

**ROYAL CIVIL SERVICE COMMISSION**  
**BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2013**  
**EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALIZATION PAPER for *ARCHITECTURE***

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<b>Date</b>	: 14 October 2013
<b>Total Marks</b>	: 100
<b>Examination Time</b>	: 150 minutes (2.5 hours)
<b>Reading Time</b>	: 15 Minutes (prior to examination time)

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**GENERAL INSTRUCTIONS:**

1. Write your Roll Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages of 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 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 two Case Studies. Choose only ONE case study and answer the questions under your choice.
4. 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 any or correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
5. Begin each Section and Part in a fresh page of the Answer Booklet.
6. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
7. Use of any other paper including paper for rough work is not permitted.
8. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
9. This paper has **08** printed pages in all, 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 the correct answer chosen 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. Golden Section pertains to which aspect of architecture?
  - a) Scale
  - b) Design
  - c) Aesthetic
  - d) Built-form
  
2. In Classical Architecture, a circular window or opening set in a wall was called:
  - a) Dormer window
  - b) Fanlight
  - c) Oculus
  - d) Apron
  
3. Identify the structure shown in the image.
  - a) The Alhambra in Granada, Spain
  - b) St. Mark's Cathedral in Venice
  - c) Notre-Dame de Paris
  - d) Westminster Abbey in London
  
4. Which famous architect said 'form ever follows function'?
  - a) Frank Lloyd Wright
  - b) Walter Gropius
  - c) Louis Henry Sullivan
  - d) Oscar Niemeyer
  
5. The architect of the famous Guggenheim Museum in Bilbao, Spain is:
  - a) I M Pei
  - b) Antoni Gaudi
  - c) Frank Gehry
  - d) Christopher Wren



6. Which classical order of 'column capitals' does the Bhutanese traditional *zhu* (image on the right) most resemble?

- a. Doric
- b. Corinthian
- c. Ionic
- d. Tuscan



7. The Dzong in the image is:

- a) Chhukha Dzong
- b) Paro Ta Dzong
- c) Gasa Dzong
- d) Jakar Dzong



8. The physical form of Ziggurat has resemblance to:

- a) Dzong
- b) Ba-zam
- c) Jangchub Chorten
- d) Zangdopelri Lhakhang

9. In a traditional Bhutanese rabsey, the correct order of the following elements from top to bottom is:

- a) Jugshing, Tshegay, Horzing
- b) Horzing, Junshing, Tshegay
- c) Tshegay, Jugshing, Horzing
- d) Horzing, Tshegay, Jugshing





10. The most common roof in traditional Bhutanese house was:

- a) Gable roof
- b) Hipped roof
- c) Lean to roof
- d) None of the above

11. Which of the following features of traditional architecture is not permissible on ordinary houses?

- a) Gyaltshen
- b) Gungdhar
- c) Jamthog roof
- d) Gaygo

12. Which of the following is not correct?
- a) Gomang rabsey
  - b) Lobur rabsey
  - c) Drey-zhu rabsey
  - d) Mago rabsey
13. In Bhutan which approach to structural design is used with regard to seismic resistance?
- a) Weak column-strong beam
  - b) Strong column-weak beam
  - c) Strong column-strong beam
  - d) None of the above
14. Which of the following could have limited the size of rooms in traditional houses?
- a) Slope of the site
  - b) Length of timber available
  - c) Size of stone available
  - d) Tensile capacity of rammed earth wall
15. In RCC, cement corresponds to which strength?
- a) Compressive
  - b) Tensile
  - c) Both compressive and tensile
  - d) None of the above
16. What is the appropriate range of slope for laying drainage pipes?
- a) 1-2.5%
  - b) 4- 6%
  - c) 5-6%
  - d) 8-9%
17. What does IC stand for in plumbing works?
- a) Internal chamber
  - b) Inter-connecting chamber
  - c) Irregular chamber
  - d) Inspection chamber

18. If the ratio of upper to lower diameter of a column is constant, the degree of curvature will be:
- More pronounced in the shorter column than in the longer.
  - More pronounced in the longer column than in the shorter.
  - Independent of the length of the column.
  - None of the above.
19. In drawing conventions which of the following arrows represent the 'direction of RISE of ramp, stair or steps'?
- 
  - 
  - 
  - 
20. Which of the following statements is TRUE in a perspective drawing?
- Further the **picture plane** is from the **observer**, the smaller the drawing will be.
  - Further the **picture plane** is from the **observer**, the larger the drawing will be.
  - Distance between the **picture plane** and the **observer** has no impact on the size of the drawing.
  - None of the above.
21. In the colour spectrum red, yellow and blue are:
- Primary colours.
  - Secondary colours.
  - Tertiary colours.
  - Complementary colours.
22. A wall built to resist the pressure of earth filling or backing, deposited behind it after it is built is called:
- Face wall
  - Retaining wall
  - Breast wall
  - None of the above
23. The gradient of a slope is generally expressed as a ratio of:
- Horizontal distance to the diagonal distance
  - Diagonal distance to the vertical distance
  - Vertical distance to horizontal distance
  - Horizontal distance to vertical distance

24. The vertical height between the upper surfaces of two successive steps is called:
- Rise
  - Riser
  - Tread
  - Flier
25. Which of the following is a method to reduce sound transmission through partitions:
- A hard reflecting surface on the outside of the wall
  - An air gap to prevent continuity of structure
  - A layer of insulating material
  - All of the above
26. The best location for fixing ventilators is:
- As far as possible from the ceiling
  - As high as possible under the ceiling
  - Exactly midway between the floor and ceiling
  - Exactly 1.2m from the floor level.
27. The property of a material to absorb heat is known as its:
- Thermal resistance
  - Thermal resistivity
  - Thermal conductivity
  - Thermal capacity
28. Sabine equation is related to which of the following?
- Sound
  - Heat
  - Weight
  - Light
29. Slump test of concrete checks:
- Strength of concrete
  - Workability of a fresh concrete
  - Proportions of a dry mix
  - None of the above
30. 1 square metre is equal to:
- 1.76 square feet
  - 17.6 square feet
  - 10.76 square feet
  - 100.76 square feet

**PART – II : Short Answer Questions (20 marks)**

**Answer ALL the questions. Each question carries 5 marks.**

**Question 1**

‘As an architect you design for the present, with an awareness of the past, for a future which is essentially unknown.’ Do you agree with the statement? How relevant is the statement to you as an architect practicing in Bhutan?

**Question 2**

List and explain two features of traditional Bhutanese architecture that reflect its response to local climatic conditions.

**Question 3**

Explain similarities and differences between 'green design' and 'passive solar design'.

**Question 4**

From the things that you learned in your college, what did you find most relevant to Bhutan and how would you use it in your practice?

**SECTION B**

**Case Study**

**Choose either Case 1 or Case 2 from this Section. Each Case carries 50 marks. Mark for each sub-question is indicated in the brackets.**

**CASE 1**

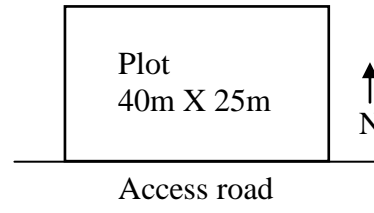
Bhutan is undergoing rapid socio-economic change and progress. These changes often manifest themselves in construction of new houses and other development projects around the country.

- a) Using examples and sketches describe how the new and emerging developments affect the traditional architecture of Bhutan and its cultural landscape. (30 marks)
- b) Against the backdrop of rapid socio-economic change, argue for or against, the relevance of the traditional architecture of Bhutan. (20 marks)

## CASE 2

Mr. Dorji and his wife Aum Pem are professionals who live in Thimphu. During free time Mr. Dorji likes to paint while Aum Pem enjoys weaving textiles. They have a 12 year daughter and a 10 year old son. Recently they bought a plot of land measuring 40m X 25m.

The plot is located on a gentle south-facing slope on the outskirts of Thimphu with very good view of the river below and mountains across the valley. It abuts an access road on its south side.



The couple wants to build their family house on this plot and they have hired you as an architect. They are quite flexible about the spatial requirements though they have requested you to provide areas for their hobbies and an additional guest bedroom. They also like to have ample open space around the house both for gardening and outdoor activities for the children. They have also expressed desire for a traditional outlook of the house, built preferably with traditional materials.

Describe how you would approach this project to meet the client's objectives and the site conditions. Propose a design concept and describe why you arrived at it. Also specify the main building materials used and the reason for doing so. Provide basic schematic design drawings (site layout, floor plans, elevations and sections. Do not forget to indicate the north direction in your illustrations.