

# AR: ARCHITECTURE AND PLANNING

1

AI25BTECH11011

1) Natural granite used for cladding in buildings belongs to the category of

- a) Igneous Rock      c) Sedimentary      d) Metamorphic
- b) Acid Rock      Rock      Rock

(GATE AR 2010)

2) 'Flying Buttress' is an architectural element of

- a) Indian Architecture      c) Gothic Architecture
- b) Greek Architecture      d) Byzantine Architecture

(GATE AR 2010)

3) A major hole in the Ozone layer has been identified above the

- a) Amazon Forest      c) Savannah Grasslands
- b) Arctic Region      d) Sahara Desert

(GATE AR 2010)

4) A flat arch at the skewback should NOT have an angle less than

- a) 30°      b) 45°      c) 60°      d) 90°

(GATE AR 2010)

5) Primary colours of natural light are

- a) Red, Blue, Yellow      c) Red, Violet, Yellow
- b) Red, Green, Blue      d) Red, Green, Yellow

(GATE AR 2010)

6) Horizontal member of a shutter that subdivides a window is termed as

- a) Mullion      b) Transorn      c) Reveal      d) Purlin

(GATE AR 2010)

7) If the temperature of a composite bar made of copper and steel is raised, then the copper bar will be under

- a) Tension                      b) Compression                      c) Shear                      d) Torsion

(GATE AR 2010)

8) E.I.A. stands for

- a) East India Association                      c) Environment Impact in Asia  
b) Environmental Impact Audit                      d) Environmental Impact Assessment

(GATE AR 2010)

9) A steel truss with parallel upper and lower chords and inclined connecting members forming a series of equilateral triangles is known as

- a) Bowsiring Truss                      c) Kingpost Truss  
b) Warren Truss                      d) Scissors Truss

(GATE AR 2010)

10) In water supply systems, the 'Reflux Valves' allow water to flow

- a) In one direction only                      c) Through air locked joints  
b) In both directions                      d) Only under low pressure

(GATE AR 2010)

11) In Islamic Architecture, the circular dome was constructed over a square configuration through

- a) Grid Iron Coffered Slab  
b) Pendentives and Squinch Arches  
c) Double Barrel Vault and Jack Arches  
d) Horizontal Cross Tie Members

(GATE AR 2010)

12) With respect to energy conservation and cost efficiency, the nature of an ideal built form should be

- a) High Rise Low Density                      c) Low Rise High Density  
b) Medium Rise High Density                      d) Low Rise Low Density

(GATE AR 2010)

13) Two default sequences P and Q are given below :

P: Specify height of extrusion or [Path]: 50

Specify angle of taper for extrusion < 0 >:

Q: Specify height of extrusion or [Path]: p

Select extrusion path or [Taper angle]:

The above mentioned sequences P and Q respectively, belong to

- a) 2D AutoCAD and 2D AutoCAD
- b) 2D and 3D AutoCAD
- c) 3D and 2D AutoCAD
- d) 3D AutoCAD and 3D AutoCAD

(GATE AR 2010)

14) When shear stress exceeds the permissible limit in a RCC slab, then this problem is solved by

- a) Increasing the slab depth
- b) Providing shear reinforcement
- c) Using high strength steel
- d) Using thinner bars but more in number

(GATE AR 2010)

15) Considering the total heat losses from all fluorescent lamps to be 79%, the Heating load (Btu / hr) due to office illumination with 48 ceiling mounted luminaires, each containing four 40 W fluorescent lamps and flat surface diffusers will be

- a) 10000 Btu / hr
- b) 15000 Btu / hr
- c) 17500 Btu / hr
- d) 21000 Btu / hr

(GATE AR 2010)

16) Prime resultant forces that develop in a structure due to an earthquake depend on

- a) Mass and Surface Area of structure
- b) Surface Area and Stiffness of structure
- c) Stiffness and Mass of structure
- d) Surface Area and Volume of structure

(GATE AR 2010)

17) Concept of 'Serial Vision' has been applied to the approach layout of

- a) Victoria Memorial Complex, Kolkata
- b) Umaid Bhawan Palace, Jodhpur
- c) Vidhan Soudha Precinct, Bangalore
- d) Rashtrapati Bhawan Complex, New Delhi

(GATE AR 2010)

18) Advanced Traffic Lane Information is an important feature of

- a) Para Transit system
- b) Intelligent Transportation system
- c) High Level Cable Car system
- d) Pedestrian Travellator system

(GATE AR 2010)

19) A local authority can go for Urban Development through

- a) Land Acquisition
- b) Land Pooling
- c) Transferable Development Rights
- d) All the above

(GATE AR 2010)

20) The Planning document submitted for the selected cities under JNNURM is

- a) Master Plan
- b) Basic Development Plan
- c) City Development Plan
- d) Outline Development Plan

(GATE AR 2010)

21) Excessive tilt of the Leaning Tower of Pisa has been checked by

- a) Pumping cement concrete mix under the dipping foundation
- b) Relocating heavier furniture to the rising side of the tower
- c) Raising the dipping side by massive Jack screws
- d) Pumping out mud and slurry from the foundation base of the rising side

(GATE AR 2010)

22) The Pritzker Prize 2009 has been awarded to

- a) Zaha Hadid
- b) Peter Zumthor
- c) Jean Nouvel
- d) Norman Foster

(GATE AR 2010)

23) The age of a tree is determined by

- a) Counting the number of rings in the stem cross section
- b) Counting the number of leaves on the main branches
- c) Measuring the height of the tree from the rootball
- d) Measuring the canopy circumference of the tree

(GATE AR 2010)

24) Nakagin Capsule Tower, Tokyo famous for its spatial modular approach was designed by

- a) Arata Isozaki
- b) Tadao Ando
- c) Kisho Kurokawa
- d) Minoru Yamasaki

(GATE AR 2010)

25) Proportioning system used in the layout of Mughal Gardens is derived from

- a) Rational number system
- b) Constants of equilateral triangle
- c) Irrational number system
- d) Constants of right angled isosceles triangle

(GATE AR 2010)

26) Match the cities in Group I with their form in Group II

Group I	Group II
P. Detroit	1. Star Form
Q. Copenhagen	2. Polycentred Net
R. Stalingrad	3. Linear City
S. San Francisco	4. Ring Form
	5. Galaxy

- a) P - 1, Q - 4, R - 3, S - 2  
b) P - 2, Q - 1, R - 3, S - 4

- c) P - 5, Q - 1, R - 2, S - 3  
d) P - 4, Q - 3, R - 1, S - 5

(GATE AR 2010)

27) Match the visionaries in Group I with their concepts in Group II

**Group I**

- P. Clarence A. Perry  
Q. Constantinos Doxiadis  
R. Paul Davidoff  
S. Walter Gropius

**Group II**

1. Post Modernism  
2. Bauhaus  
3. Advocacy Planning  
4. Dynopolis  
5. Neighborhood Unit

- a) P - 5, Q - 4, R - 3, S - 2  
b) P - 5, Q - 4, R - 2, S - 1

- c) P - 1, Q - 3, R - 2, S - 1  
d) P - 2, Q - 4, R - 2, S - 5

(GATE AR 2010)

28) Match the trees in Group I with their botanical names in Group II

**Group I**

- P. Neem  
Q. Amaltas  
R. Pipal  
S. Asoka

**Group II**

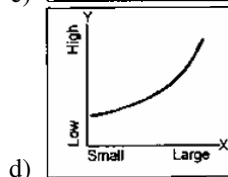
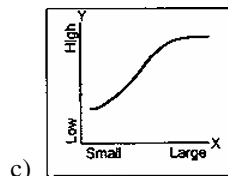
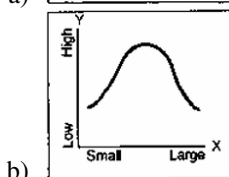
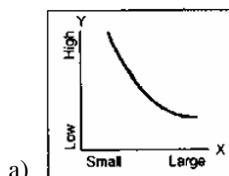
1. Cassia Fistula  
2. Azadirachia Indica  
3. Ficus Bengalensis  
4. Ficus Religiosa  
5. Saraca Indica

- a) P - 1, Q - 2, R - 3, S - 4  
b) P - 3, Q - 4, R - 5, S - 1

- c) P - 2, Q - 1, R - 4, S - 5  
d) P - 2, Q - 3, R - 5, S - 4

(GATE AR 2010)

29) Following graphs represent the relationship between city size (in terms of population) on X-axis and area under residential use (in percent) on Y-axis. Identify the correct graph.



(GATE AR 2010)

- 30) Global climate change is expected to bring about a combination of the following changes. Identify the correct combination.

P. Increase in Biodiversity  
 Q. Emergence of New Diseases  
 R. Loss of Biodiversity  
 S. Loss of all Rocky Outcrops  
 T. Sea Level Rise  
 U. Extinction of Polar Bears  
 V. Emergence of New Islands

- a) P, Q, R, S      b) Q, R, T, U      c) R, T, U, V      d) Q, R, U, V

(GATE AR 2010)

- 31) Annual housing demand of a metropolitan city is estimated through the combination of the following components. Identify the correct combination.

P. New Entrants to the City  
 Q. Elderly Population Living in Cities  
 R. New Relocated Slum Dwellers  
 S. Slum Squatter Dwellers  
 T. Unauthorized Dwelling Units  
 U. Dilapidated Houses  
 V. Part of Backlog  
 W. Any Other Houses

- a) P, R, T      b) U, S, Q      c) W, Q, T      d) P, U, V

(GATE AR 2010)

- 32) A square pin jointed truss is subjected to a load  $P$ , acting in the direction of member  $US$ , at joint  $U$ . The force in member  $UR$  is

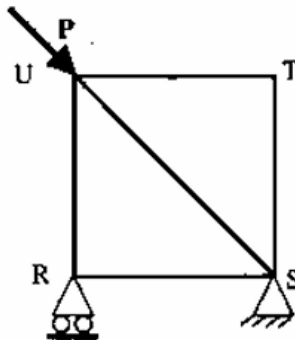


Fig. 32

- a) 1.414 P      b) 1.000 P      c) 0.707 P      d) 0.000 P

(GATE AR 2010)

- 33) Given below is the sketch plan of a site showing contours. The broken lines show valleys and ridges. Identify the ridges and valleys.

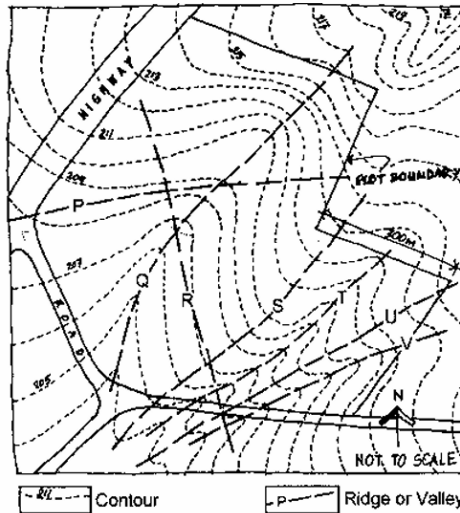


Fig. 33

- |  |                                     |
|--|-------------------------------------|
| a) Ridges: P, Q, R<br>Valleys: S, T, T | c) Ridges: S, U<br>Valleys: Q, T, V |
| b) Ridges: T, V<br>Valleys: R, T, U    | d) Ridges: R, V, U<br>Valleys: P, T |

(GATE AR 2010)

- 34) From the following, identify the factors which influence the loudness of sound to a listener in an enclosure
- P. Loudness of sound at source
  - Q. Directivity factor
  - R. Length/Width ratio of the enclosure
  - S. Distance between sound source and listener
  - U. Sound absorption co-efficient of all enclosing surfaces
  - V. Surface area of enclosing surfaces
  - Y. Inside temperature level of the enclosure

- a) P, Q, S, Y, V      b) Q, R, S, U, Y      c) P, R, S, U, V      d) P, Q, S, U, V

(GATE AR 2010)

- 35) Match the lamps in Group I with their Colour Rendering Index (CRI) in Group II

<b>Group I</b>	<b>Group II</b>
P. Mercury Vapour	1.65 - 70
Q. Metal Halide	2.40 - 55
R. High-pressure sodium	3.20 - 25
S. Low-pressure sodium	4.60 - 64

- a) P - 4, Q - 2, R - 1, S - 3                      c) P - 2, Q - 1, R - 4, S - 3  
b) P - 3, Q - 2, R - 4, S - 1                      d) P - 4, Q - 3, R - 2, S - 1

(GATE AR 2010)

36) Match the terms in Group I with the architectural elements in Group II

<b>Group I</b>	<b>Group II</b>
P. Tympanum	1. Auditorium Stage
Q. Proscenium	2. Door or Window Bands
R. Campanile	3. Circular House
S. Dymaxion	4. Church Tower
	5. Horizontal Space for Services

- a) P - 1, Q - 3, R - 2, S - 4                      c) P - 2, Q - 1, R - 4, S - 3  
b) P - 2, Q - 3, R - 4, S - 1                      d) P - 1, Q - 2, R - 3, S - 5

(GATE AR 2010)

37) Identify the most representative percentage distribution of landuse for a medium urban centre, according to UDPFI guidelines, where  
Residential = R, Commercial = C, Transport = T, Industry = I.

- a) R = 30%, C = 20%, T = 12%, I = 10%  
b) R = 45 %, C = 4%, T = 14%, I = 8%  
c) R = 30%, C = 4%, T = 14%, I = 15%  
d) R = 45%, C = 10%, T = 12%, I = 10%

(GATE AR 2010)

38) If the area of a plot is 1000 sq.m, area of its adjoining roads is 500 sq.m., maximum permissible FAR is 150 and maximum permissible Ground Coverage is 50%, then utilizing fullest ground coverage and assuming floors of equal area, the number of storeys that can be built on the plot is

- a) 6                      b) 4                      c) 3                      d) 2

(GATE AR 2010)

39) Match the buildings in Group I with their architects in Group II



**Group I**

P. British Council Library, New Delhi

Q. Osho Commune Campus, Pune

R. CII Solrabji Godrej Green Business Centre, Hyderabad

S. IIM New Campus, Ahmedabad

**Group II**

1. Hasmukh C. Patel

2. Charles Correa

3. Hafeez Contractor

4. Karan Grover

5. Balkrishna V. Doshi

a) P - 1, Q - 2, R - 3, S - 4

b) P - 2, Q - 3, R - 4, S - 1

c) P - 2, Q - 3, R - 5, S - 1

d) P - 5, Q - 4, R - 3, S - 2

(GATE AR 2010)

- 40) The age-sex compositions of three communities are represented by the diagrams P, Q and R as shown below.

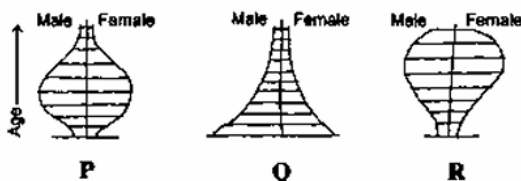


Fig. 40

Each of them implies a strong socio-economic characteristic as indicated below.

a) 1. Aging community

b) 2. Economically vibrant community

c) 3. Multi ethnic community

d) 4. Young community with high birth

rate

Identify the correct set out of the following

a) P - 4, Q - 3, R - 1

b) P - 2, Q - 4, R - 3

c) P - 2, Q - 4, R - 1

d) P - 4, Q - 2, R - 3

(GATE AR 2010)

- 41) The correct requirements provided to seek permission from the local authority for constructing a small residential building are

P - Key Plan

Q - Site Plan

R - Zonal Plan

S - Building Plan

T - Power of Attorney

U - Ownership Title

V - Transport Plan

W - Drainage / Sewerage/ Water Supply Plan

X - Solid waste disposal plan

- a) P, Q, R, S, W      b) P, Q, S, U, W      c) P, S, V, W, X      d) Q, S, T, V, X

(GATE AR 2010)

- 42) Two commands P and Q, in AutoCAD are given below.

P: Current settings: Mode = TFIM, Radius = 0.0000

Select first object or [Polyfine/Radius/Trim/mUltiple]:

Q: (TFIM mode) Current chamfer Dist1 = 0.0000, Dist2 = 0.0000

Select first line or [Polyfine/Distance/Angle/Trim/Method/mUltiple]:

The above mentioned commands are used for

- a) P: Trim and Q: Trim      c) P: Fillet and Q: Chamfer  
b) P: Fillet and Q: Trim      d) P: Trim and Q: Chamfer

(GATE AR 2010)

- 43) A 'T- beam slab' is cast and cured. The shuttering has to be removed. The right sequence for removal of shuttering is

- a) Base of beam → Sides of beam → Base of slab → Vertical support under beam  
b) Base of slab → Sides of beam → Base of beam → Vertical support under beam  
c) Base of slab → Sides of beam → Vertical support under beam → Base of beam  
d) Base of beam → Base of slab → Sides of beam → Vertical support under beam

(GATE AR 2010)

- 44) Bioclimatic chart developed by Victor Olygay shows the relationship between

- a) Temperature and Precipitation      c) Air Movement and Temperature  
b) Relative Humidity and Precipitation      d) Temperature and Relative Humidity

(GATE AR 2010)

- 45) In a display window of height  $H = 8.66$  m, of a retail store, a luminaire of intensity  $L$  is mounted at a distance  $L = 5$  m away from the rear. Its light beam is cast at an angle of  $45^\circ$  from the ceiling, as shown in the figure alongside.

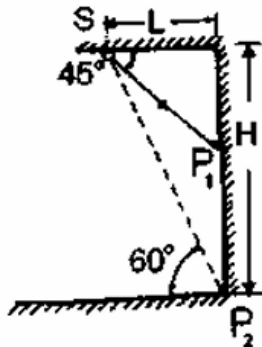


Fig. 45

The ratio of illumination at points  $P_1$  and  $P_2$  is

a)  $1 : \sqrt{3}$

b)  $\sqrt{3} : 2$

c)  $\sqrt{2} : 1$

d)  $1 : 2$

(GATE AR 2010)

46) Following figure shows network for a particular project consisting of four activities.

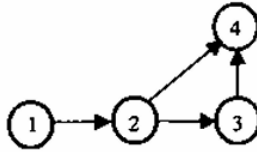


Fig. 46

Normal duration and crash time for each activity are given below.

Activity	Normal duration (in days)	Crash time (in days)
1 - 2	3	2
2 - 3	4	2
2 - 4	5	4
3 - 4	7	5

The minimum time required for completion of project is

a) 9 days

b) 13 days

c) 14 days

d) 19 days

(GATE AR 2010)

47) Pick the **ODD** one from the figures given below with respect to Reflection and Transmission of light.

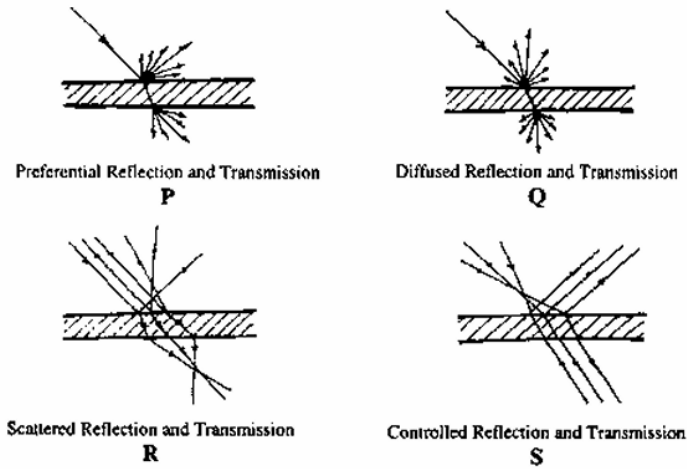


Fig. 47

a) P

b) Q

c) R

d) S

(GATE AR 2010)

**Common Data for Questions****Common Data for Questions 48 and 49:**

A simply support beam PQ is subject to a load of 100 kN through a rigid link at the centre of the beam as shown in the figure below

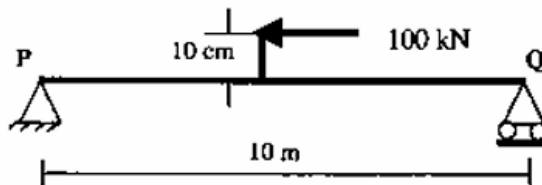
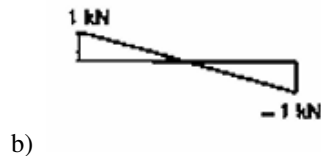
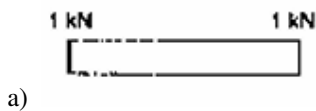


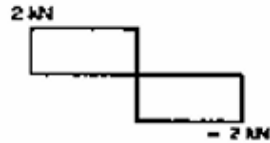
Fig. 47

48) Correct shear force diagram for the beam is





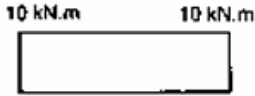
c)



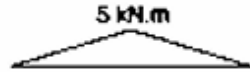
d)

(GATE AR 2010)

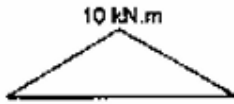
49) Bending moment diagram for the above beam is



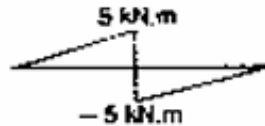
a)



c)



b)



d)

(GATE AR 2010)

**Common Data for Questions 50 and 51:**

A plot of land is to be developed as a residential neighbourhood. The key development conditions and project requirements are given below

Plot area : 1.25 Hectares

Maximum permissible FAR : 350

Maximum permissible ground coverage : 30%

Maximum permissible height : 45 m

Density of population : 800 ppHa

Average household size : 3.55

Building Type	Percentage of Dwelling Units	Total Built up Area (in sq. m)
L.I.G.	20	4480
M.I.G.	55	18600
H.I.G.	25	14200

50) The total number of dwelling units under L.I.G., M.I.G. and H.I.G. respectively, are

	L.I.G.	M.I.G.	H.I.G.
P	56	155	71
Q	60	142	71
R	56	150	63
S	59	155	63

a) P

b) S

c) Q

d) R

(GATE AR 2010)

- 51) With the above data, the covered area of each flat (in sq. m) under L.I.G., M.I.G. and H.I.G. respectively are

	L.I.G.	M.I.G.	H.I.G.
P	70	130	200
Q	80	120	200
R	70	130	220
S	80	120	220

a) Q

b) S

c) R

d) P

(GATE AR 2010)

### Linked Answer Questions

#### Statement for Linked Answer Questions 52 and 53:

A person has purchased an old building at a cost of Rs. 2,50,000/-, excluding the cost of land. The scrap value of the building is 10 % of the cost of purchase and the future life of the building is 20 years.

- 52) The total amount of sinking fund at the end of 20 years will be

a) Rs. 1,35,000/-

b) Rs. 1,90,000/-

c) Rs. 2,25,000/-

d) Rs. 2,30,000/-

(GATE AR 2010)

- 53) If the rate of interest is 7 %, then the annual installment of sinking fund will be

a) Rs. 4,583/-

b) Rs. 4,855/-

c) Rs. 5,507/-

d) Rs. 5,640/-

(GATE AR 2010)

#### Statement for Linked Answer Questions 54 and 55:

A standpipe system in a 39 m tall building has a rooftop reservoir for fire fighting containing  $1/2$  hour water supply.

- 54) Assuming that each floor has one hose, the delivery rate (in litre per second) of the fire hose at greatest pressure is

a) 75

c) 81

b) 78

d) 84

(GATE AR 2010)

- 55) The volume of water (in cubic metre) required for the reservoir is

- a) 105
- b) 110

- c) 120
- d) 130

(GATE AR 2010)

**General Aptitude (GA) Questions**

- 56) 25 persons are in a room. 15 of them play hockey, 17 of them play football and 10 of them play both hockey and football. Then the number of persons playing neither hockey nor football is:

- a) 2
- b) 17
- c) 13
- d) 3

(GATE AR 2010)

- 57) *Choose the most appropriate word from the options given below to complete the following sentence:*

**If we manage to ——— our natural resources, we would leave a better planet for our children.**

- a) uphold
- b) restrain
- c) cherish
- d) conserve

(GATE AR 2010)

- 58) *The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.*

**Unemployed : Worker**

- a) fallow : land
- b) unaware : sleeper
- c) wit : jester
- d) renovated : house

(GATE AR 2010)

- 59) *Which of the following options is the closest in meaning to the word below:*

**Circulious**

- a) cyclic
- b) indirect
- c) confusing
- d) crooked

(GATE AR 2010)

- 60) *Choose the most appropriate word from the options given below to complete the following sentence:*

**His rather casual remarks on politics ——— his lack of seriousness about the subject.**

- a) masked
- b) belied
- c) betrayed
- d) suppressed

(GATE AR 2010)

- 61) Hari (H), Gita (G), Irfan (I) and Saira (S) are siblings (i.e. brothers and sisters). All were born on 1st January. The age difference between any two successive siblings (that is born one after another) is less than 3 years. Given the following facts:
- Hari's age + Gita's age > Irfan's age + Saira's age.
  - The age difference between Gita and Saira is 1 year. However, Gita is not the oldest and Saira is not the youngest.
  - There are no twins.
- In what order were they born (oldest first)?

- a) HSIG                      b) SGHI                      c) IGSB                      d) IHSG

(GATE AR 2010)

- 62) 5 skilled workers can build a wall in 20 days; 8 semi-skilled workers can build a wall in 25 days; 10 unskilled workers can build a wall in 30 days. If a team has 2 skilled, 6 semi-skilled and 5 unskilled workers, how long will it take to build the wall?
- a) 20 days                      b) 18 days                      c) 16 days                      d) 15 days

(GATE AR 2010)

- 63) **Modern warfare has changed from large scale clashes of armies to suppression of civilian populations. Chemical agents that do their work silently appear to be suited to such warfare; and regretfully, there exist people in military establishments who think that chemical agents are useful tools for their cause.** *Which of the following statements best sums up the meaning of the above passage:*
- Modern warfare has resulted in civil strife.
  - Chemical agents are useful in modern warfare.
  - Use of chemical agents in warfare would be undesirable.
  - People in military establishments like to use chemical agents in war.

(GATE AR 2010)

- 64) Given digits 2, 2, 3, 3, 3, 4, 4, 4, 4 how many distinct 4 digit numbers greater than 3000 can be formed?
- a) 50                              b) 51                              c) 52                              d) 54

(GATE AR 2010)

- 65) If  $137 + 276 = 435$  how much is  $731 + 672$ ?
- a) 534                              b) 1403                              c) 1623                              d) 1513

(GATE AR 2010)