Q. 1 – Q. 5 carry one mark each.

Q.1 An apple costs Rs. 10. An onion costs Rs. 8.

Select the most suitable sentence with respect to grammar and usage.

(A) The price of an apple is greater than an onion.

(B) The price of an apple is more than onion.

(C) The price of an apple is greater than that of an onion.

(D) Apples are more costlier than onions.

Q.2 The Buddha said, "Holding on to anger is like grasping a hot coal with the intent of throwing it at someone else; you are the one who gets burnt."

Select the word below which is closest in meaning to the word underlined above.

(A) burning (B) igniting (C) clutching (D) flinging

Q.3 **M** has a son **Q** and a daughter **R**. He has no other children. **E** is the mother of **P** and daughter-in-law of **M**. How is **P** related to **M**?

(A) **P** is the son-in-law of **M**. (B) **P** is the grandchild of **M**.

(C) **P** is the daughter-in law of **M**. (D) **P** is the grandfather of **M**.

Q.4 The number that least fits this set: (324, 441, 97 and 64) is _____.

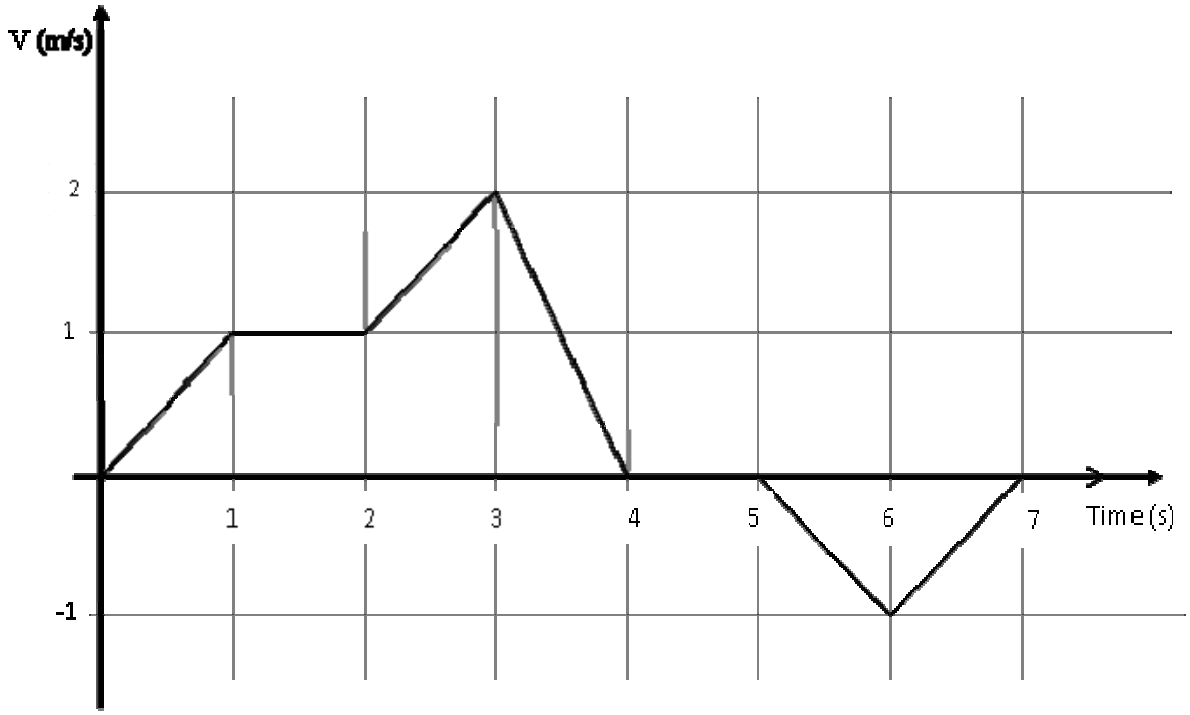
(A) 324 (B) 441 (C) 97 (D) 64

Q.5 It takes 10 s and 15 s, respectively, for two trains travelling at different constant speeds to completely pass a telegraph post. The length of the first train is 120 m and that of the second train is 150 m. The magnitude of the difference in the speeds of the two trains (in m/s) is _____.

(A) 2.0 (B) 10.0 (C) 12.0 (D) 22.0

Q. 6 – Q. 10 carry two marks each.

Q.6 The velocity V of a vehicle along a straight line is measured in m/s and plotted as shown with respect to time in seconds. At the end of the 7 seconds, how much will the odometer reading increase by (in m)?



(A) 0 (B) 3 (C) 4 (D) 5

Q.7 The overwhelming number of people infected with rabies in India has been flagged by the World Health Organization as a source of concern. It is estimated that inoculating 70% of pets and stray dogs against rabies can lead to a significant reduction in the number of people infected with rabies.

Which of the following can be logically inferred from the above sentences?

(A) The number of people in India infected with rabies is high.

(B) The number of people in other parts of the world who are infected with rabies is low.

(C) Rabies can be eradicated in India by vaccinating 70% of stray dogs.

(D) Stray dogs are the main source of rabies worldwide.

Q.8 A flat is shared by four first year undergraduate students. They agreed to allow the oldest of them to enjoy some extra space in the flat. Manu is two months older than Sravan, who is three months younger than Trideep. Pavan is one month older than Sravan. Who should occupy the extra space in the flat?

(A) Manu (B) Sravan (C) Trideep (D) Pavan

Q.9 Find the area bounded by the lines $3x+2y=14$, $2x-3y=5$ in the first quadrant.

(A) 14.95 (B) 15.25 (C) 15.70 (D) 20.35

Q.10 A straight line is fit to a data set (ln x, y). This line intercepts the abscissa at ln $x = 0.1$ and has a slope of −0.02. What is the value of y at $x = 5$ from the fit?

(A) −0.030 (B) −0.014 (C) 0.014 (D) 0.030

END OF THE QUESTION PAPER

Q. 1 – Q. 25 carry one mark each.

Q.1 'Dharahara' refers to

(A) Concept of Vastu Shastra
(B) Elevation feature of a Hindu Temple
(C) Heritage tower at Kathmandu
(D) Construction method of Buddhist Architecture

Q.2 'Mushroom Column' is a typical feature of

(A) Pantheon, Rome (B) Parthenon, Athens
(C) Chrysler Building, New York (D) Johnson Wax Building, Racine

Q.3 'AMRUT', the new scheme launched by Government of India, stands for

(A) Atal Mission for Rejuvenation and Urban Transformation
(B) Atal Mission for Renewal of Urban Transportation
(C) Atal Mission for Redevelopment of Urban Transportation
(D) Atal Mission for Renewal and Urban Transformation

Q.4 The concept of 'Dry Garden' is associated with

(A) Japanese Garden (B) Chinese Garden (C) Mughal Garden (D) Egyptian Garden

Q.5 The concept of Transit Oriented Development (TOD) refers to

(A) Transit oriented planning in institutional campuses
(B) High density development along a mass transit corridor
(C) Orienting residential blocks towards the transit in a gated community
(D) Spatial design for persons with disabilities along a mass transit corridor

Q.6 The components measuring Human Development Index (HDI) of a nation are

(A) Life expectancy, Education and Per Capita Income
(B) Life expectancy, Economy and Housing
(C) Health, Development and Per Capita Income
(D) Housing, Health and Hygiene

Q.7 As per the Ancient Monuments and Archaeological Sites and Remains Act, 2010, the extent of 'prohibited area' beyond the 'demarcated protected area' in meters is

(A) 50 (B) 100 (C) 200 (D) 500

Q.8 In CMYK colour model, 'K' represents the colour

(A) White (B) Black (C) Blue (D) Green

Q.9 'Segregation at source' is a concept associated with

(A) Solid waste management (B) Disaster management
(C) Traffic management (D) Water management

Q.10 In a flat slab, the load is transferred through

(A) Beam action (B) Membrane action
(C) Plate action (D) Vector action

Q.11 Map is an

(A) Isometric projection
(B) Orthographic projection
(C) Axonometric projection
(D) Oblique projection

Q.12 'Indore Slum Networking Programme' has been planned by

(A) B. V. Doshi
(B) Dulal Mukherjee
(C) Anil Laul
(D) Himanshu Parikh

Q.13 'Volume Zero' is a film based on the architectural works of

(A) Peter Eisenman
(B) Charles Correa
(C) Daniel Libeskind
(D) Roger Angers

Q.14 The unit of Thermal Conductivity of a material is

(A) W/(m K)
(B) $W/(m^2 K)$
(C) m K/W
(D) m^2 K/W

Q.15 A semicircular niche in the wall of a mosque, towards the direction of Mecca is known as

(A) Sahn (B) Minbar (C) Qibla (D) Mihrab

Q.16 As per CPWD Guidelines and Space Standards for Barrier Free Built Environment, the minimum turning radius for a wheelchair in mm is

(A) 900 (B) 1200 (C) 1500 (D) 1800

Q.17 'Summit Curve' is a term associated with the design of

(A) Roads and flyovers
(B) Escalators and elevators
(C) Tensile fabric structures
(D) Geodesic domes

Q.18 As per Census of India 2011, Nagar Panchayat refers to

(A) Rural area surrounded by a growing city
(B) Urban area within a panchayat
(C) Rural area adjacent to a nagar
(D) Urban area with a statutory local government

Q.19 Statutory setback of a building depends on

(A) Building height
(B) Property boundary
(C) Width of access road
(D) Ground coverage

Q.20 Super plasticizer is added in a concrete mix to

(A) Reduce the water-cement ratio for a given workability
(B) Increase the water-cement ratio for a given workability
(C) Reduce the flow
(D) Reduce the content of coarse aggregate

Q.21 Shodhan House, Ahmedabad was designed by

(A) Anant Raje
(B) Le Corbusier
(C) Louis I. Kahn
(D) B. V. Doshi

Q.22 Low-emissivity coating on a glazing unit

(A) Increases the SHGC
(B) Increases the VLT
(C) Reduces the SHGC
(D) Increases the VLT and SHGC

Q.23 Spatial connectedness in GIS refers to

(A) Tomography (B) Topography (C) Topiary (D) Topology

Q.24 In a residential neighbourhood, the net area of residential plots is 50 percent of the total area. If the population is 8000, the ratio of net density to gross density of the neighbourhood is _____

Q.25 A hemispherical earth mound of 3 meter diameter is proposed to be constructed in a children's park. If the proportion of soil and sand for the construction is 3:2, the estimated volume of soil in cubic meters is _____

Q. 26 – Q. 55 carry two marks each.

Q.26 Match the ancient cities in **Group –I** with their characteristic features in **Group-II**

	Group-I		**Group-II**
P	Mohen-jo-daro	1	Agora
Q	Babylon	2	Enclosed Court
R	Kahun	3	Grid Iron Street Pattern
S	Athens	4	Forum
		5	Hanging Garden

(A) P-3, Q-4, R-2, S-5
(B) P-4, Q-5, R-1, S-2
(C) P-3, Q-5, R-2, S-1
(D) P-4, Q-5, R-2, S-3

Q.27 Match the water purification stages in **Group-I** with the corresponding items in **Group-II**

	Group-I		**Group-II**
P	Coagulation	1	Ammonium hydroxide
Q	Filtration	2	Sodium Zeolite
R	Disinfection	3	Alum
S	Softening	4	Sand
		5	Chlorine

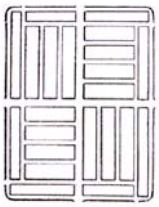
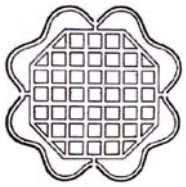
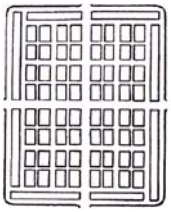
(A) P-3, Q-4, R-1, S-5
(B) P-1, Q-4, R-3, S-2
(C) P-2, Q-3, R-5, S-4
(D) P-3, Q-4, R-5, S-2

Q.28 Match the software tools in **Group-I** with their field of application in **Group-II**

	Group-I		**Group-II**
P	Radiance	1	Outdoor thermal environment
Q	Odeon	2	Construction management
R	Rayman	3	Air-flow analysis
S	Primavera	4	Acoustical design
		5	Lighting analysis

(A) P-3, Q-4, R-5, S-1
(B) P-5, Q-3, R-1, S-2
(C) P-5, Q-4, R-1, S-2
(D) P-4, Q-1, R-2, S-5

Q.29 Match the street layouts of ancient Indian settlements in **Group – I** with their corresponding types in **Group – II**

Group-I		**Group-II**	
P		1	Nandyavarta
Q		2	Swastika
R		3	Padmaka
S		4	Chaturmukha
		5	Karmukha

(A) P-2, Q-4, R-3, S-5
(B) P-2, Q-3, R-4, S-5
(C) P-4, Q-3, R-5, S-1
(D) P-4, Q-3, R-2, S-1

Q.30 Associate the terms in **Group-I** with the building hardware in **Group-II**

	Group-I		**Group-II**
P	Parliamentary	1	Bar
Q	Aldrop	2	Lock
R	Panic	3	Hinge
S	Mortise	4	Bolt

(A) P-3, Q-1, R-2, S-4
(B) P-2, Q-4, R-1, S-3
(C) P-3, Q-4, R-1, S-2
(D) P-2, Q-3, R-4, S-1

Q.31 Hoop and meridional forces are associated with

(A) Dome
(B) Truss
(C) Folded Plate
(D) Space Frame

Q.32 Match the Olympic stadia in **Group-I** with their Architects in **Group-II**

	Group-I		**Group-II**
P	Palazzetto dello Sport, Rome	1	Herzog & de Meuron
Q	Olympic Arena, Tokyo	2	Frei Otto
R	Bird's Nest, Beijing	3	Kenzo Tange
S	Olympia Stadion, Munich	4	Roger Taillibert
		5	P. L. Nervi

(A) P-5, Q-2, R-1, S-4 (B) P-5, Q-3, R-1, S-2
(C) P-2, Q-1, R-4, S-5 (D) P-2, Q-4, R-1, S-3

Q.33 Match the terms in **Group-I** with the related terms in **Group-II**

	Group-I		**Group-II**
P	Acquisition	1	Ownership
Q	Planning permission	2	Construction
R	Building plan sanction	3	Land cover
S	Mutation	4	Land use
		5	Land

(A) P-5, Q-4, R-2, S-1 (B) P-5, Q-3, R-1, S-2
(C) P-3, Q-4, R-5, S-1 (D) P-5, Q-3, R-2, S-4

Q.34 Associate the structural systems of **Group-I** with buildings in **Group-II**

	Group-I		**Group-II**
P	Diagrid	1	Millennium Dome, London
Q	Outrigger truss	2	HSBC, Hong Kong
R	Suspended floor	3	Taipei 101, Taipei
S	Cable stayed	4	Hearst Tower, New York
		5	Sears Tower, Chicago

(A) P-1, Q-2, R-3, S-5 (B) P-5, Q-3, R-4, S-1
(C) P-4, Q-2, R-3, S-1 (D) P-4, Q-3, R-2, S-1

Q.35 Associate the systems in **Group-I** with their applications in **Group-II**

	Group-I		**Group-II**
P	Nisargruna	1	Renewable energy generation
Q	Vortex-DEWAT	2	Ground water recharge
R	Swale	3	Solid waste management
S	BIPV	4	Desalination
		5	Waste water treatment

(A) P-4, Q-1, R-5, S-3 (B) P-1, Q-2, R-5, S-4
(C) P-3, Q-5, R-2, S-1 (D) P-5, Q-4, R-2, S-1

Q.36 Match the Houses in **Group-I** with their Architects in **Group-II**

	Group-I		**Group-II**
P	Villa Müller, Prague	1	Frank Gehry
Q	Farnsworth House, Illinois	2	Frank Lloyd Wright
R	Schröder House, Utrecht	3	Adolf Loos
S	Dancing House, Prague	4	Mies van der Rohe
		5	Gerrit Rietveld

(A) P-5, Q-2, R-4, S-1 (B) P-3, Q-4, R-5, S-1
(C) P-3, Q-2, R-5, S-4 (D) P-5, Q-4, R-2, S-3

Q.37 Match the Books in **Group-I** with their Authors in **Group-II**

	Group-I		**Group-II**
P	Space, Time and Architecture	1	Bill Hillier
Q	The Social Logic of Space	2	Christopher Alexander
R	Timeless Way of Building	3	Rob Krier
S	Form, Space and Order	4	Sigfried Gideon
		5	Francis D. K. Ching

(A) P-3, Q-4, R-1, S-5 (B) P-4, Q-3, R-1, S-2
(C) P-5, Q-4, R-2, S-3 (D) P-4, Q-1, R-2, S-5

Q.38 Associate the green rating system in **Group-I** with the respective country in **Group-II**

	Group-I		**Group-II**
P	CASBEE	1	UAE
Q	Green Mark	2	China
R	GRIHA	3	Japan
S	Estidama	4	Singapore
		5	India

(A) P-2, Q-4, R-5, S-1 (B) P-4, Q-1, R-5, S-2
(C) P-3, Q-5, R-1, S-2 (D) P-3, Q-4, R-5, S-1

Q.39 Match the instruments in **Group-I** with the corresponding usage in **Group-II**

	Group-I		**Group-II**
P	Pyranometer	1	Shadow analysis
Q	Heliodon	2	Seismic intensity
R	Total Station	3	Wind velocity
S	Anemometer	4	Solar radiation
		5	Land survey

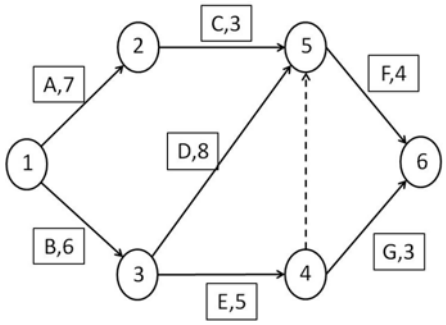
(A) P-2, Q-1, R-5, S-3 (B) P-4, Q-3, R-1, S-2
(C) P-4, Q-1, R-5, S-3 (D) P-1, Q-4, R-2, S-3

Q.40 As per URDPFI guidelines, the number of Equivalent Car Space (ECS) required to accommodate ten cars, sixteen scooters and forty bicycles will be_____

Q.41 A steel I-beam section is subjected to a bending moment of 96 kN-m. The moment of inertia of the beam section is 24,000 cm^4. The bending stress at 100 mm above the neutral axis of the beam in MPa will be _____

Q.42 A room is mechanically ventilated through four air-conditioning ducts. The opening area of each duct is 0.35 sqm. The air velocity in the duct is 0.5 m/s. The temperature difference between the ambient air and supply air is 10 °C. Volumetric specific heat of air is 1250 J/m^3 °C. Assuming one Ton of refrigeration (TR) equals 3.5 kW, the cooling load of the room in TR will be _____

Q.43 A CPM network of a construction project is given in the figure below. The activity durations are mentioned in weeks. The project completion time in weeks will be _____



Q.44 For a room with dimensions 4m × 3m × 3m (L×B×H), the details of indoor acoustical treatment are as follows.

Component	Wall		Ceiling		Floor
Percentage area	30	70	40	60	100
Absorption coefficient at 1000 Hz	0.4	0.1	0.6	0.1	0.1

The reverberation time in seconds at 1000 Hz is _____

Q.45 In 2001, the population and work force participation rate of a town were 30,000 and 30 percent respectively. The work force participation rate in the year 2011 increased to 34 percent. If the decadal population growth rate was 6 percent, the increase in the number of working people in the town in 2011 was _____

Q.46 In a 20 storey building with 3m floor to floor height, a passenger lift is hoisted by a steel rope. Weight of the lift car is 750 kg and ultimate load the steel rope can carry is 39,000 kg. Assuming a factor of safety of 20 for the steel rope and an average passenger weight of 75 kg, the passenger capacity of the lift is _____

Q.47 One litre of acrylic paint can cover 16 sqm of wall area for the first coat and 24 sqm for the second coat. The walls of a lecture hall measuring 12m × 8m × 4m (L × B × H) need to be painted with two coats of this paint. The hall has total glazed fenestration area of 12 sqm. The number of 4 litre paint containers required will be _____

Q.48 A 250 mm × 250 mm RCC column is reinforced with one percent steel. The permissible compressive stress of concrete and steel are 8 N/mm^2 and 150 N/mm^2 respectively. The axial load carrying capacity of the column in kN is _____

Q.49 A solar photo-voltaic system is proposed to be installed at the roof top of a hostel. The cost of installation and the annual maintenance are INR 2,40,000 and INR 6000 respectively. It is expected to generate 600 kWh of electricity per month. Assume unit price of electricity as INR 5. Ignoring the discount rate, the payback period of the investment in years is_____

Q.50 A pump is installed in an apartment building to lift water from ground level to the roof top water tank with the capacity of 10,000 litres. Total head of lift is 18 m and pumping time is 30 minutes to fill the tank completely. Assuming acceleration due to gravity (g) as 10 m/sec^2 and efficiency of the pump as 80 percent, the power requirement of the pump in kW will be _____

Q.51 In a housing project, the number of LIG, MIG and HIG units are in the ratio of 1:1:2. The ratio of areas of the units is 3:5:8. Assume unit cost of construction is same for all the three types. For a no profit no loss situation, if 10% discount is offered to LIG and MIG units on sale price, extra charge in percentage payable per HIG unit will be _____

Q.52 The estimated number of bricks (unit size: 250 mm × 125 mm × 75 mm) for laying one course of a 250 mm thick brick wall using rat-trap bond for a running length of 3.9 meter will be _____

Q.53 The difference in invert levels between two pits separated by a distance of 30 meter is one meter. An intermediate pit is required to be constructed at a distance of 18 meter from the pit at higher level. Maintaining the same slope, the difference in invert levels of the new pit and the pit at lower level in mm will be _____

Q.54 A four-storey building with equal areas in each floor is required to be designed on a plot with FAR of 2.0. If the FAR is increased to 2.2, the percentage increase in ground coverage utilizing full FAR in both cases will be _____

Q.55 A lamp source of 3200 candela is mounted on a wall at a height of 2 meter from the work-plane. It subtends an angle of incidence of 60^{o} with the center of the work plane. The illumination at the centre of the work plane in Lux is _____

END OF THE QUESTION PAPER

Q. No	Type	Section	Key	Marks
1	MCQ	GA	C	1
2	MCQ	GA	C	1
3	MCQ	GA	B	1
4	MCQ	GA	C ; D	1
5	MCQ	GA	A	1
6	MCQ	GA	D	2
7	MCQ	GA	A	2
8	MCQ	GA	C	2
9	MCQ	GA	B	2
10	MCQ	GA	A	2
1	MCQ	AR	C	1
2	MCQ	AR	D	1
3	MCQ	AR	A	1
4	MCQ	AR	A	1
5	MCQ	AR	B	1
6	MCQ	AR	A	1
7	MCQ	AR	B	1
8	MCQ	AR	B	1
9	MCQ	AR	A	1
10	MCQ	AR	C	1
11	MCQ	AR	B	1
12	MCQ	AR	D	1
13	MCQ	AR	B	1
14	MCQ	AR	A	1
15	MCQ	AR	D	1
16	MCQ	AR	MTA	1
17	MCQ	AR	A	1
18	MCQ	AR	D	1
19	MCQ	AR	A ; C	1
20	MCQ	AR	A	1
21	MCQ	AR	B	1
22	MCQ	AR	C	1
23	MCQ	AR	D	1
24	NAT	AR	2.0 : 2.0	1
25	NAT	AR	4.15 : 4.30	1
26	MCQ	AR	C	2
27	MCQ	AR	D	2
28	MCQ	AR	C	2
29	MCQ	AR	B	2
30	MCQ	AR	C	2
31	MCQ	AR	A	2
32	MCQ	AR	B	2
33	MCQ	AR	A	2
34	MCQ	AR	D	2
35	MCQ	AR	C	2
36	MCQ	AR	B	2
37	MCQ	AR	D	2
38	MCQ	AR	D	2
39	MCQ	AR	C	2

40	NAT	AR	18 : 18	2
41	NAT	AR	40 : 40	2
42	NAT	AR	2.45 : 2.55	2
43	NAT	AR	18 : 18	2
44	NAT	AR	0.4 : 0.5	2
45	NAT	AR	1812 : 1812	2
46	NAT	AR	16 : 16	2
47	NAT	AR	4 : 4	2
48	NAT	AR	585 : 595	2
49	NAT	AR	8 : 8	2
50	NAT	AR	1.2 : 1.3	2
51	NAT	AR	5 : 5	2
52	NAT	AR	36 : 36	2
53	NAT	AR	400 : 400	2
54	NAT	AR	5 : 5 ; 10 : 10	2
55	NAT	AR	100 : 100	2