirling
   (c) Carnot
   (d) **Bell-coleman**
3. Ammonia-absorption refrigeration cyclerequires
   (a) very little work input
   (b) maximum work input
   (c) nearly same work input
   (d) zero work input
4. An important characteristic of absorption system of refrigerationis
   (a) noisyoperation
   (b) quietoperation
   (c) cooling below 0°C
   (d) very little power consumption
5. .The relative coefficient of performance is
   (a) actual COP/fheoretical COP
   (b) theoretical COP/actual COP
   (c) actual COP x theoretical COP
   (d) 1-actual COP x theoretical COP
6. Clapeyron equation is a relation between
   (a) temperature, pressure and enthalpy
   (b) specific volume and enthalpy

(c) temperature and enthalpy

(d) temperature, pressure, and specil volume

7. In vapour compression cycle, the condition of refrigerant is very wetvapour

(a) after passing through thecondenser

(b) before passing through thecondenser

(c) after passing through the expansion

(d) before entering the expansion valve

8.One ton refrigeratiqn correspondsto

(a) cal/min

(b) kcal/kr

(c) 80 kcal/min

(d) 80 kcal/hr

9.In S.J. unit, one ton of refrigeration is equalto

(a) 210 kJ/min

(b) 21 kJ/min

(c) 420kJ/min

(d) 840kJ/min

10.The vapour compression refrigerator employs the followingcycie

(a) Rankine

(b) **Reversed Carnot**

(c) Reversed Rankine

(d) Brayton

11.Allowable pressure on high-pressure side or ammonia absorption system is of the orderof

(a) atmospheric pressure

(b) slightly above atmospheric pressure

(c) 2-4 bars

(d) 5-6 bars

12.The moisture in a refrigerant is removedby

(a) Evaporator

(b) safety relief valve

(c) dehumidifier

(d) driers

13.The condensing pressure due to the presence of non-condensable gases, as compared to that actually required for condensing temperatures without non-condensablegases,

(a) will be higher

(b) will be lower

(c) will remain unaffected (d) may be higher or lower

14.Critical pressure of a liquid is thepressure

(a) above which liquid will remainliquid

(b) above which liquid becomes gas

(c) above which liquid becomes vapour

(d) above which liquid becomes solid

15.Critical temperature is' the temperature abovewhich

(a) a gas will never liquefy

(b) a gas will immediately liquefy

(c) water will evaporate

(d) water will never evaporate

16.The refrigerant for a refrigerator shouldhave

(a) high sensible heat **(c) high latentheat**

(b) high total heat (d) low latentheat

17.Rating of a domestic refrigerator is of the orderof

(a) 0.1 ton (c) 10tons

(b) 5 tons (d) 40tons

18.The COP of a domesticrefrigerator

(a) is less than 1 (c) is equal to 1

(b) is more than 1 (d) depends upon the make

19.The domestic refrigerator uses following type ofcompressor

(a) centrifugal (c) miniature sealed unit

(b) axial **(d) piston type reciprocating**

20.Presence of moisture in a refrigerant affects the workingof

(a) compressor (c) evaparator

(b) condenser **(d) expansion valve.**

21.Refrigeration in aeroplanes usually employs the followingrefrigerant

(a) Co2 (b) Freon-11

(c) Freon-22 **(d) Air**

22.Domestic refrigerator working on vapour compression cycle uses the following type of expansiondevice

(a) electrically operated throttling valve

(b) manually operated valve

(c) thermostatic valve

(d) capillary tube

23.Air refrigeration operates on

(a) Carnot cycle (c) Rankinecycle

(b) Reversed Carnot cycle (d) Erricsoncycle

24.Air refrigeration cycle is used in

(a) domestic refrigerators (c) air conditioning

(b) commercial refrigerators **(d) gas liquefaction**

25.In a vapour compression cycle, the refrigerant immediately after expansion valveis

(a) liquid (c) saturated liquid

(b) sub-cooled liquid **(d) wet vapour**

26.The vapour pressure of refrigerant shouldbe

(a) lower than atmospheric pressure

(b) higher than atmospheric pressure

(c) equal to atmospheric pressure

(d) could be anything

27.For better COP of refrigerator ,the pressure range corresponding to temperature ein evaporator and condenser must be

(a) Small **(c) euqal**

(b) high (d) anything

28.The bank of tubes at the back of domestic refrigerator are

(a) condenser tubes (b) evaporator tubes

(c) refrigerant cooling tubes (d) capillary tubes

29.The higher temperature in vapour compression cycle occurs at

(a) receiver (c) evaporator

(b) expansion valve **(d) condenser discharge**

30.Highest temperature encountered in refrigeration cycle should be

(a) near critical temperature of refrigerant

(b) above critical temperature

(c) at critical. temperature

(d) much below critical temperature

31.In refrigerator, liquid receiver is required between condenser and flow controlling device, if quantity of refrigerant for system is

(a) less than 2 kg

(b) more than or equal to 3.65kg

(c) more than 10 kg

(d) there is no such consideration

32.Absorption system normally uses the followingrefrigerant

(a) Freon-11

(b) Freon-22

(c) C02

(d) S02

33.One of the purposes of sub-cooling the liquid refrigerant isto

(a) reduce compressor overheating

(b) reduce compressor dischargetemperature

(c) increase cooling effect

(d) ensure that only liquid and not the vapour enters the expansion (throttling)valve

34.The value of COP in vapour compression cycle isusually

(a) always less than unity **(b) always more than unity**

(c) equal to unity (d) any one of the above

35.In a refrigeration system, heat absorbed in comparison to heat rejectedis

(a) more

(b) less

(c) same

(d) more for small capacity and less for highcapacity

36.Condensing temperature in a refrigerator is thetemperature

(a) of cooling medium

(b) of freezing zone

(c) of evaporator

(d) at which refrigerant gas becomesliquid

37.Formation of frost on evaporator inrefrigerator

(a) results in loss of heat due to poor heattransfer

(b) increases heat transfer rate

(c) is immaterial

(d) can be avoided by proper design

38.Inrefrigerators,thetemperaturedifferencebetweentheevaporatingrefrigerantandthe mediumbeingcooledshouldbe

(a) high, of the order of 25°

(b) as low as possible (3 to11°C)

(c) zero

(d) any value

39.In a flooded evaporator refrigerator, an accumulator at suction of compressor is usedto

(a) collect liquid refrigerant and prevent it from going tocompressor

(b) detect liquid in vapour

(c) superheat the vapour

(d) collect vapours

40. Accumulators should have adequate volume to store refrigerant charge atleast

(a) 10%
(c) 50%
(b) 25%
(d) 75%

41. At lower temperatures and pressures, the latent heat of vaporisation of arefrigerant

(a) decreases
(c) remains same
(b) increases
(d) depends on other factors

42. A refrigeration cycle operates between condenser temperature of + 27°C and evaporator temperature of- 23°C. The Cannot coefficient of performance of cycle willbe

(a) 0.2
(c) 5
(b) 1.2
(d) 6

43. Which of the following is not a desirable property of arefrigerant

(a) high triiscibility with oil
(b) low boiling point
(c) good electrical conductor
(d) large latent heat

44. In vapour compression refrigeration system, refrigerant occurs as liquidbetween

(a) condenser and expansion valve
(b) compressor and evaporator
(c) expansion valve andevaporator
(d) compressor and condenser

45. Pick up the correct statement about giving up of heat from one medium to other in ammonia absorption system

(a) strong solution to weaksolution
(b) weak solution to strongsolution
(c) strong solution to ammonia vapour
(d) ammonia vapour to weak solution

46.Efficiency of a Cornot engine is given as 80%. If the- cycle direction be reversed, what will be the value of COP of reversed Carnot cycle

(a) 0.25

(b) 0.50

(c) 0.75

(d) 1.0

47.Highest pressure encountered in a refrigeration system shouldbe

(a) critical pressure of refrigerant

(b) much below criticalpressure

(c) much above criticalpressure

(d) near critical pressure

48.If a heat pump cycle operates between the condenser temperature of +27°C and evaporator temperature of - 23°C, then the Carnot COP will be

(a) 0.2

(b) 1.2

(c) 5

(d) 6

49.A certain refrigerating system has a normal operating suction pressure of 10 kg/cm gauge and condensing pressure of about 67 kg/cm. The refrigerant usedis

(a) Ammonia

(b) Carbon dioxide

(c) Freon

(d) Brine

50.Aqua ammonia is used as refrigerant in the following type of refrigerationsystem

(a) compression

(b) direct

(c) indirect

(d) absorption