

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2016
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALIZATION PAPER FOR ARCHITECTURE

Date: 2 October 2016
Total Marks: 100
Examination Time: 150 minutes (2.5 hours)
Reading Time: 15 minutes (*prior to examination time*)

GENERAL INSTRUCTIONS

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages, printing error, clarify doubts and to read instructions in Question Paper. You are NOT permitted to write during this time.
3. This paper consists of **TWO Sections, namely Section A and Section B.**
Section A has two parts: Part I - **30 Multiple Choice Questions.**
Part II - **4 Short Answer Questions.**
All questions under **Section A** are **COMPULSORY.**
Section B consists of 2 case studies. Choose only **ONE** case study and answer the questions under your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
6. Begin each Section and Part in a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
10. The Question paper has 9 printed pages including this Instruction Page.

GOOD LUCK!

SECTION A

PART I – Multiple Choice Questions (30 marks)

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (c). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. In Architectural floor plans, the broken line that appears approximately 1200mm outside the exterior wall represents _____.
 - a. Sidewalk
 - b. Roof Overhang
 - c. Household drain
 - d. None of the above.

2. The architectural drafter begins a set of drawings by drawing the _____ first.
 - a. Foundation Plan
 - b. Floor Plan
 - c. Elevations
 - d. Building Sections

3. With reference to building services, an abbreviation MEP stands for
 - a. Mechanical, Electrical, Plumbing
 - b. Machine, Electrical, Piping
 - c. Machines, Electronics, Piping
 - d. Machineries, Electrical, Plumbing

4. As per Bhutan Building Rules 2012, the minimum height of habitable room in low altitude is _____.
 - a. 2750mm
 - b. 2800mm
 - c. 2540mm
 - d. 2700mm

5. M20 concrete mixing ratio refers to
 - a. 1:1.5:3
 - b. 1:2:3
 - c. 1:2:4
 - d. None of the above.

6. As per Bhutan Road Act 2013, the right of way for building construction along National High Way on either side is _____ from the centreline of road.
 - a. 30 feet
 - b. 25 feet
 - c. 20 feet
 - d. 50 feet

7. The plinth area of a building is 10,000 square feet, has 5 stories, and the site is 100,000 square feet. What is the FAR for the site in this instance?
- 0.45
 - 0.40
 - 0.10
 - 0.50
8. As per Building Color Code of Bhutan 2014, which is **NOT** the color of exterior walls of buildings in Thimphu Thromde?
- White
 - Mud Color
 - Pink
 - Light Brown
 - Exposed Stone Masonry with its natural color depending on the stone and masonry type without any plaster
9. The temporary structural members used in construction of building as seen in picture beside is called as _____.
- Bamboo Member
 - Supporting Structure
 - Scaffolding
 - Supporting Post



10. As per the Bhutanese Architectural Guidelines 2015, the recommended roof angle of slope _____.
- 11 deg-18 deg
 - 12 deg-18 deg
 - 10 deg-15 deg
 - 10 deg-18 deg

11. For classification of hotels, the proposed architectural design of hotel needs to be approved by _____.

- a. Tourism Council of Bhutan
- b. Hoteliers Association of Bhutan
- c. Thimphu Thromdey
- d. Bhutanese Institute of Architects

12. Which Architect said, “form ever follows functions”?

- a. Frank Lloyd Wright
- b. Louis Sullivan
- c. Walter Gropious
- d. B.V. Doshi

13. The photograph shown beside is the one of the best known works of renowned Architect called

- a. Frank Lloyd Wright
- b. Le Corbusier
- c. Louis Sullivan
- d. None of the above



14. The Architectural firm who did planning and design of the Royal Supreme Court Complex of Bhutan is

- a. Gandhara Consultancy Firm
- b. United Consultancy Firm
- c. Christopher Charles Benninger Architects
- d. None of the above.

15. _____ first used the term “organic architecture” in an Architectural Record.

- a. D.V. Doshi
- b. Le Corbusier
- c. Frank Lloyd Wright
- d. Walter Gropious

16. The concrete mixing ratio of 1:2:4 is to be understood as
- 1 sand :2 cement: 4 aggregates
 - 1 cement : 2 sand : 4 aggregates
 - 1 cement : 2 aggregates : 4 sand
 - None of the above.
17. The oldest Dzong of Zhabdrung era in the country is
- Pungthang Dechen Phodrang Dzong in Punakha.
 - Semtokha Dzong in Thimphu.
 - Trashichodzung in Thimphu.
 - Jakar Dzong in Bumthang.
18. The first Buddhist temples built in the country are
- Jampa Lakhang in Bumthang & Kyichu Lakhang in Paro.
 - Jampa Lakhang in Bumthang & Taktshang in Paro.
 - Kyichu Lakhang in Paro & Tharpaling Monastery in Bumthang.
 - None of the above.
19. To practice architecture in the Bhutan, Architects need to register with the
- Construction Development Board.
 - Bhutanese Institute of Architects.
 - Thimphu Thromde.
 - Ministry of Works & Human Settlement.
20. In land measurement, one decimal is equal to
- 435.60 sq. ft
 - 560.00 sq. ft
 - 435.00 sq. ft
 - 560.50 sq. ft
21. Normally, the Sawmill use _____ (unit) to measure the quantity of sawn timber:
- Cubic Meter.
 - Cubic Centimeter.
 - Cubic Feet.
 - None of the above.
22. For solar energy gain, the maximum window opening is to face
- South
 - North
 - East
 - West

23. In traditional Bhutanese Rabsey, the correct order of elements from bottom to top is

- Dung, Bho, Pem, Chotsi.
- Dung, Pem, Chotsi, Bho
- Pem, Bho, Chotsi, Dung
- Pem, Chotsi, Dung, Bho

24. Based on the table alongside, the minimum numbers of water closets required for women in a theatre with a seating capacity of 4,000 is

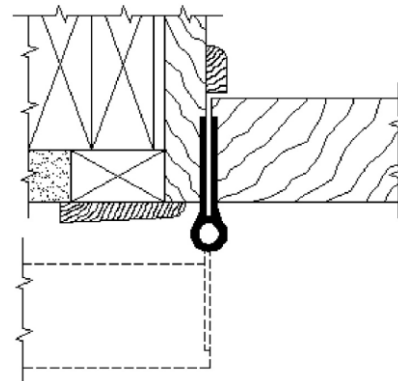
- 25
- 29
- 28
- 27

Water Closets for an Assembly Occupancy

Number of Persons of Each Sex	Minimum Number of Water Closets	
	Male	Female
1 - 50	1	2
51 - 75	2	3
76 - 100	2	4
101 - 125	3	5
126 - 150	3	6
151 - 175	4	7
176 - 200	4	8
201 - 250	5	9
251 - 300	5	10
301 - 350	6	11
351 - 400	6	12
Over 400	7 plus 1 for each additional increment of 200 males in excess of 400	13 plus 1 for each additional increment of 100 females in excess of 400

25. The type of door hinge in the construction drawing beside is a

- Full mortise
- Full surface
- Half mortise
- Half surface



26. Which of the following methods of bidding is used on most Government projects?

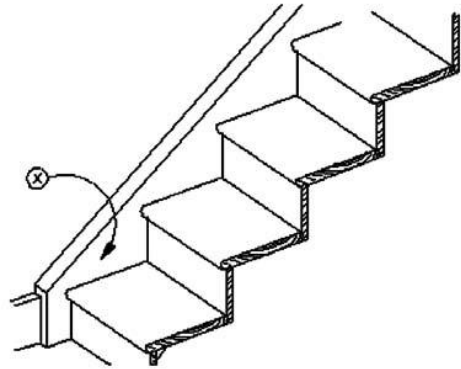
- Direct Contract
- Negotiated directly
- Invited from short listed contractors
- Public invitation

27. In painting a wall surface, the first coat applied on fresh wall is called

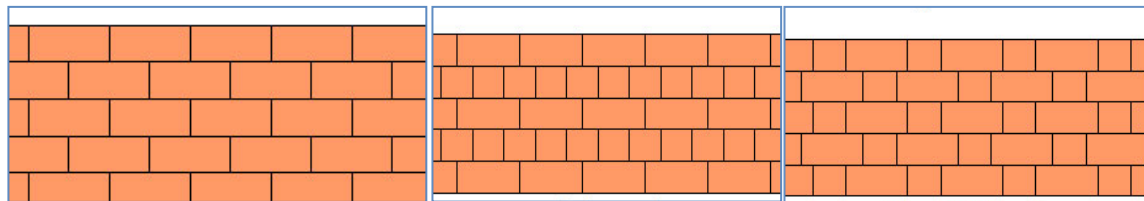
- Base coat
- Under coat
- Primer
- None of the above.

28. What is the term for staircase element indicated at X in the sketch beside?

- a. Riser
- b. Stringer
- c. Baseboard
- d. Handrail



29. The architect has specified that the contractor build a sample brick wall using a English Bond. Which of the following walls satisfies the specifications?



- a.
- b.
- c.
- d. None of the above

30. What is the maximum time period that mortar can be used before hydration has damaged effect on its final strength?

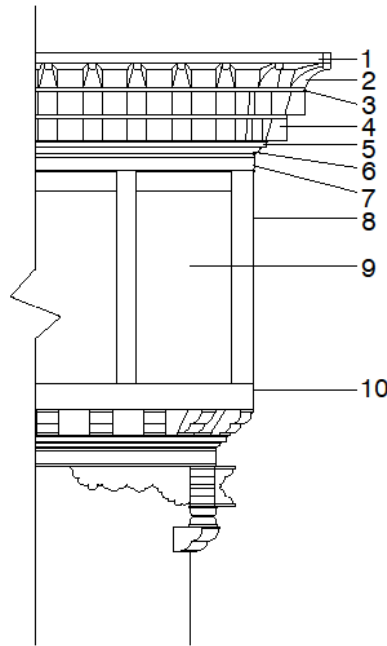
- a. ½ to 1 ½ hours.
- b. 2 to 3 ½ hours.
- c. 3 ½ to 4 ½ hours.
- d. 4 to 6 hours.

PART II – Short Answer Questions (20 marks).

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

1. List down the rules/codes/regulations you may refer while doing Hotel Design in core municipal area.
2. In relation to plot size and proposed building plinth area, what is meant by Site Coverage? Illustrate in percentage for the plot size of 0.1150 acres and building plinth area of 2500 square feet.
3. List down the important factors you need to consider while doing site analysis.

4. The sketch shown below is a typical illustration of Rabsey (cornices) in Bhutanese Traditional Architecture. Level the architectural elements listed below :



SECTION B

Case Study

Choose either Case 1 or 2 from this section. Each case study carries 50 marks.

Case 1

In Bhutanese Traditional Architecture, the roof is the one of the main architectural elements climatically as well as aesthetically. As per the *Bhutanese Architectural Guidelines 2015*, there are four main types of roof design in Traditional Bhutanese Architecture as follows:

- a) Jabzhi Roof
 - b) Jamthok Roof
 - c) Drangim Roof
 - d) Chenkhep Roof.
- i. Explain the significance, importance and climatic impact of using/adopting the above types of roof with sketches/drawing (20 marks)
 - ii. Describe 5 different Bhutanese Traditional Architectural elements with sketches/drawings which contribute uniqueness to our lifestyle, culture and exhibit our architectural identity. (30 marks)

OR

Case 2

Mr. Karma and his family have 22.75 m X 17.40 m land within Thimphu urban area in UV 2 precinct. The permissible site coverage in this precinct is 50 percent and 2 storeyed permissible height. Mr. Karma approached you for consultancy services and you are providing complete architectural and engineering services for the design of family residential house with the following space requirements:

- a) Living area
- b) Family Room cum dining area
- c) Kitchen
- d) Toilet and store
- e) Guest Room with attached toilet
- f) Master Bed Room with attached toilet
- g) Choshom
- h) Minimum 2 or more additional bed rooms for children with common toilet.

Fulfilling above requirements, provide schematic design and drawings: site plan, floor plans, elevations and sections adequately exhibiting a sense of functional layout of spaces in line with the following: (Don't forget to indicate north direction in your drawings)

- i. Relevant Reference/Codes/Rules you would make (list them). (2 marks)
- ii. Site Analysis (briefly mention the relevant factors). (4 marks)
- iii. Other consultants/professionals you may involve in this project (list them). (2 marks)
- iv. Design Principles/concepts (Briefly explain appropriately) (12 marks)
- v. Delivery of final design/drawings. (30 marks)

