Time: 3 Hours **Maximum marks: 75**

Q.1	**Choose the correct option and write answer along with option code**		**20 M**
Sr No	**Questions**		**Options**
1.	Vessels that contain flammable or combustible vapours or pressurized gas can be cause of following Hazard	a.	Ergonomic Hazard
		b.	Explosion Hazard
		c.	Biological Hazard
		d.	Psychological Hazard
2.	Application of air circulation is	a.	Material handling
		b.	Repairing
		c.	Personal protection
		d.	Burning
3.	Most of the non-renewable energy comes from	a.	Sun
		b.	fossil fuels
		c.	Biomass
		d.	Geothermal
4.	As per PHA ranking, when failure results in major injury or death of personnel. The severity of the event is	a.	Catastrophic
		b.	Critical
		c.	Major
		d.	Minor
5.	Manufacturing and component preparation shall meet Grade ----- conditions of clean room air.	a.	C
		b.	B
		c.	A
		d.	D
6.	Which **Relief system** in Preventive and Protective management of Fires & explosion makes use of electrostatic attraction?	a.	Scrubbers
		b.	Sprinklers
		c.	Passivation
		d.	Fire walls

7.	Secondary pollutants are those which are produced in the atmosphere when _____ reactions take place among primary pollutants.	a.	Physical
		b.	Chemical
		c.	Biological
		d.	Analytical
8.	The minimum temperature at which a liquid gives off enough vapor to ignite in presence of an ignition source is known as	a.	Flash point
		b.	Boiling point
		c.	Ceiling vapor point
		d.	TLV
9.	___ system needed where high velocity suppression is necessary to prevent fire spread.	a.	Dry
		b.	Wet
		c.	Pre-action
		d.	Deluge
10.	How is COD calculated?	a.	Waste water is oxidised chemically using bromine in acid solutions
		b.	Waste water is oxidised chemically using sodium in acid solutions
		c.	Waste water is oxidised chemically using dichromate in acid solutions
		d.	Waste water is oxidised chemically using potassium in acid solutions
11.	What is FMEA	a.	Fast mode and effect analysis
		b.	Front mode and effect analysis
		c.	False mode and effect analysis
		d.	Failure mode and Effect Analysis
12.	The aspect of air conditioning that is responsible for replenishing stale indoor air with outside air is	a.	Heating
		b.	Ventilation
		c.	Air circulation
		d.	Cooling
13.	Which of the following is listed under asphyxiant gas?	a.	Oxygen
		b.	Breathing air
		c.	Air
		d.	Nitrogen

14.	Absolute exposure limit value for a chemical that should not be exceeded at any time	a.	TLV-TWA
		b.	TLV-STEL
		c.	TLV-C
		d.	TLV-B
15.	Following type of fires involve ordinary combustible materials like paper, wood and fabrics, rubber	a.	Fire A
		b.	Fire B
		c.	Fire C
		d.	Fire D
16.	Probability of the event that might occur X Severity of the event if it occurs =	a.	Hazard
		b.	Risk
		c.	Accident
		d.	Mistake
17.	What are the three groups of the biotic factors of Ecosystem?	a.	Consumer, Water, and Producer
		b.	Decomposer, Consumer, and Rocks
		c.	Producer, Decomposer, and Consumer
		d.	Weather, Consumer, and Decomposer
18.	Isolating people from hazard is which type of control?	a.	Engineering control
		b.	PPE
		c.	Administrative control
		d.	Substitution
19.	According to WHMIS classification, Class E Chemical Hazard is due to	a.	Compressed gas
		b.	Pyrophosphoric material
		c.	Corrosive material
		d.	Flammable gas
20.	The quality effluent is produced by ------ treatment can be used for irrigation purpose	a.	Primary
		b.	Secondary
		c.	Tertiary
		d.	Pretreatment

Q.2.**Solve <u>any two</u> from the following three Questions** **20 M**

i.a. Give the schematic representation of an HVAC system. List the components of the HVAC system and explain significance

i.b. What is PHA? Give main steps involved in PHA. Comment on general components of PHA worksheet.

ii. a. Write flow chart for ETP (Effluent treatment plant)? Explain following terms with reference to Physicochemical measurements of effluents, i) BOD ii) COD

ii.b. Define Risk. Give overview of quality risk management process as per ICH Q9 guidelines.

iii.a. Explain Management of over-Exposure to chemicals and elaborate on TLV concept

iii. b. Match the following

	Hazard		Harm Caused
a	Benzene	i	Bronchitis
b	Asbestos	ii	Fire & explosion
c	Electricity	iii	Mesothelioma
d	Wet floor	iv	electrocution
e	Conc. H_2SO_4	v	Leukemia
f	Sodium metal	vi	Slips, falls

Q.3 **Solve <u>any seven</u> from the following** **35M**

i Discuss clean room concept, classification and note on air flow patterns practiced in pharma industry

ii Write a note on hazards caused by organic solvents

iii Write a note on Fire & Explosion hazard management (FEHM) with an emphasis on stages of FEHM Process by schematic flow diagram

iv Define Deforestation. What are the chief effects of Deforestation?

v Write short Note on different types of Fire extinguishers.

vi What is meant by fire triangle? Explain how the knowledge about this helps in prevention of fire.

vii What are different techniques to control Chemical Hazards

viii Enlist different Energy resources and Explain problem associated with Energy resources

ix Match the following

	Severity		Impact
a	Negligible	i	Single fatality or permanent total disability or major occupational illness.
b	Marginal	ii	Multiple fatalities from an incident or Occupational chronic illness leading to Death.
c	Critical	iii	Major injury or health effects, irreversible health damage without loss of life
d	Severe	iv	Slight injury or health effects
e	Catastrophic	v	Minor injury or health effects-affecting work performance, reversible health Effects

****