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| LESSON PLAN OF 4TH SEMESTER(2016-19) CIVIL ENGINEERING |
| Discipline :-CIVIL  | Semester:-4TH  | Name of the Teaching Faculty:- P B DEPTI RANAJN  |
| Subject:-WATER SUPPLY & WASTE WATER ENGINEERING | No of Days/per Week Class Allotted :-04 | Semester From:- **02ND JAN,2019** To:- **15TH APRIL, 2019** No of Weeks:- **14** |
| **Week** | **Class Day** | **Theory/ Practical Topics** |
| 1st | 1st | INTRODUCTION: 1.1 Necessity of treated water supply 1.2 Historical development |
| 2nd | 2.0 QUANTITY OF WATER 2.1 Water requirements for different uses 2.2 Per capita demand |
| 3rd | variation in demand and factors affecting demand 2.3 Methods of forecasting population, Numerical problems using different methods  |
| 4th | SOURCES OF WATER ; 3.1 Surface sources 3.2 Underground sources 3.3 Yield from well |
| 2nd | 1st | 3.4 Sinking of wells 3.5 Sanitary protection of wells and maintenance of well 3.6 Well pumps – type, selection, installation |
| 2nd | CONVEYANCE OF WATER : 4.1 Intakes – types, description of river intake, reservoir intake, canal intake 4.2 Pumps for conveyance & distribution – types, selection, installation, most economic diameter of pumping main |
| 3rd | 4.3 Pipe materials – necessity, suitability, merits & demerits of each type, selection of pipe material 4.4 Pipe joints – necessity, types of joints, suitability, methods of jointing |
| 4th | 4.5 Laying of pipes – method, testing 4.6 Pipe corrosion – cause and remedies |
| 3rd | 1st | 5 QUALITY OF WATER : 5.1 Impurities in water – organic and inorganic, classification 5.2 Harmful effects of impurities |
| 2nd | 5.3 Analysis of water – sampling and tests for physical, chemical and bacteriological quality, significance of tests 5.4 Water quality standards for different uses |
| 3rd | 6 TREATMENT OF WATER 6.1 Flow diagram of conventional water treatment system 6.2 Treatment process / units |
| 4th | 6.2 Treatment process / units : 6.2.1 Aeration ; Necessity, types of aerators, essential features 6.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks – types, essential features, operation & maintenance 6.2.3 Sedimentation with coagulation: |
| 4th | 1st | 6.2.4 Filtration : Necessity, principles, types of filters 6.2.5 Disinfection : Necessity, methods of disinfection, types of chemical disinfectants, criterion for ideal disinfectants |
| 2nd | 6.2.6 Miscellaneous treatment methods 6.3 Chemicals required in various treatment units, their uses and feeding devices 6.4 Determination of dosage of chemical requirement for coagulation, chlorination, |
| 3rd | 7 DISTRIBUTION SYSTEM : 7.3 General requirements, types of distribution system-gravity, direct and combined 7.1 Methods of supply – intermittent and continuous 7.2 Maintenance of required |
| 4th | 7.3 Storage – necessity, types – underground, ground level, overhead reservoirs, suitability, accessories 7.4 Distribution system layout – types, comparison, suitability 7.5 Loss and wastage – cause, detection, remedial measure |
| 5th | 1st | 8 APPURTENANCE IN DISTRIBUTION SYSTEM : 8.1 Valves-types, features, uses, purpose-sluice valves, check valves, air 04 valves, scour valves |
| 2nd | 8.2 Fire hydrants 8.3 Water meters – types, uses, fixing |
| 3rd | 9 W/S PLUMBING IN BUILDING : 9.1 Method of connection from water mains to building supply 9.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code |
|  | 4th  | 9.3 Water supply fittings-features, uses, purpose, fixing and jointing 9.4 Hot water supply – Electric water supply, Solar water heater features, fittings and fixing |
| 6th  | 1st | B:SANITARY ENGINEERING 10 10 INTRODUCTION 10.1 Aims and objectives of sanitary engineering |
| 2nd | 11 QUANTITY OF SEWAGE : 11.1 Quantity of sanitary sewage 11.2 Computation of size of sewer, application of Chazy’s formula, Limiting velocities of flow : self-cleaning and scouring |
| 3rd | 12 SEWARAGE SYSTEM : 12.1 Types of system 12.2 Shapes of sewer 12.3 Sewer materials |
| 4th | 13 SEWER APPURTENANCES ; 13.1 Manholes and Lamp holes – types, features, location, function, construction 13.2 Inlets, Grease & oil trap – features, location, function, construction |
| 7th  | 1st | **13.3 Storm regulator, inverted siphon - features, location, function, construction 13.4 Sewage Pumping – necessity, ejectors, location, components of pumping station, types of pumps and selection.**  |
| 2nd | 14 SEWAGE CHARACTERSTICS : 14.1 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological |
| 3rd | 14.2 Analysis of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD, Nitrogen |
| 4th | 14.3 Significance of parameters 14.4 Bacteriology of sewage-decomposition cycles of sewage – aerobic & an- aerobic – C, N, S cycle  |
| 8th  | 1st | **15 SEWAGE DISPOSAL : 15.1 Disposal on land** |
| 2nd | 15.2 Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream |
| 3rd | 16 SEWAGE TREATMENT 16.1 Principles of treatment, flow diagram of conventional treatment 16.2 Primary treatment |
| 4th | 16.3 Secondary treatment  |
| 9th  | 1st | 16.4 Sludge disposal |
| 2nd | sludge digestion - necessity, principles, essential features, operation, construction of sludge digesters |
| 3rd | disposal of digested sludge 16.5 Isolated treatment units – features, principles |
| 4th | operation, construction, maintenance of septic tank and soak pit/soak trench |
| 10th  | 1st |  design of septic tank according to I.S. code; oxidation pond – principles & essential features |
| 2nd | 17 SANITARY PLUMBING FOR BUILDING : |
| 3rd | 17.1 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage |
| 4th | 17.2 Plumbing arrangement of single storied & multi storied building as per I.S. code practice |
| 11th  | 1st | 17.3 Sanitary fixtures – features, function, and maintenance and fixing of the fixtures |
| 2nd | water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe |
| 3rd | Inspection, testing |
| 4th | maintenance of sanitary fixtures |
| 12th  | 1st | 18 RURAL WATER SUPPLY & SANITATION |
| 2nd | 18.1 Spring water source  |
| 3rd | development, sanitary protection, Maintenance |
| 4th | 18.2 Roof top rain water harvesting |
| 13th  | 1st | techniques, elementary |
| 2nd | **Treatment, storage, maintenance**  |
| 3rd | 18.3 Single pit & two pit latrine |
| 4th | **18.3 Single pit & two pit latrine** |
| 14th  | 1st | features, construction, Maintenance, disposal of sludge  |
| 2nd | DOUBT CLEARING CLASSES |
| 3rd | DOUBT CLEARING CLASSES |
| 4th | PREVIOUS YEAR QUESTION DISCUSSION |
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