

VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF PHYSICS

QUESTION BANK



II SEMESTER

PH8201-PHYSICS FOR CIVIL ENGINEERING

Regulation – 2017

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DEPARTMENT OF PHYSICS

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SUBJECT : PH8201-PHYSICS FOR CIVIL ENGINEERING

SEM / YEAR: II SEM/AY-2017-2018

UNIT I - THERMAL PERFORMANCE OF BUILDINGS

Heat transfer through fenestrations, thermal insulation and its benefits - heat gain and heat loss estimation - factors affecting the thermal performance of buildings, thermal measurements, thermal comfort, indices of thermal comfort, climate and design of solar radiation, shading devices - central heating. Principles of natural ventilation - ventilation measurements, design for natural ventilation - Window types and packaged air conditioners - chilled water plant - fan coil systems -water piping - cooling load - Air conditioning systems for different types of buildings – Protection against fire to be caused by A.C.Systems.

PART - A

Q.No	Questions	BT	Competence
1.	What is meant by fenestration and why do we require it?	BT L 2	Understand
2.	What is thermal insulation?	BT L 1	Remember
3.	What are the principles of thermal insulation?	BT L 2	Understand
4.	List out the benefits of thermal insulation.	BT L 2	Understand
5.	Define heat gain and heat loss.	BT L 2	Understand
6.	List few factors which affect performance of the building.	BT L 4	Analyse
7.	State the significance of thermal comfort.	BT L 1	Remember
8.	What is thermal performance of the building?	BT L 3	Apply
9.	Define thermal indices?	BT L 1	Remember
10.	Define solar radiation.	BT L 4	Analyse
11.	What are the uses of shading devices?	BT L 2	Understand
12.	Write the significance of central heating.	BT L 3	Apply
13.	What is ventilation?	BT L 1	Remember
14.	How will you classify natural ventilation?	BT L 2	Understand
15.	How is chilled water plant different from other systems?	BT L 4	Analyse
16.	Write at least two advantages of fan coil systems.	BT L 2	Understand
17.	What is cooling load?	BT L 5	Evaluate
18.	What do you mean by air-conditioning?	BT L 2	Understand
19.	What are the types of water piping?	BT L 2	Understand
20.	Mention at least two precautions to prevent fire caused by AC systems.	BT L 2	Understand

PART - B

1.	i) What is meant by fenestration and what are the advantages? (6) ii) Describe the benefits of thermal insulation. (7)	BT L 2	Understand
2.	Discuss in detail the factors affecting the thermal performance of building. (13)	BT L 2	Understand
3.	Discuss heat gain and heat loss estimation in the components of buildings. (13)	BT L 2	Understand

4.	Describe climate and design of solar radiation. (13)	BT L 2	Understand
5.	.Explain in detail i) Central heating, (7) ii) Principe of natural ventilation (6)	BT L 1	Remember
6.	Discuss in detail the ventilation in a building and explain how is the ventilation is measured? (13)	BT L 1	Remember
7.	Explain in detail the design and the measurements for natural ventilation in a Building. (13)	BT L 2	Understand
8.	Discuss in detail the window type and packaged air conditioner systems. (13)	BT L 1	Remember
9.	Describe the principle, construction and working of chilled water plant with neat diagram. (13)	BT L 1	Remember
10.	Write short note on (i) Fan coil system with its block diagram.(7) (ii) Designing o f natural ventilation. (6)	BT L 4	Analyse
11.	Write short note on (i) Water piping (6) (ii) Cooling load (7)	BT L 4	Analyse
12.	Explain in detail the different types of air-conditioning systems. (13)	BT L 1	Remember
13.	Discuss in detail the centralized air conditioning systems for different types of buildings. (13)	BT L 4	Analyse
14.	Discuss the air conditioning systems for different types of buildings and protection against fire caused by AC system. (13)	BT L 1	Remember

UNIT II - ACOUSTICS

Classification of sound- decibel- Weber–Fechner law – Sabine’s formula- derivation using growth and decay method – Absorption Coefficient and its determination –factors affecting acoustics of buildings and their remedies. Methods of sound absorptions - absorbing materials - noise and its measurements, sound insulation and its measurements, impact of noise in multi-storeyed buildings.

PART – A

Q.No	Questions	BT Level	Competence
1.	Classify sound waves based on frequency.	BTL 1	Knowledge
2.	Define intensity of sound.	BTL 1	Knowledge
3.	What is a decibel?	BTL 2	Understand
4.	State Weber-Fechner law.	BTL 4	Analyse
5.	Mention a few sound absorbing materials.	BTL 4	Analyse
6.	Define absorption coefficient of a material. What is its unit?	BTL 1	Knowledge
7.	A hall has a volume of 5000 m^3 . It is required to have reverberation of 1.5 second. What should be the total absorption in the hall?	BT L 5	Evaluate

8.	What are the acoustical factors to be considered while construct any building?	BTL 6	Creating
9.	What is the role of sound absorbers in a good acoustical building?	BTL 4	Analyse
10.	Describe about various types o f sound absorbers with their physical characteristic	BTL 1	Knowledge
11.	Mention few methods to measure sound absorption coefficients.	BTL 2	Understand
12.	Mention few factors affecting the acoustics of building.	BTL 3	Apply
13.	Define reverberation and reverberation time.	BTL 4	Analyse
14.	What are the sources of noise?	BTL 3	Apply
15.	How is the noise produced in a building?	BTL 3	Apply
16.	What is structural born noise?	BTL 4	Analyse
17.	How noises are measured?	BTL 3	Apply
18.	What is sound insulation? How it is measured?	BTL 3	Apply
19.	What are the main causes of noise in multi-storeyed building?	BTL 4	Analyse
20.	Mention the requirements for good acoustics of building?	BTL 1	Knowledge
PART – B			
1.	Derive Sabine’s formula for the reverberation time of a Hall. Explain the growth and decay of sound energy. (13)	BTL2	Understand
2.	Derive Sabine’s mathematical relation for reverberation time. (13)	BTL 4	Analyse
3.	Explain the various factors that affect acoustics of buildings. What are their remedies? (13)	BTL 2	Understand
4.	i) Describe the methods of sound absorption in buildings. (6) ii) How will you estimate absorption coefficient of the hall? (7)	BTL 1	Knowledge
5.	Discuss the various types of sound absorbing materials. (13)	BTL 1	Knowledge
6.	Describe different types of sound absorbers used in designing a building with good acoustical properties. (13)	BTL 2	Understand
7.	Write note on different types of noises in buildings. (13)	BTL 2	Understand
8.	What are the mechanisms involved in the sound absorption? Explain in detail the sound measurements and the noise insulation in the buildings. (13)	BTL 4	Analyse
9.	Write in detail the various methods of sound absorptions. What are sound absorption materials? (13)	BTL 4	Analyse
10.	Explain in detail the various methods of sound absorptions. (13)	BTL 3	Apply
11.	i) What are the remedies to protect good acoustics of the building? (6) ii) How will you measure the noise produced inside the building? (7)	BTL 1	Knowledge
12.	What is sound insulation? Explain, how it is measured? (13)	BTL 2	Understand
13.	Describe the methods are used to reduce the noise in a multi-storey buildings and how can one calculate the sound absorption coefficient? (13)	BTL 2	Understand

14.	Discuss in detail about impact of noise in multi-storeyed buildings. (13)	BTL 4	Analyse
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UNIT III - LIGHTING DESIGNS

Radiation quantities – spectral quantities – relationship between luminescence and radiant quantities – hemispherical reflectance and transmittance – photometry: cosines law, inverse square law. Vision – photopic, mesopic, scotopic visions. Colour – luminous efficiency function - Visual field glare, colour - day light calculations - day light design of windows, measurement of day-light and use of models and artificial skies, principles of artificial lighting, supplementary artificial lighting.

PART – A

Q.No	Questions	BT Level	Competence
1.	Define radiant Power	BTL1	Remember
2.	Define Radiant intensity.	BTL1	Remember
3.	Define irradiance.	BTL1	Remember
4.	How hemispherical reflectors are formed?	BTL4	Analyse
5.	Define hemispherical transmittance.	BTL1	Remember
6.	What is luminous flux?	BTL2	Understand
7.	Define luminous intensity.	BTL1	Remember
8.	Define candela.	BTL1	Remember
9.	Define intensity of illumination.	BTL1	Remember
10.	What is Photometry?	BTL2	Understand
11.	State Cosines law.	BTL1	Remember
12.	What are Photopic, mesopic and scotopic?	BTL2	Understand
13.	What do you mean by glare? How does it affect the optical performance of the hall?	BTL3	Apply
14.	Mention different types of glare.	BTL3	Apply
15.	Define discomfort glare.	BTL2	Understand
16.	What are the reducing factors of visibility?	BTL2	Understand
17.	What is meant by average day light factor?	BTL2	Understand
18.	What is the use of models in daylight calculation?	BTL4	Analyse
19.	Explain briefly artificial sky models.	BTL5	Evaluate
20.	Mention few artificial light sources.	BTL5	Evaluate

PART – B

1.	Discuss the different radiometric quantities. (13)	BTL2	Understand
2.	Discuss the different photometric quantities. (13)	BTL2	Understand
3.	Describe relations between radiant and luminous characteristics of radiation. (13)	BTL2	Understand
4.	State Cosines law and derive the expression for intensity of illumination. (13)	BTL4	Analyse
5.	Show that luminance on a surface is inversely proportional to the square of the distance. (13)	BTL4	Analyse
6.	Explain the following a) Photopic b) Mesopic c) Scotopic (4+4+5)	BTL1	Remember
7.	Explain colour – luminous efficiency function. (13)	BTL2	Understand
8.	Write notes on a) Visual field glare b) day light calculation c) day light factor. (4+4+5)	BTL1	Remember

9.	Write in detail about the day light design and measurements in the buildings. (13)	BTL1	Remember
10.	Write detailed note on effect of window shape and size-on day light. (13)	BTL1	Remember
11.	What is meant by day light factor? Describe about the role of artificial sky in building lighting design. (13)	BTL4	Analyse
12.	Explain the possible methods to measure the day light in a building with neat diagram. (13)	BTL1	Remember
13.	Write in details the Principles and techniques involved in the artificial lightings. (13)	BTL1	Remember
14.	Describe principles of artificial lighting and supplementary artificial lighting. (13)	BTL2	Understand

UNIT IV - NEW ENGINEERING MATERIALS

Composites - definition and classification - Fibre reinforced plastics (FRP) and fiber reinforced metals (FRM) - Metallic glasses - Shape memory alloys - Ceramics - Classification - Crystalline - Non Crystalline - Bonded ceramics, Manufacturing methods - Slip casting - Isostatic pressing - Gas pressure bonding - Properties - thermal, mechanical, electrical and chemical ceramic fibres - ferroelectric and ferromagnetic ceramics - High Aluminium ceramics.

PART - A

Q.No	Questions	BT Level	Competence
1.	What are composite materials?	BTL2	Understand
2.	What are the types of composites based on matrix materials?	BTL2	Understand
3.	What is fibre reinforced plastics?	BTL2	Understand
4.	What are the types of fibre reinforced plastics?	BTL2	Understand
5.	What is the role of matrix in FRP in composites?	BTL3	Apply
6.	Mention the application of composites.	BTL3	Apply
7.	What are Metallic glasses?	BTL1	Remember
8.	Mention the properties of metallic glasses.	BTL3	Apply
9.	List the advantages of metallic glasses as transformer core materials.	BTL5	Evaluate
10.	What are shape memory alloys?	BTL2	Understand
11.	What is pseudo elasticity?	BTL2	Understand
12.	What are ceramic materials?	BTL1	Remember
13.	Distinguish between crystalline and Non crystalline ceramics.	BTL4	Analyse
14.	Write the mechanical properties of ceramics.	BTL5	Evaluate
15.	What are the applications of ceramics?	BTL2	Understand
16.	What are ferromagnetic ceramics?	BTL2	Understand

17.	What are ferroelectric ceramics?	BTL2	Understand
18.	Write a note on slip casting.	BTL5	Evaluate
19.	What is high alumina ceramics?	BTL2	Understand
20.	State any four applications of High Aluminium ceramics?	BTL3	Apply
PART – B			
1.	Discuss the classification of composites. Give detailed study of FRP and FRM. (13)	BTL1	Remember
2.	Explain in detail the preparation, properties and applications of Fibre reinforced plastics. (13)	BTL2	Understand
3.	Explain in detail the preparation and the properties of metallic glasses. (13)	BTL2	Understand
4.	How are metallic glasses prepared? Explain how the melt spinner device can be used to produce met glasses. (13)	BTL2	Understand
5.	What are shape memory alloys? How are they prepared? Explain with neat diagram their characteristics. List out any four applications of shape memory alloys. (13)	BTL4	Analyse
6.	Discuss in detail the manufacturing process of ceramics and its applications. (13)	BTL3	Applying
7.	What are ceramic materials? Discuss the various properties and applications in the construction engineering. (13)	BTL3	Apply
8.	Discuss the classification of ceramics. (13)	BTL4	Analysing
9.	Describe slip casting process in detail and mention different ceramic forming processes. (13)	BTL2	Understand
10.	Explain the following manufacturing methods of ceramics i) Slip casting ii) Isostatic pressing iii) Gas pressure bonding. (4+4+5)	BTL1	Remember
11.	Explain thermal, mechanical, electrical and chemical properties of ceramic materials. (13)	BTL4	Analyse
12.	Discuss in detail the manufacturing process of ceramics and its applications. (13)	BTL2	Understand
13.	Discuss the characteristics, Advantages and applications of ceramic fibres. (13)	BTL3	Apply
14.	Write note on i) Ferroelectric ceramics ii) Ferro magnetic iii) High aluminium ceramics. (4+4+5)	BTL1	Remember

UNIT V - HAZARDS

Seismology and Seismic waves - Earth quake ground motion - Basic concepts and estimation techniques - site effects - Probabilistic and deterministic Seismic hazard analysis - Cyclone and flood hazards - Fire hazards and fire protection, fire-proofing of materials, fire safety regulations and fire fighting equipment - Prevention and safety measures.

PART - A

Q.No	Questions	BT	Competence
1.	What are seismic waves?	BTL2	Understand
2.	Explain P - waves and S-waves.	BTL1	Remember
3.	Define the two types of surface waves.	BTL2	Understand
4.	What are anthropogenic hazards?	BTL1	Remember
5.	Define intensity of earthquake.	BTL1	Remember
6.	What are the causes of earthquake?	BTL4	Analyse
7.	Mention few units for the measurement of earthquakes?	BTL2	Understand
8.	What is SHA? Mention the most important factors affecting seismic	BTL1	Remember
9.	Write about DSHA.	BTL1	Remember
10.	What is probabilistic seismic hazard analysis?	BTL2	Understand
11.	Write the four steps in PSHA.	BTL2	Understand
12.	What is storm surge?	BTL1	Remember
13.	What are the categories of cyclone based on wind speeds their capacity to cause damage?	BTL1	Remember
14.	What is flood hazard?	BTL1	Remember
15.	List the methods of flood prevention.	BTL2	Understand
16.	Write briefly the fire prevention code.		
17.	What is fire hazards and list the types.	BTL2	Understand
18.	What do you mean by the fire extinguisher? Give examples.	BTL4	Analyse
19.	What are fire-proofing materials?	BTL1	Remember
20.	Mention the fire safety regulations.	BTL2	Understand

PART - B

1.	Discuss the various earthquake hazards and explain the disaster mitigation after earthquake. (13)	BTL3	Apply
2.	Discuss earthquake ground motion with types, intensity and magnitude. (13)	BTL2	Understand
3.	Describe the earthquake in terms of p-waves, s-waves and explain various parameters. (13)	BTL2	Understand
4.	Explain Deterministic seismic hazard analysis and probabilistic seismic hazard analysis. (13)	BTL1	Remember
5.	Discuss the Deterministic seismic hazard analysis. (13)	BTL1	Remember
6.	Explain in detail how the cyclone is formed. What are the different types? (13)	BTL4	Analyse
7.	Discuss in detail the cyclone and the flood hazards. What are the safety measures? (13)	BTL3	Apply

8.	Explain cyclone hazard with cause and effects. (13)	BTL4	Analyse
9.	What are the flood hazards? Explain the preventive measures. (13)	BTL3	Apply
10.	Explain in detail the flood hazards. (13)	BTL2	Understand
11.	Discuss the various hazards due to Fire in a multi-storey building and guidance on preventive measure, first aid and other ways to minimize damages. (13)	BTL4	Analyse
12.	Describe fire proofing materials. (13)	BTL1	Remember
13.	Explain in detail the operation of different types of fire extinguishers equipments. (13)	BTL5	Evaluate
14.	Explain in detail the fire safety regulations and fire fighting equipments. (13)	BTL3	Apply

CIVIL Q B VEC PHYSICS