

ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2023
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALISATION PAPER FOR ARCHITECTURE

Date	: October 7, 2023
Total Marks	: 100
Writing 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 to check the number of pages of the Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & 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 two Case Studies. Choose only **ONE** case study and answer the questions of 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 the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part on 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 must to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
10. This paper has **8 printed pages**, including this instruction page.

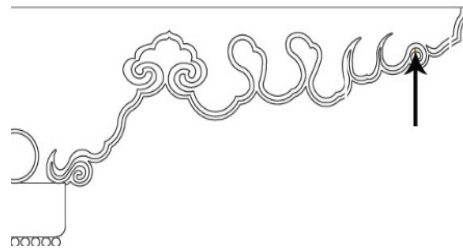
GOOD LUCK!

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 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which building material have high Seismic resistance and flexibility of nailed joints?
- Bamboo
 - Timber
 - Ply
 - Husk
2. In the following sketch (carving of the Zhu), what is the meaning of the element marked in the sketch?

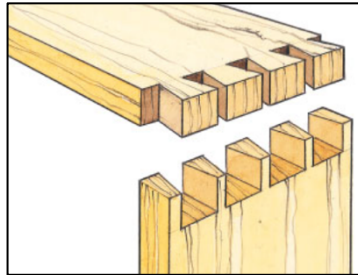


- King sitting on the throne
 - Queen in prostration
 - Water running from mountain
 - Snake entering the hole
3. The very ornate architectural style developed in the later renaissance period:
- Baroque
 - Neoclassicism
 - Flamboyant
 - Rayonnant
4. Sabine equation is related to which of the following?
- Thermal conductivity
 - Ventilation
 - Illumination
 - Acoustics
5. In which of the following, the strength of stone is maximum?
- Parallel to the nature to bed.
 - 45° to the nature of bed.
 - Perpendicular to the nature of bed.
 - Same in all the direction.
6. The vertical member which is fixed between string and handrail to give support to the handrail is:
- Flight
 - Newel Post
 - Scotia
 - Baluster
7. Ancient Egyptian architecture is characterized by
- Massiveness and ornamentation
 - Human-centric & trabeated
 - Highly decorative
 - Very ornate

8. In architecture and decoration, what is a swag?
- a) A support
 - b) A metalworking tool
 - c) A carved decoration
 - d) A type of bridge
9. What is the psychological effect of the colour Yellow?
- a) Helps alleviate anxiety
 - b) Aids intuition
 - c) Increases enthusiasm
 - d) Activates memory

10. The name of the joinery detail shown in the figure is

- a) Mortise and Tenon joint
- b) Mitered Butt joint
- c) Half lap joint
- d) None of the above



11. The yield strength of steel rebars used for building construction or renovation in Bhutan is:
- a) 250 MPa or higher (HYSD)
 - b) 415 MPa or higher (HYSD)
 - c) 500 MPa or higher (HYSD)
 - d) 550 MPa or higher (HYSD)
12. The daylight factor is maximum for
- a) dome-structure building
 - b) a vertical window
 - c) an inclined window
 - d) none of these
13. Stages of project formulation includes all of the following **EXCEPT**
- a) Financial Analysis
 - b) Cost-Benefit Analysis
 - c) Design analysis
 - d) Pre-Investment Analysis
14. The continuous beam is;
- a) fixed at both ends
 - b) fixed at one end and free at the other end
 - c) supported on more than two supports
 - d) extending beyond the supports
15. 1 feet = _____
- a) 30.48 cm
 - b) 30.84 cm
 - c) 31.48 cm
 - d) 31.84 cm

16. “Moderately compact internal planning of houses will be of benefit for most of the year. Courtyard type buildings are very suitable”. Which climatic conditions support this design recommendation for shelters?
- Hot-dry climate
 - Warm-humid climate
 - Composite climate
 - Tropical upland climate
17. In Bhutan, mason is traditionally referred to as _____.
- Zow
 - Lha-rib
 - Paap
 - Dozow
18. The theory which deals with finding stresses at a section due to pure moment is called
- Bending stress theory
 - Shearing stress theory
 - Simple bending theory
 - Simple shearing theory
19. Cement concrete is a mixture of
- water, cement, sand and aggregate.
 - water, cement and sand.
 - water, cement and aggregate.
 - cement, sand and aggregate.
20. The main structural function of Zhu in traditional Bhutanese architecture is
- to increase the thickness of the timber flooring.
 - to decrease the thickness of the timber flooring.
 - to decrease the length and increase the load bearing capacity of dung.
 - to increase the length and decrease the load bearing capacity of dung.
21. The architectural order from the base to top of kachen is:
- Phue-Raep-Chem-Drey-Zhu-Kaden
 - Kadhen-Raep-Chem-Drey-Phue-Zhu
 - Kadhen-Chem-Raep-Drey-Zhu-Phue
 - Kadhen-Chem-Drey-Zhu-Phue-Raep
22. Which of the following is not the category of heritage sites?
- Cultural heritage sites
 - Heritage building
 - Cultural site
 - Archaeological sites
23. Which of the following is not the typology of rabsey in traditional Bhutanese architecture?
- Gomang Gocham
 - Parop Rabsey
 - Gyesargo Rabsey
 - Zhubor rabsel

24. Which of these architectural styles began in the United States?

- a) Regency
- b) Tudor
- c) Prairie
- d) Stuart

25. Who designed the city of Chandigarh in India?

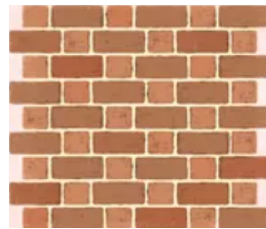
- a) Ludwig Mies van der Rohe
- b) Frank Lloyd Wright
- c) Le Corbusier
- d) Frank Lloyd Wright

26. In perspective drawing, what is the purpose of using vanishing points?

- a) To create realistic colors and shading in the drawing.
- b) To accurately measure the dimensions of the objects.
- c) To create the illusion of depth and three-dimensionality.
- d) To add decorative elements and patterns to the artwork.

27. The type of brick bond shown in the image is _____

- a) English bond
- b) Flemish bond
- c) Common bond
- d) Running bond



28. In topographic surveying, which instrument is commonly used to measure horizontal angles between two points?

- a) Measuring tape
- b) Theodolite
- c) Clinometer
- d) Plumb bob

29. Who designed the building shown in the picture?

- a) Jørn Utzon
- b) Fariborz Sahba
- c) Gunnar Asplund
- d) Christopher Benninger



30. In painting a surface, the first coat applied is:

- a) Primer
- b) Undercoat
- c) Topcoat
- d) Base

PART II – Short Answer Questions [20 marks]

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

- 1) What is biophilic design? Provide a description of three features commonly found in biophilic design and provide illustrations where necessary. **(2+3 marks)**
- 2) “In Bhutan, architectural creativity is limited by regulation that mandates the integration of traditional architectural elements into modern designs.” Present your argument supporting either the statement "For" or "Against," and provide relevant examples to substantiate your stance. **(3.5+1.5 marks)**
- 3) Dzongs in Bhutan have historically played a crucial role in unifying the country, and they continue to serve their purpose in the present. Explore some typical design characteristics found in dzongs, and bolster your explanation with relevant illustrations. **(3+2 marks)**
- 4) Design/sketch (only plan) a modular kitchen cum dining room in a duplex with a maximum area of 18 square meters. Clearly label all fixtures and furniture, and provide accurate dimensions, including wall-to-wall measurements and relative dimensions of the fixtures and furniture from the internal wall. **(5 marks)**

SECTION B: CASE STUDY [50 marks]

Choose either CASE I or CASE II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

CASE I

Question 1

Vernacular houses are scattered across the picturesque landscape of Bhutan, creating a shared cultural panorama with their natural surroundings. Research has revealed that there are two broad categories of vernacular houses in Bhutan: rammed earth houses are prevalent in the western and central parts of Bhutan, while stone masonry houses dominate the central and eastern regions. Beyond their cultural significance, these vernacular houses are revered for their sustainable characteristics, attributed to their harmonious integration with the environment and the utilization of locally sourced materials. Unfortunately, the escalating pace of urbanization, rural-to-urban migration, and recent calamities have placed these traditional houses in jeopardy.

- a) Describe a standard vernacular house in Bhutan and emphasize its spatial utilization and incorporation of sustainable design principles. **(10 marks)**
- b) Illustrate a comprehensive visual representation (including plan, section, and elevation) of a familiar vernacular house, accompanied by annotations delineating the interior components. Emphasize the evolution of spatial utilization within the vernacular house over time, elucidating the resultant modifications made to the structure. **(15 marks)**

Question 2

Provide a concise description of your thesis, outlining your design concept and the novel elements you introduced. Accompany your narrative with relevant illustrations to enhance clarity and comprehension. In the subsequent part, allocate equal consideration to appraising your thesis's potential areas of improvement. Delve into a critical examination of the strengths and weaknesses of your work. **(5+5 marks)**

Question 3

You have been appointed as a conservation architect entrusted with formulating the conservation plan for Changangkha Lhakhang in Thimphu. Expound upon the key responsibilities that you will assume and outline the step-by-step process you will execute to develop the comprehensive conservation plan. **(15 marks)**

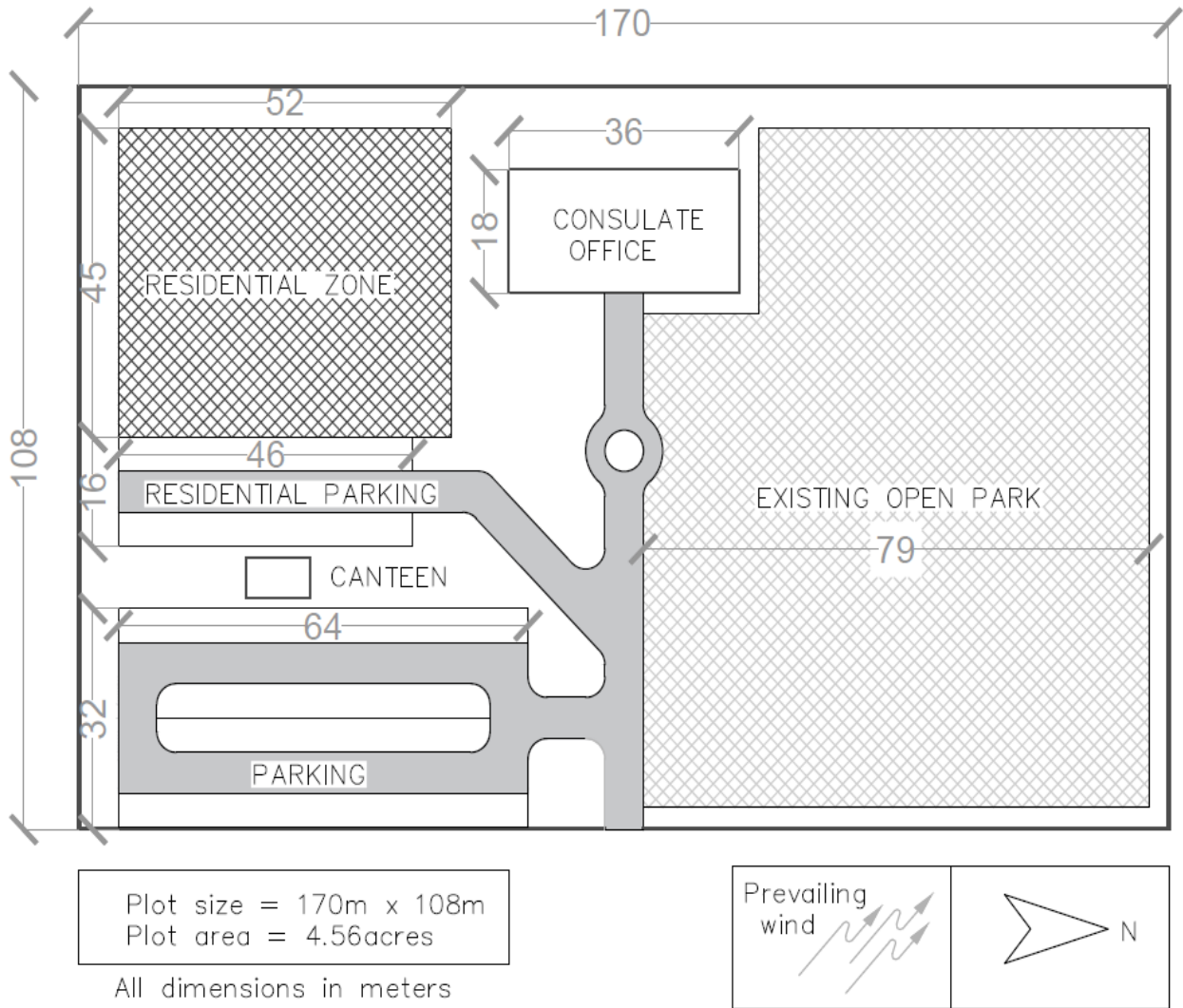
CASE II

You have been commissioned to design a cultural centre within the premises of the Royal Bhutanese Consulate Office in Perth, Australia. The primary aim of this cultural centre is to serve as a hub for the Bhutanese community in Perth and throughout Australia, fostering a connection to Bhutan through national festivities and cultural engagements. The designated site for the cultural centre is within the adjacent open park, as illustrated in the provided site plan. The interior of the centre will encompass essential spaces such as a reception area, display room, auditorium, worship facility, libraries, and a café. Furthermore, you have the creative liberty to suggest additional functions that complement the purpose of the centre.

The structure's height must not exceed three stories, and it should seamlessly integrate with the surrounding open park. Although there are no constraints on design form or facade aesthetics, the cultural centre is required to encapsulate the essence of the Bhutanese culture and resonate with the identity of its people.

Referring to the site plan and the design brief, your task involves designing a cultural centre that aligns with the client's vision and integrates your design ingenuity. Provide the following details as part of your designing process:

- Brief description on the concept (100-200 words).
- Sketches to support the concept.
- Basic drawings (site plan clearly showing the site and building dimensions, floor plans, section (min. 2) and elevations (min. 4))
- Descriptions of any other features.



Site plan

TASHI DELEK