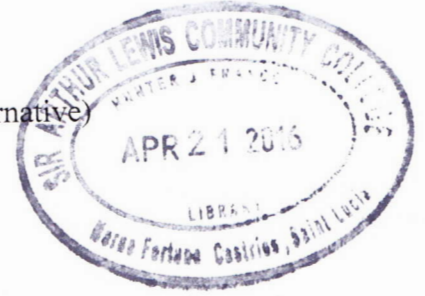


EXIMINATION SESSION : May 2015 Final Examination (Alternative)
TUTOR(S) :
PROGRAMME TITLE : Architectural Technology
PROGRAMME CODE(S) : 3BD-ART-AD
COURSE TITLE : Building Services
COURSE CODE(S) : BLT 109
CLASS (ES) : Year 2
DATE :
TIME :
DURATION : 3 hrs
ROOM :
INVIGILATOR(S) :



#B38

INSTRUCTIONS:

This paper contains a hundred (100) multiple choice questions. Students are required to answer **all** questions.

- Commence each answer on a new page
- Please number your responses accurately.
- Students are advised to use a pen to write this examination.
- Write your ID Number on *each* answer sheet.
- All cell phones must be turned off during the examination.
- **Note:** Bags, books as well as writing paper not given by the invigilator should be deposited at the front of the examination room or as otherwise indicated.
- Students must sign **IN** and **OUT** on the examination class list.

Building Services

BLT 109

Multiple Choice Final Examinations

Ques. 1.

A 'separate' system of drainage is where?

- W.C and bath wastes run separately to the R. W pipes.
- House has its own separate disposal arrangement for waste
- Separate drainage pipes are used for each fitting
- Rainwater and foul water travel in separate pipes.

Ques. 2.

The fall on a drain should be such that the effluent is cleared away. This action is called?

- Mean water level
- Self pipe alignment
- Self cleaning velocity
- Mean efficiency gradient

Use the question below and answer the questions from 3 through 7, select the correct answer. Each question has ONLY one correct answer.

A drawing office measures 45m x 16m x 4.5 m requires a service illuminance of (find in table provided) on drawing boards which are set 1 m above the floor. The 80 W tubular florescent lamp chosen have a luminous efficacy of 85lm/W. They are to be mounted on the ceiling in luminaries which have a DLOR of 55%. The room reflectance is 0.5 for the ceiling and 0.3 for the walls the initial light loss factor is 0.9.

Ques. 3.

From table determine the illuminance (lux) for the drawing office.

- 500 lux
- 100lux
- 750 lux
- 200lux

Ques. 4.

Determine the spacing of the luminaries (H_m) where the height of the tables is 1.5m.

- 5m
- 2.5m
- 3m
- 0.5m

Ques. 5.

Determine the initial luminous flux output of each lamp.

- 6800 lm
- 165lm
- 5lm
- 400lm

Ques. 6.

Determine the ROOM INDEX; (find formula on formula sheet)

- 10
- 4
- 8
- 3

Ques. 7.

Use the **Lumen Method** of design; to calculate the number of lamps required (use the answers from questions 3, 4, 5, and 6 in the formula) for a Drawing office

- 24 Lamps
- 487 Lamps
- 247 Lamps
- 123 Lamps

Ques. 8.

From the list below indicate which is NOT a category for fire-fighting equipment for building

- Sprinklers and other fixed water sprays
- Fixed wet and dry risers
- Portable extinguishers
- Doors and windows smoke alarms

Ques. 9.

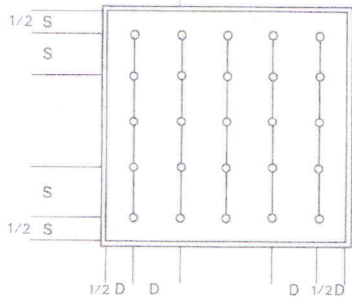
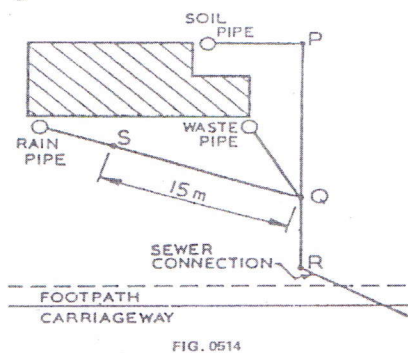


Fig. above illustrates which spacing arrangements

- Wet Jet System
- Sprinkler System
- Multi-jet System
- All of the Above.

Ques. 10.



At which point would it be necessary to provide an inspection chamber on the drain shown in Fig 0514

- Q and R
- P Q and R
- Q R and S
- P and R

Ques. 11.

Which one of the following materials would be the most suitable for a drain carrying a chemical effluent?

- Pitch pipes
- Cast Iron
- Asbestos cement
- Glazed earthenware

Ques. 12.

Heat is distributed by the water of a simple gravity hot water system by

- Irradiation
- Radiation
- Conduction
- Convection

Ques. 13.

The recommended voltage rating of electric hand tools on a construction sites is

- 415
- 240
- 110
- 55

Ques. 14.

Which one of the following pipeline material, under similar condition, would offer the greatest resistance to damage by frost?

- Low carbon steel
- Copper
- Polyethylene
- Cast Iron

Ques. 15.

If the branch connection from the lavatory basin exceeds the permitted length, which one of the following will occur?

- Surcharging
- Backing up
- Induced siphonage
- Self siphonage

Ques. 16.

If the height of a feed cistern supplying a tap is increased it will

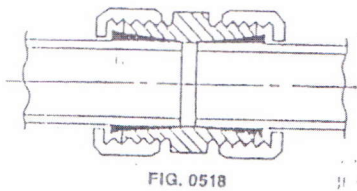
- Cause water hammer
- Increase the water flow
- Reduce the water flow
- Reduce the pressure

Ques. 17.

The term 'water table' refers to

- The depth at which water is encountered during excavation works
- The height at which water will be extracted by capillary action
- The mean sea level measured at the nearest coast line
- An imaginary line measured one meter below ground level

Ques. 18.



The type of pipe joint shown in the section in Fig. 0518 is?

- a. Compression
- b. Capillary
- c. 'O'-ring
- d. Screwed and socket

Ques. 19.

When several passenger lifts are to be installed in a building it is better to?

- a. Separate the passenger cabs
- b. Group them together in a lobby
- c. Spread them throughout the length of the building
- d. Offset the lifts by the population of the building.

Ques. 20.

The main reason for limiting the length of branch waste connections to a single stack soil pipe system is to?

- a. Retain the water seal in a trap to an appliance
- b. Be more economical in the use of pipe work
- c. Maintain the necessary degree of slope
- d. Simplify the installation and connection.

Ques. 21.

A combined system of drainage is one where?

- a. Two or more systems are serviced by the same drain
- b. Soil and surface water are collected into a single drain
- c. Soil drains and surface water drains are laid in the same trench
- d. Soil drainage from W.C. is combined with waste water from the sink.

Ques. 22.

Traps are used in a drainage system are as follows?

- a. As an access point for rodding.
- b. As an inlet point for soil pipes
- c. To collect surface water
- d. To prevent pollution of the atmosphere.

Ques. 23.

Connecting a circuit between a single live cable and a neutral cable would produce

- a. Single-phase supply
- b. Two-phase supply
- c. Three-phase supply
- d. Four-phase supply

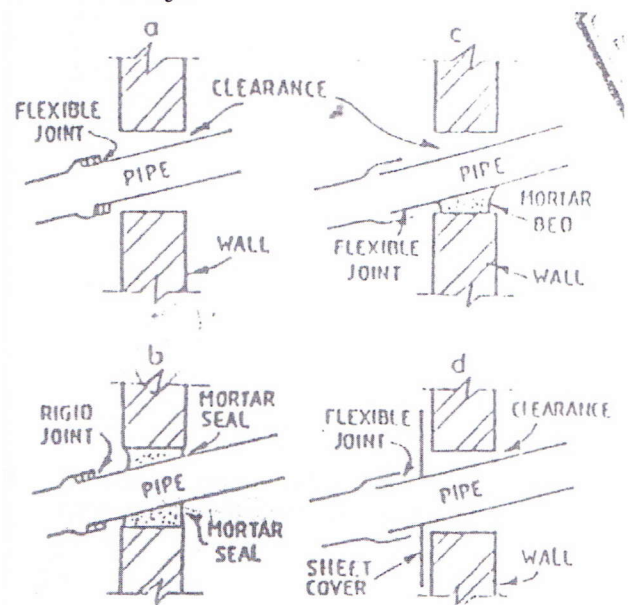
Ques. 24.

A requirement for surface water drains in a combined system of drainage is that they?

- a. Need to be trapped
- b. Need to be vented
- c. Must have manholes
- d. Have a minimum fall of 1 in 40

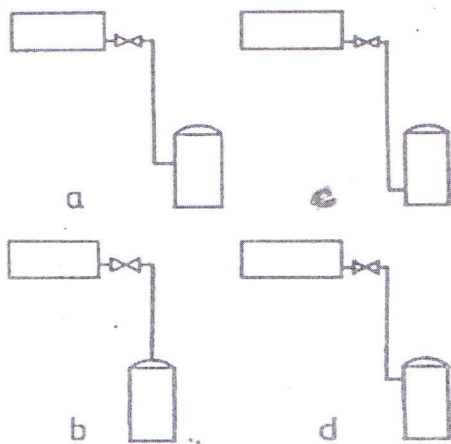
Ques. 25.

Which of the following arrangements for vitreous clay drainage pipe passing through substructure walls is the most satisfactory?



Ques. 26.

The cold feed to an ordinary direct hot water cylinder should be as indicated at



Ques. 27.

The cold water supply system shown in Fig. 1.7 it is considered to be a

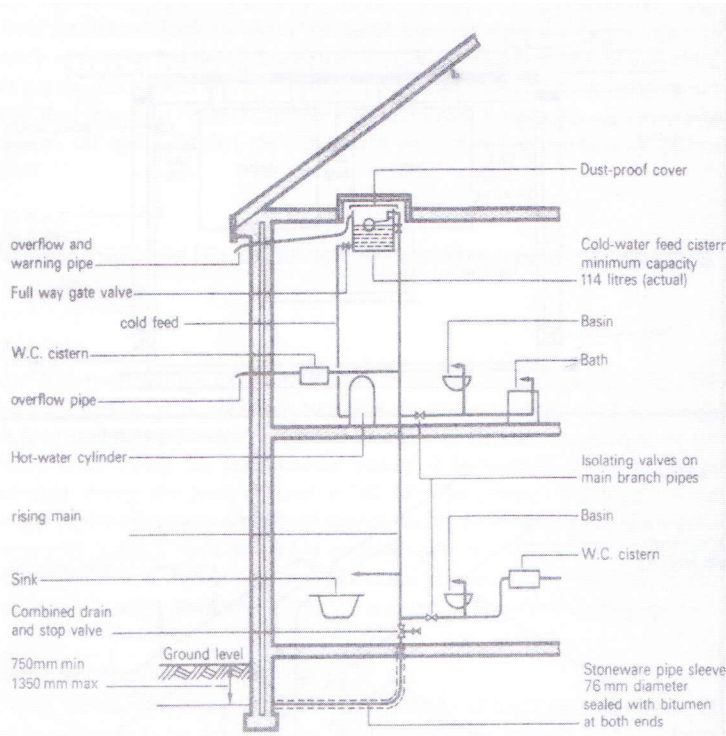


Fig. 1.7

- a. Direct system
- b. Indirect system
- c. Intermittent system
- d. Tank and cylinder system

Ques. 28.

The purpose of a 75mm deep seal trap under a sanitary fitting is to

- a. Change the direction of the pipes
- b. Join the fitting to the waste pipe
- c. Allow access for cleaning
- d. Prevent the loss of water seal

Ques. 29.

Select the correct statement about solar energy

- a. Flat plate collectors absorb only direct radiation
- b. Flat plates collectors should ideally be oriented due south but a variation up to 45° either side of due south will not appreciably reduce the collector's efficiency
- c. Water is the most common medium for heat transfer and storage in solar systems
- d. Supplying 100% of the hot water requirement by solar heating is usually economically feasible.

Ques. 30.

When water freezes in a copper plumbing system which one of the following is most likely to fail?

- a. Pipe walls
- b. Bibcock
- c. Pipe clips
- d. Compression joints

Ques. 31.

The recommended minimum diameter for the waste pipe from a bathroom shower is?

- a. 25mm
- b. 32mm
- c. 38mm
- d. 44mm

Ques. 32.

Electricity distribution networks are done via a

- a. Grid system
- b. Transformer system
- c. Spherical system
- d. None of the above

Ques. 33.

Siphonage problems in waste pipe systems may be eliminated by the

- Reduction of the depth of the water seals in the sanitary fittings
- Use of larger diameter sanitary pipes in the system
- Elimination of acute bends in the sanitary pipework
- Controlled ventilation of the outlet from sanitary traps

Ques. 34.

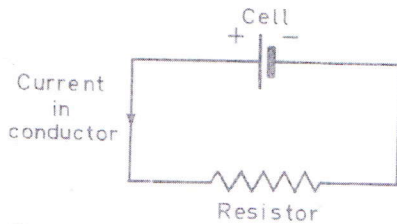


Figure 7.1

Fig. 7.1 shows an example of a? Retain the water seal in a trap to an appliance

- A lamp circuit in series
- Ammeter
- A simple circuit
- A simple magnetic field

Ques. 35.

The most suitable test for soundness of joints in a new 100mm diameter underground drain would be to

- Fill the drain with smoke
- Fill the drain with water
- Create an air pressure in the drain
- Pass a 95mm diameter ball through the drain

Ques. 36.

From which one of the following traps to lavatory basins are stoppages most easily removed?

- Bottle trap
- Q trap
- S trap
- P trap

Ques. 37.

Which one of the following is a soil appliance?

- Shower
- Bath
- Bidet
- Urinal

Ques. 38.

In order to provide the most efficient fire-extinguishing agent, fire risks are classified in four groups Class A (Carbonaceous materials) Class B (Fires in inflammable liquids) Class C Fires (Fires in inflammable gases) Class D (Fires in inflammable metals). From the list below which is the best extinguishing agent for Class A fires?

- Dry Powder
- Dry sand and dry powder
- Carbon dioxide and acid
- Water and dry powder

Ques. 39.

A back inlet gulley can be positioned in a drain to provide a

- Connection between soil pipe and drain
- Rodding arm to clean the drain if blocked
- Connection between rainwater pipe and drain
- Suitable location for fresh air inlet.

Ques.40.

Which one of the following types of sanitary traps has a vertical outlet?

- S
- Q
- P
- Running

Ques. 41.

In a two storey domestic work, where should the stop cock to a service pipe be installed?

- Adjacent to the storage cistern on the down flow
- On a distribution pipe adjacent to an appliance
- At a foot of the raising main
- On a cold feed adjacent to a hot water cylinder

Ques. 42.

Which one of the following is a soil appliance?

- a. Adjacent to the storage cistern on the down flow
- b. On a distribution pipe adjacent to an appliance
- c. At a foot of the raising main
- d. On a cold feed adjacent to a hot water cylinder

Ques. 43.

Rainwater pipes in a combined drainage system must discharge through a

- a. Slow bend
- b. Trapped gully
- c. Soak away
- d. Backdrop manhole

Ques. 44.

Which one of the following provisions will ensure that a drain is traceable at a later date?

- a. Pipe work straight between access points
- b. Pipe work laid parallel to external walls of boundary
- c. Traps at all entries to drainage pipes work
- d. Pipe work laid at a uniform gradient

Ques. 45.

When laying a drainage system a flexible bed is used in order to?

- a. Allow settlement in a building
- b. Accommodate the movement in drainage pipes
- c. Accommodate wall plates movements in roots
- d. Allow expansion in heating pipes

Ques. 46.

Which one of the following is the **most** common form of electrical distribution for domestic housing?

- a. One-phase 2 wire
- b. Two-phase 3 wire
- c. Three-phase 4 wire
- d. Four-phase 5 wire

Ques. 47.

Refer to Fig. X. A ventilation pipe would be included in the drainage system at point?

- a. 1
- b. 2
- c. 3
- d. 4

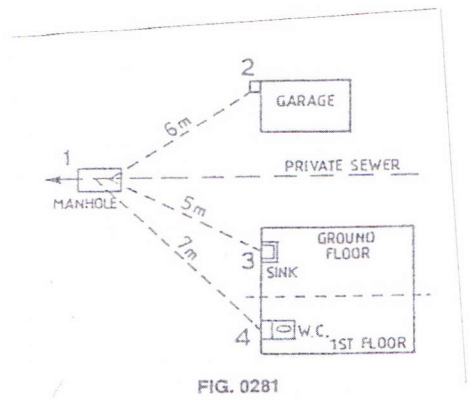
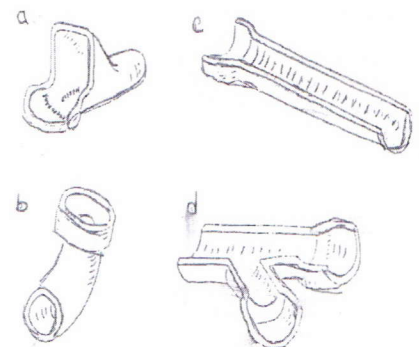


FIG. 0281

Ques. 48.

Which one of the following sketches illustrates a drain chute?

- a. 1
- b. 2
- c. 3
- d. 4



Ques. 49.

Fig. 0744 shows the section through the base of an inspector chamber. The concrete indicated at A is called the?

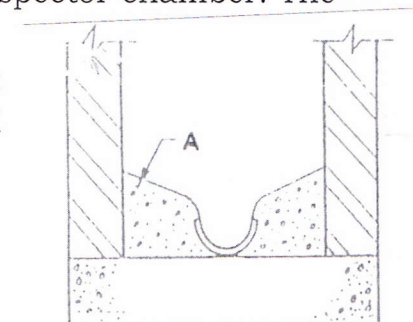


FIG. 0744

- a. Haunching
- b. Flaunching
- c. Channeling
- d. Benching

Ques. 50.

The single stack system of sanitary pipework can most conveniently be used where

- a. The building is a single storey
- b. There is a short run between the drains and the sewer
- c. There is no intercepting trap
- d. The sanitary appliance are grouped closely together

Section B: Science Long Answer

Read each question carefully and answer on the sheet provided.

Students must answer ALL QUESTIONS in this section.

Each question is worth 25marks

1

- (a) Write a concise paragraph on each of the following mechanical conveyors (use a properly labeled diagram to assist in your explanation) describing their importance in assisting the movement of people, etc. in buildings, including their merits and demerits.
- (i) Lifts
 - (ii) Escalators
- (12 marks)
- (b) Sketch a vertical section through a lift shaft in a four storey building showing the essential features of the installation including lift well and motor room.
- (7 marks)
- (c) List the precautions required in the lift installation above.
- (6 marks)

2.

- (a) List three types of firefighting equipment for building and outline briefly their respective operations.
- (15 marks)
- (b) The fire resistance of elements of construction concerns the following terms with regards to the testing of walls, floors columns, beams etc.
- Integrity
 - Stability
 - Insulation
- Define briefly each of the above in the context of BS.476
- (10 marks)

3

- (a) Define and explain the following terms;
- (i) Explain the term "National Grid" as it relates to the distribution of electricity
 - (ii) Give a brief explanation of the term "Excess Current" and list the *three* (3) devices available to protect circuits from this.
- (13 marks)
- (6 marks)
- (b) Define the following terms as applied to electricity.
- (i) Earthing
 - (ii) Resistance
 - (iii) Potential difference
- (6 marks)

4.

- (a) Determine the design flow rate for hot or cold water distributing pipe supplying the following; 4 W.C's (public bath), 8 Wash Basins (industrial use) and 2 Showers (industrial use).
- (5 marks)
- (b) The required loading unit rating for appliances in an industrial factory is 128. The factory has the following Urinals, 5 on the first floor and 6 on the second floor; the urinals require flushing every 25mins and each urinal would require 4.50 liters to flush. Determine the design flow rate for the cold distributing pipe for the appliances mentioned.
- (15 marks)
- (c) Calculate the effective loss of head per meter when a copper hot or cold water distributing pipe having a length of 18m with 4 elbows in the run is required, to discharge 2 liters /second under a constant head of water of 6m.
- (5 marks)