

**ROYAL CIVIL SERVICE COMMISSION
CIVIL SERVICE COMMON EXAMINATION (CSCE) 2009**

EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALIZATION PAPER for ARCHITECTURE

Date : 8th November 2009
Total Marks : 100
Examination Time : 2.5 hours
Reading Time : Min. 5 minutes (Prior to exam. Time)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY!

I. General Instructions:

1. Do not write anything during the first 15 minutes. This time is to be spent on reading the instructions and the questions and for clarifying any misprints or doubts.
2. This book is the property of the Royal Civil Service Commission and shall not be removed from the Examination Hall. No pages shall be removed or torn from this book.
3. Any pages found missing shall be reported to the Invigilators within the first 15 minutes of the receipt of the book.
4. Candidates shall be required to produce the Admission Card while entering the Examination Hall and as and when demanded by the authorized officials.
5. Candidates shall not be allowed to carry any papers or other information devices into the Examination Hall.
6. Candidates shall write their allotted Registration Numbers only in the space provided in the Answer Book. No other particulars that would indicate the identity of the candidate shall be written either in the Question or the Answer Book.
7. Candidates shall be allowed to leave the Examination Hall only after the full 2.5 hours time allotted for the examination is completed. If a candidate completes answering the questions, he/she must sit quietly until the allotted time is over.

II. Specific Instructions:

1. All answers must be written in the separate Answer Book provided. Any answers written in the Question Book shall not be marked.
2. All answers must be written in black or blue ink. Drawings can be done with pencil and colour, where applicable.
3. All answers must be written neatly and legibly. Illegible writings shall not be marked.
4. Use of mobile phones shall not be permitted.
5. Normal scale rulers and drafting pencils are permitted.
6. There are **3 Sections of Questions** in this Paper. Read and follow the instructions on how to answer each section carefully!
7. This Question Book consists of 9 printed pages.

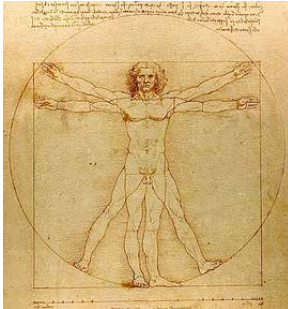
SECTION 1: MULTIPLE CHOICE QUESTIONS

(30 marks – 1 mark for each question)

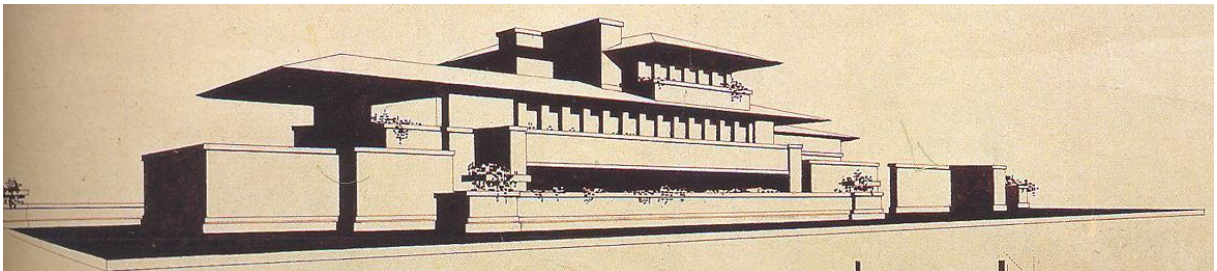
Instructions:

Answer all 30 questions in this section. Copy the question number and the letter of the correct answer onto the Answer Book provided.

1. The renowned drawing shown below was created by Leonardo da Vinci based on the correlations of ideal human proportions with geometry described by a Roman architect in his book *De architectura*. Name the architect.



- a) Eugene-Emmanuel Viollet-le-Duc
b) Marcus Vitruvius Pollio
c) John Ruskin
d) Le Corbusier
2. The late 19th century English movement that attempted to re-establish the skills of craftsmanship threatened by mass production and industrialization is called:
- a) Art Nouveau
b) Arts-and-Crafts
c) Art Deco
d) Artisan Mannerism
3. ‘Form follows function’ was coined by:
- a) Frank Lloyd Wright
b) Mies van der Rohe
c) Alvar Aalto
d) Louis Sullivan
4. The sketch below shows one of Frank Lloyd Wright’s works that stood out among the great achievements of Modernism. Identify the building.

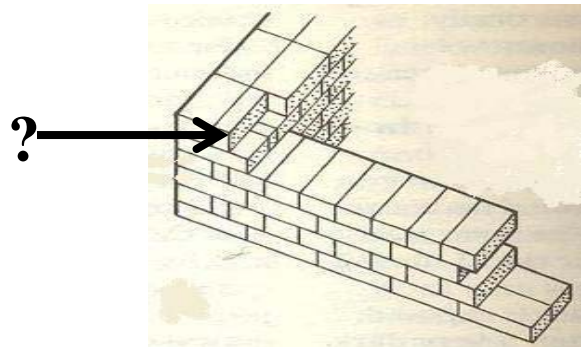


- a) Unity Church and community house, Oak Park
b) Falling Waters, Pennsylvania
c) Robie House, Chicago
d) S.C. Johnson and Son administration building, Racine

5. Among the Greek temple architecture, the practice of optical refinement is best seen in:
- Parthenon
 - Propylaea
 - Acropolis
 - Erechtheion
6. The order invented by the Renaissance architects, which were characterized by columns that extended the height of two or more floors is called:
- Colossal order
 - Superimposed order
 - Composite order
 - Tuscan order
7. The *ekra* construction technique in Bhutan, which constitute several interwoven bamboos inserted within timber frame and plastered with mud mortar is similar to:
- Dado
 - Weather-boarding
 - Wattle and daub
 - Stucco

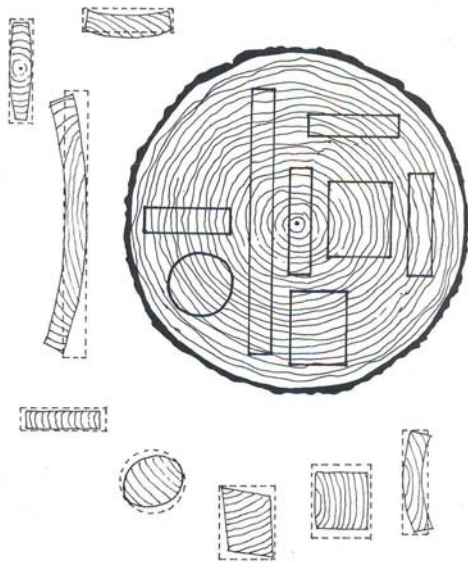
8. In the sketch below, the brick position in question in a typical English bond pattern is known as:

- Closer
- Header
- Stretcher
- Quoin



9. In traditional rammed earth construction, horizontal timber members are inserted at regular intervals especially at the corners of the layout for:
- Reducing the settlement cracks
 - Increasing the tensile strength
 - Providing better resistance against lateral force
 - Improving the binding quality
10. The proportion of concrete mix of 1:2:4 is ideally recommended for:
- Mass Concrete work in foundation footings
 - R.C.C arches of long span
 - R.C.C works in water retaining structures
 - R.C.C works in buildings

11. The sketch below show:



- a) The characteristic shrinkage and distortion of timber section as affected by the direction of the annual rings
- b) The process by which timber is cut and sawn into suitable sections
- c) The type of natural defects in timber section
- d) The microstructure of wood

12. To achieve maximum strength of a stone masonry work, one general rule is that the direction of natural bed of all sedimentary stones should be:

- a) Parallel to the direction of pressure
- b) Perpendicular to the direction of pressure
- c) Perpendicular to the direction of course
- d) Parallel to the direction of course

13. Timber is generally seasoned:

- a) To increase the hygroscopicity of wood
- b) To increase the susceptibility of wood to insect and fungi attack
- c) To reduce the electrical resistance of wood
- d) To reduce the tendency of timber to crack, shrink and warp

14. The physical properties of steel such as ductility and strength are partly influenced by:

- a) Calcium content
- b) Carbon content
- c) Oxygen content
- d) Sulphur content

14. One advantage of a good brick work over stone work is:

- a) It is stronger
- b) It absorbs moisture
- c) It resists fire better
- d) It is brittle

15. A psychrometric chart relates temperature, air moisture content and

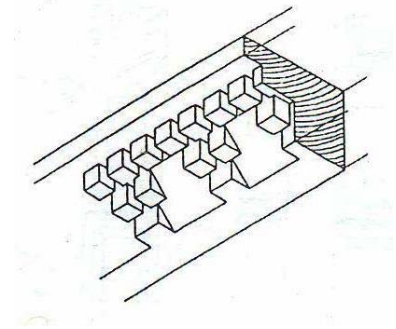
- a) Relative Humidity
- b) Vapour Pressure
- c) Precipitation
- d) Solar radiation

16. If the Floor Area Ratio (FAR) on a plot of land of 450 sqm is 2 and the permissible plot coverage is 50%, the maximum number of floors permissible would be:

- a) 2
- b) 3
- c) 4
- d) 5

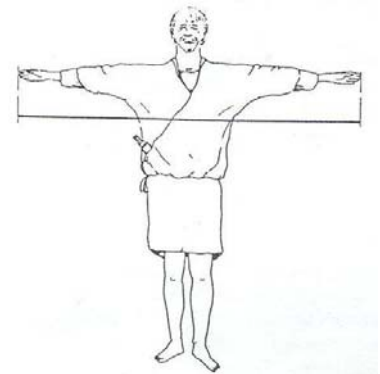
17. The sketch below is a profile of a traditional member that is found only in Dzongs and Lhakhangs:

- a) Norbu Bagam
- b) Norbu Horzhu
- c) Choetseg
- d) Boh



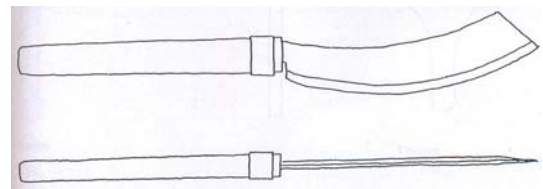
18. Human body provided a natural basis for all units of measurement. The figure below represents which unit of traditional Bhutanese measurement:

- a) Tho
- b) Thru
- c) Dom
- d) Lhache



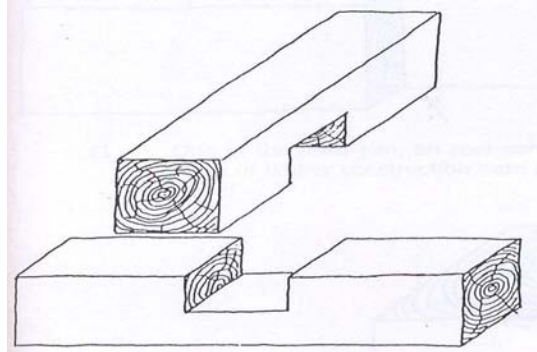
19. Carpenters are known to use several types of tool for carpentry work. The sketch below is of a tool that is used by traditional Bhutanese carpenter to provide a smooth finish for beam or joist:

- a) Tarey
- b) Patang
- c) Bjilee
- d) Banki



20. The traditional timber construction technique in Bhutan employs several types of wood joints, which contribute towards the strength, rigidity and aesthetic of the overall timber frame structure. The sketch below is of a joint that is used during the construction of timber cornices. Name the joint.

- a) Dovetail joint
- b) Mortise and Tenon joint
- c) Lap joint
- d) Scarf joint



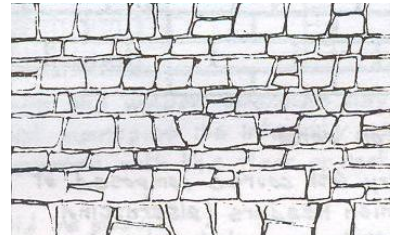
21. One of the most common traditional Bhutanese roofs is shown in the sketch below. Name the roof style.

- a) Jamthog
- b) Jabzhi
- c) Chenkhep
- d) Lung-go



22. The sketch below is the elevation of a stone masonry wall. Which type of masonry is reflected below?

- a) Coursed Ashlar
- b) Random Rubble
- c) Coursed Rubble
- d) Rusticated



23. As a general rule of thumb, the strength of a beam will:

- a) Increase according to the square of its increase in depth
- b) Decrease according to the square of its increase in depth
- c) Increase according to the cube of its increase in length
- d) Decrease according to the cube of its increase in length

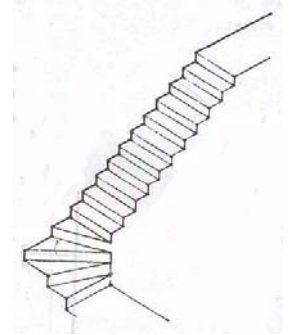
24. A member of wood, brick or concrete that is fixed horizontally to support the structure above the opening is known as:

- a) Sill
- b) Jambs
- c) Lintel
- d) Tie

25. An architectural feature consisting of a large projecting moulded course which is fixed near to the top of the wall is known as
- a) Cornices
 - b) Freize
 - c) Copings
 - d) Parapet

26. The sketch below represents one of the many types of stair. Name the type:

- a) Spiral stair
- b) 'L' stair
- c) Winder stair
- d) 'U' return stair



27. What would be most effective in reducing the deflection of a uniformly loaded, simply supported beam?
- a) Reducing the load by 10%
 - b) Reducing the span by 10%
 - c) Increasing the moment of inertia, I , by 10%
 - d) All of the above are equally effective

28. The main body of the church, which is used as the central approach to the high altar is called
- a) Aisle
 - b) Chancel
 - c) Nave
 - d) Triforium

29. Which of the following admixtures should be added to accelerate concrete setting?
- a) Sodium Chloride
 - b) Sodium Carbonate
 - c) Potassium Chloride
 - d) Calcium Chloride

30. A sun-facing wall built from material that can act as a thermal mass (stone, metal, concrete or adobe) combined with an air space, insulated glazing and vents to form a large solar thermal collector is called
- a) Buttress wall
 - b) Trombe wall
 - c) Curtain wall
 - d) Retaining wall

SECTION 2: SHORT ANSWER QUESTIONS

(20 marks – 5 marks for each question)

Instructions:

Answer all 4 questions in this section. Copy the question number and write the answers to that question in the separate Answer Book provided.

Question 31:

List the salient features of traditional Bhutanese architecture that differentiate religious buildings from vernacular buildings. Describe them briefly and provide sketches to aid your descriptions.

Question 32:

As an architect trained to work more with modern construction materials and techniques, will you propagate the use of traditional materials and construction technique through your design in Bhutan? Support your answers by listing the advantages and disadvantages.

Question 33:

In the last five years of your study, whose work has had the greatest influence in your designs? You may use drawings or sketches to emphasize your answer.

Question 34:

If you are to design a passive solar efficient building in Thimphu, which aspects of the design would you work on to produce the desired result. Provide illustrations, where necessary.

SECTION 3: CASE STUDY QUESTIONS

(50 marks)

Instructions:

Out of the two questions in this section, select and answer only ONE question. Copy the question number and write the answers to that question in the separate Answer Book provided. Please note that the mark for this section is 50% of the total marks.

Question 35:

“By studying aspects of cultural transfer from a praxiological point, we have identified three potential factors that may unveil the role of the dzong as key to the understanding of what may well be understood by the ‘dynamics’ of Bhutan’s ‘living’ architecture: 1. The cultural role and authority of the master-builder; 2. Bhutan’s application of ‘nailess’ architecture; 3. The dzong as cultural centre.”

Dujardin, Marc .2000. ‘From Living to Propelling Monument: the Monastery-Fortress (dzong) as Vehicle of Cultural Transfer in Contemporary Bhutan’. Journal of Bhutan Studies, vol.2, no.2, Thimphu.

- a) Bhutan is one of the few countries in the world that can flaunt its traditional buildings as ‘living’ heritage buildings. How will you interpret this ‘living’ aspect of the traditional buildings in Bhutan? Is this something that Bhutan should sustain in the near future or should Bhutan work on phasing out this ‘living’ aspect, especially heritage buildings, for sake of modernization. (25 marks)

- b) Most publications that mention Bhutanese architecture emphasize the 'nailless' character of traditional Bhutanese architecture and its construction technique. Support this statement by describing the 'nailless' characteristic of Bhutanese architecture and use as many illustrations and sketches to clarify your description. (25 marks)

Question 36:

Mr. Kinley and his wife Ms. Deki are young Bhutanese couple with a 15 year old son and an 11 year old daughter. Mr. Kinley owns a book shop in the main Thimphu city, whereas Ms. Deki has recently completed her baking training. The family owns a plot of land in Thimphu measuring 30 m X 30 m. Their plot is on a gradual slope that can be easily accessed by 5m wide road from the main highway. Furthermore, the area where the plot is located attracts large number of visitors, both local and foreign, as the site overlooks Thimphu valley towards east, thereby providing the plot with a good view of Thimphu valley especially Tashichho Dzong.

Ever since Mr. Kinley has learnt that the Municipal Corporation has approved a number of development proposals in his plot area, he wants to undertake a mixed use development of his plot. After careful planning and discussion, Mr. Kinley and Ms. Deki have approached you to design their new residence cum bookshop and café. Since the couple is aware of the maximum height permissible on their plot, they have clearly informed you that they would like to use the entire ground floor to house a café that is neatly integrated with a book and souvenir gift shop. Since their plot gets a good view of Thimphu valley, they would preferably like to have a sun deck, which can be used as an extension of their café. On the other hand, they want a comfortable home for the family on the first floor.

Upon checking with the Municipal Corporation and the relevant Development Control Regulations (DCR) for the area in which Mr. Kinley’s plot is located, you find the following development guidelines and restrictions:

DESIGNATED PRECINT	PLOT AREA	MAX. PLOT COVERAGE	SET BACKS Front, Side & Rear	MAX. HEIGHT
	(Sqm.)	(%)	Meter	No. of Floors
Urban Village Periphery	371.6 ~ 1000	40	3m on three sides and 5m on the side accommodating the septic tank	2

USES PERMISSIBLE
Apartments and group housing are permitted. Residential, local level retail shops and services, household economic activity and cottage industries not involving use of, or installations of, a machinery driven by more than 1 KW power and which do not create noise, vibrations, fumes, dust, etc. only in independent dwellings units. Commercial uses like local level retail shops, internet browsing centre, fast food outlets, canteens, snack bars will be permitted only on the ground floor per plot. Bars, discotheque, pool rooms and any other night time recreational centers and activities contradicting with residential uses would not be permitted.

Describe how you would approach this project and the different processes you would have to take your client through to ensure that the project meets both client’s objectives and achieves development permission from the Municipal Corporation. Propose a design concept and describe why you have arrived at it. Provide basic schematic design drawings (site layouts, plans, elevations and sections – do not forget to indicate the north direction). (50 marks)
