UNIT-II
Conveyance System

Part – A

1.What are the two important types of conduit depending upon characteristics of flow? (NOVDEC 2010)
(i) Gravity conduits (ii) Pressure conduits

2.What are the different pipe materials which are used for water conveyance? (NOVDEC 2010)
Cast iron, wrought iron, galvanized iron, steel, cement concrete, asbestos, plastic, lead, copper, wood

3.What are the advantages expected in using pressure conduits instead of gravity conduits? (NOVDEC 2011)
o Pressure conduits may be constructed at any elevation of hydraulic gradient
o Location, construction and maintenance are easy and costs low
o Direct route connections are possible
o Pipes for low and high pressure can be designed economically

4.What is meant by pipe appurtenances and mention their role? (NOVDEC 2011)
Pipe appurtenances are components attached in pipe line which aid in proper functioning of pipe network.
Role of appurtenances are ceasing, controlling, diversion and regulating flows through the pipe network.
Appurtenances are valves, tees, bends, crosses etc.

5.Enlist the factors controlling the choice of materials for water conduits? (APRMAY 2011), (NOVDEC 2012)
o Chemical characteristics of water and degree of resistance to acid, base, solvents.
o Resistance to scour and flow (friction coefficient).
o External forces and internal pressures.
o Soil conditions.
o Type of backfill
o Useful life
o Strength and water tightness of joints and effective control of infiltration and inflow.
o Availability in diameter, length, and ease of installation.
o Cast of construction and maintenance.

6.Mention the situation in which pumps will be connected in (a) series (b) parallel (APRMAY 2011)
(a) Pumps in series
oWhen high head is required for water supply
oWhen the area of water supply is steep sloped or undulated
oWhen the intake is located at low lying area
(b) Pumps in parallel
o When more quantity of discharge is required
o To have a spare pumping system when one pump is under repair
o When water supply area is relatively flat

7.What is the loss head in a C.I transmission main 300mm in diameter and 2km in length with C=100, when it carries a flow of 10m^3/min? (NOVDEC 2012)

Hazen Williams's formula:
$H_l = KQ^{1.85}$ $K = \dfrac{10.62L}{C^{1.85} D^{4.87}}$ K = 1491.3308, H_l = 105,587.14 m

8.Brief the function of intake structure? (MayJun2012), (APRMAY 2015)
o The main function of intakes is to provide highest quality of water from source.
o To protect pipes and pumps from damaging or clogging by wave action, floating bodies and
  submerged aquatic lives
o To help in safely withdrawing water from the source over predetermined pool levels and then to
  discharge this water into the withdrawal conduit
o Intake should be operated with less cost and maintenance

9.Write down the formula to find out head loss caused by pipe friction? (MayJun2012)
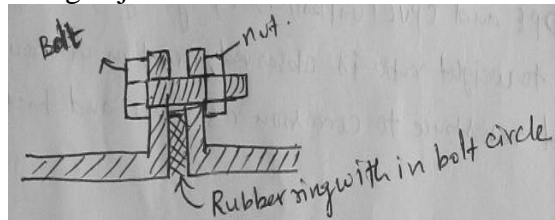Hazen Williams's formula:
$$H_l = KQ^{1.85} \quad K = \frac{10.62L}{C^{1.85} D^{4.87}}$$
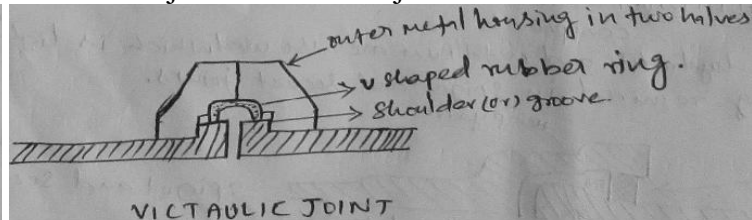
Darcy's formula:
$$H_l = \frac{KLQ^2}{D^5} \quad K = \frac{16f}{2g\pi^2}$$

10.Any two line diagrams of joints in pipe lines? (NOVDEC 2013)
Flanged joint   Mechanical joint or Victaulic joint

11.What is the difference between system curve and pump curve? (NOVDEC 2013)

System Head Curve	Pump Head Curve
The system head curve is the sum of the static head and the friction losses that have to be overcome in order to pump liquid into the process.	The pump curve describes the relation between flow rate and head for the actual pump.
The static head does not vary with the flow rate and it is only function of elevation or back pressure against which the pump is operating	Increasing the impeller diameter or speed increases the head and flow rate capacity

12. What are the types of intake according to their position? (MAYJUN 2013)
   • Submerged Intake
   • Exposed Intake

13. How will you calculate total head in the design of pumps for water supply schemes? (MAYJUN 2013)
To calculate head accurately we must calculate the total head on both the suction and discharge sides of the pump along with friction head and surface pressure head
System head = total discharge head - total suction head
H = hd - hs
The total discharge head is made from three separate heads:
hd = hsd + hpd + hfd
   • hd = total discharge head
   • hsd = discharge static head
   • hpd = discharge surface pressure head
   • hfd = discharge friction head

The total suction head also consists of three separate heads
hs = hss + hps - hfs

- hs = total suction head
- hss = suction static head
- hps = suction surface pressure head
- hfs = suction friction head

14.Enlist the external forces acting on water transmission main if the pipe is laid under heavy traffic? (NOVDEC 2014)
Internal pressure, vertical earth load, surface live loads, surface impact loads, thermal expansion and movement at pipe bends

15.What is meant by economic diameter of pumping main? (NOVDEC 2014)
Large diameter of pumping main increases investment cost, smaller diameter increases operation, maintenance cost and head loss. For optimum conditions diameter of pipe selected and pumping cost should make total annual expenses minimum. Selection of such diameter of the pipe is called as economical diameter of the pumping main. $D = 0.97$ to $1.22\sqrt{Q}$, D = Diameter, Q = Discharge

16.What is an intake? (MAYJUN 2014)
The intake or intake works comprises of a structure placed in a surface water source to permit the withdrawl of water from the source and then to discharge into an intake conduit through which it will flow into the water works system.

17.What are the properties of ductile iron pipe? (MAYJUN 2014)
o Ductile Iron is a high tensile strength, corrosion resistant material
o The pipe is manufactured using centrifugal casting in metal or resin lined moulds
o Contains carbon 3.2 to 3.6%
o To resist corrosion internal and external linings with cement, bonded zinc, and ashpalt are provided
o Life span of 100 plus years

18.List out any two appurtenances in water conveyance system? (APRMAY 2015)
Sluice valves or gate valves, Air relief valves, Reflux valves, Relief valves, Altitude valves, Scour valves, Tee joints, crosses and blow-off chambers