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Q : 16) Match List I (Chart) with List II (Facilitation) and select the correct answer using the code given below the lists:

List I	List II
A. Bar chart B. Milestone bar chart C. W.B.S D. Linked bar chart	1. Activity dependencies can be implied 2. Resource requirement can be depicted 3. Higher level of authority can effect monitoring & control 4. Trade base site supervision can be assigned

Codes:

A : 4, 3, 2, 1

B : 2, 1, 4, 3

C : 4, 1, 2, 3

D : 2, 3, 4, 1



Q : 17) A bar chart is commonly used because

A : It is simple to draw and easy to understand

B : It indicates at a glance the overall progress of the project

C : It shows critical and non-critical activities

D : It incorporates uncertainties for delay in estimation of time required for completion of activities

Q : 18) Which of the following techniques belong to 'Project time plan'?

- 1. Critical path method**
- 2. Precedence network analysis**
- 3. Line of balance technique**
- 4. Linear programme chart**

A : 1, 2 and 3 only

B : 1, 2 and 4 only

C : 3 and 4 only

D : 1, 2, 3 and 4



Q : 19) Which one of the following techniques is not covered in project network analysis?

A : Critical path method

B : Program evaluation and review techniques

C : Procedure network analysis

D : Measurement book



Q : 20) In an activity-on-arrow network, which of the following rules of network logic are mandatory?

- 1. Any two events can be directly connected by not more than one activity.**
- 2. Event numbers should not be duplicated in a network.**
- 3. Before activity may begin, all the activities preceding it must be completed.**

Select the correct answer using the code given below.

A : 1 and 2 only

B : 2 and 3 only

C : 1 and 3 only

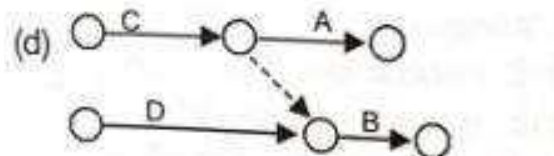
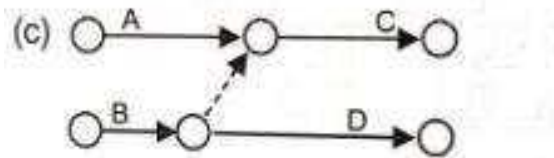
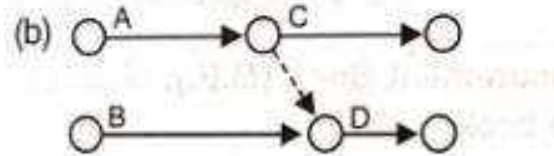
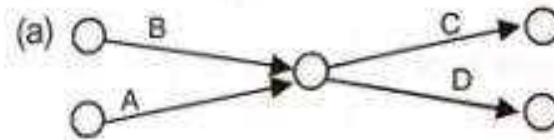
D : 1, 2 and 3



Q : 21) Statement (I) : A dummy job takes zero time to perform.

Statement (II) : It is used solely to illustrate precedence relationship.

Q : 22) Activity 'C' follows activity 'A' and activity 'D' follows activities 'A' and 'B'. The correct network for the projects is



Q : 23) Consider the following features/factors:

- 1. Projects are of the non-repetitive type**
- 2. Time required need not be known**
- 3. Time required is known precisely**
- 4. Events have been established for planning**
- 5. Emphasis is given to activities of project.**

PERT is preferred for planning because of

A : 1, 2 and 4

B : 3, 4 and 5

C : 1, 3 and 4

D : 1, 2 and 5



Q : 24) For a given activity, the optimistic time, pessimistic time and the most probable estimates are 5, 17 and 8 days respectively. The expected time is

A : 8 days

B : 9 days

C : 10 days

D : 15 days



Q : 25) The probability distribution taken to represent the completion time in PERT analysis is

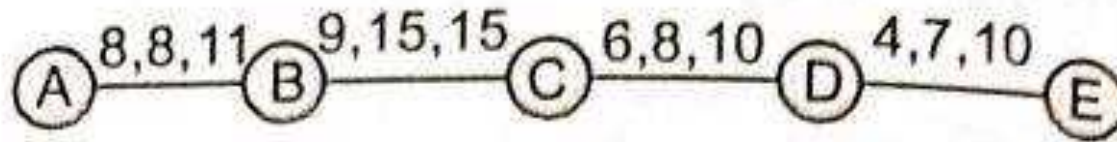
A : Gamma distribution

B : Normal distribution

C : Beta distribution

D : Log-normal distribution

Q : 26) The line of a PERT network is shown above in the diagram with a, m, b durations. What is the probable range of the total duration?



A : 34.2 to 47.2

B : 34.2 to 44.2

C : 32.6 to 44.2

D : 32.6 to 42.4



Q : 27) A, B, C, D and E are the 5 activities along the unique critical path of a AOA network of activities.

Their characteristics are as under

Activity	A	B	C	D	E
Expected duration (days)	7	6	11	14	5
Standard deviation (days)	2	2	3	4	1

What is the possible range of project duration (in days?)

A : 31.2 to 54.8

B : 28.1 to 57.9

C : 25.5 to 60.5

D : 24.6 to 61.4

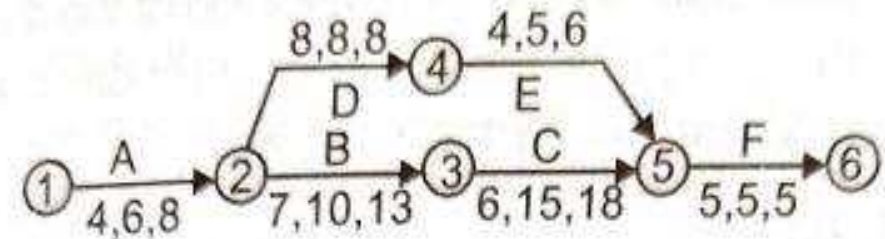
Q : 28) What is the proportional variation, and what is the 'range' of project duration : the network as shown with the indicated probabilistic a, m, b durations of the respective activities?

A : 1/15, 28 to 42

B : 1/15, 30 to 45

C : 1/12, 28 to 42

D : 1/12, 30 to 45





Q : 29) Consider the following statements:

- 1. PERT is activity-oriented and adopts deterministic approach.**
- 2. CPM is event-oriented and adopts probabilistic approach.**
- 3. PERT is event-oriented and adopts probabilistic approach.**

Which of these statements is/are correct?

A : 1 only

B : 1 and 2

C : 2 and 3

D : 3 only



Q : 30) It is estimated that an activity can be assigned an optimistic duration of 16 days, a pessimistic duration of 28 days and a most likely duration of 19 days. What is the expected duration for this activity?

A : 20 days

B : 19 days

C : 22 days

D : 18 days



Q : 31) Slack time in PERT analysis

A : Can never be greater than zero

B : Is always zero for critical activities

C : Can never be less than zero

D : Is minimum for critical events



Q : 32) Consider the following for durability of well-graded concrete:

- 1. The environment**
- 2. Cover to embedded reinforcement**
- 3. Shape and size of concrete member**

Which of these are correct?

A : 1 and 2 only

B : 1 and 3 only

C : 2 and 3 only

D : 1, 2 and 3



Q : 33) Consider the following constituents of a high performance concrete (HPC):

- 1. Cement**
- 2. Fine aggregate**
- 3. Coarse aggregate**
- 4. Water**
- 5. Mineral admixture**
- 6. Chemical admixture**

Which of these constituents are relevant for HPC?

A : 1, 2, 3, 4, 5 & 6

B : 1, 2, 3, 4 & 5 only

C : 2, 3, 4, 5, & 6 only

D : 1, 2, 3, 4, & 6 only

Q : 34) The workability of concrete is assessed through:

- 1. Slump test**
- 2. Compaction factor test**
- 3. Setting time of cement**
- 4. Le-chatelier's apparatus**

A : 1 and 2

B : 2 and 3

C : 3 and 4

D : 4 and 1

Q : 35) Consider the following statements as describing the rheological behaviour of fresh concrete:

- 1. Newtonian**
- 2. Non-Newtonian**
- 3. Ratio of shear stress to shear rate is constant**
- 4. Ratio of shear stress to shear rate depends upon the shear rate**

Which of these statements are correct?

A : 1, 2, 3 and 4

B : 2 and 4 only

C : 1, 2 and 4 only

D : 2, 3 and 4 only

Q : 36) What is the amount of water required for a workable RC of mix 1 : 2 : 4 by weight, when W/C is 0.6 and unit weight of concrete is 2400 kg/m³?

A : 165 l

B : 205 l

C : 245 l

D : 285 l



Q : 37) The carbonation process is demonstrated more by

A : Atmospheric corrosion

B : Chloride corrosion

C : Stress corrosion

D : Hydrogen embrittlement

Q : 38) Which of the following are relatable to autoclaved aerated concrete?

- 1. Light weight**
- 2. Strong**
- 3. Inorganic**
- 4. Nontoxic**

A : 1, 2 and 3 only

B : 1, 2 and 4 only

C : 3 and 4 only

D : 1, 2, 3 and 4



Q : 39) The workability of concrete becomes more reliable depending on

- 1. Aggregate-cement ratio**
- 2. Time of transit**
- 3. Grading of the aggregate**

A : 1 only

B : 2 only

C : 3 only

D : 1, 2 and 3

Q : 40) Consider the following particulars in respect of a concrete mix design:

	Weight	Specific gravity
Cement	400 kg/m ³	3.2
Fine aggregates	-	2.5
Coarse aggregates	1040 kg/m ³	2.6
Water	200 kg/m ³	1.0

What shall be the weight of the fine aggregates?

A : 520 kg/m³

B : 570 kg/m³

C : 690 kg/m³

D : 1000 kg/m³



Q : 41) Consider the following statements regarding cyclopean concrete:

- 1. Size of aggregate is more than 150 mm.**
- 2. Size of aggregate is less than 150 mm.**
- 3. High slump.**
- 4. High temperature rise due to heat of hydration.**

Which of the above statements are correct?

- A : 1 and 3 only**
- B : 1 and 4 only**
- C : 2 and 3 only**
- D : 2 and 4 only**

Q : 42) Given that for an element in a body of homogeneous isotropic material subjected to plane stress; ϵ_x , ϵ_y and ϵ_z are normal strains in x, y, directions respectively and μ is the poisson's ratio, the magnitude of unit volume change of the element is given by

A : $\epsilon_x + \epsilon_y + \epsilon_z$

B : $\epsilon_x - \mu(\epsilon_y + \epsilon_z)$

C : $\mu (\epsilon_x + \epsilon_y + \epsilon_z)$

D : $1/\epsilon_x + 1/\epsilon_y + 1/\epsilon_z$

Q : 43) In terms of bulk modulus (K) and modulus of rigidity (G), the poisson's ratio can be expressed as

A : $(3K - 4G)/(6K + 4G)$

B : $(3K + 4G)/(6K - 4G)$

C : $(3K - 2G)/(6K + 2G)$

D : $(3K + 2G)/(6K - 4G)$



Q : 44) If all dimensions of prismatic bar of square cross-section suspended freely from the ceiling of roof are doubled then the total elongation produced by its own weight will increase

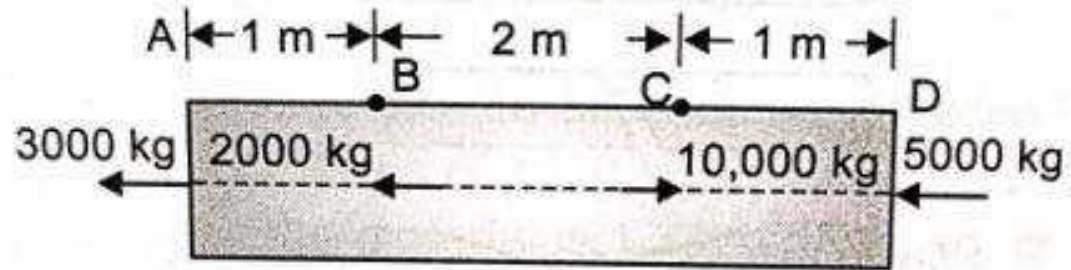
A : Eight times

B : Four times

C : Three times

D : Two times

Q : 45) A prismatic bar of uniform cross-sectional area of 5 cm^2 is subjected to axial loads as shown in the given figure.



Portion BC is subjected to an axial stress of

A : 400 kg/cm^2 tension

B : 2000 kg/cm^2 compression

C : 1000 kg/cm^2 tension

D : 600 kg/cm^2 tension

Q : 46) Match List-I with List-II and select the correct answer:

List-I	List-II
A. Tenacity	1. Continues to deform without much increase of stress
B. Plasticity	2. Ultimate strength in tension
C. Ductility	3. Extension in a direction without rupture
D. Malleability	4. Ability to be drawn out by tension to a small section without rupture

Codes:

A : 2, 1, 4, 3

B : 2, 1, 3, 4

C : 1, 2, 4, 3

D : 1, 2, 3, 4



Q : 47) The material in which large deformation is possible before the absolute failure or rupture is termed as

A : Brittle

B : Elastic

C : Ductile

D : Plastic



Q : 48) If the Young's modulus 'E; is equal to bulk modulus 'K', then what is the value of the Poisson's ratio?

A : 1/4

B : 1/2

C : 1/3

D : 3/4

Q : 49) A steel rod, 100 mm long is held between two rigid supports. It is heated by 20°C. If the coefficient of thermal expansion of the material of the rod is $15 \times 10^{-6}/^{\circ}\text{C}$ and modulus of elasticity is $200 \times 10^3 \text{ MN/m}^2$, what is the stress in the rod?

A : 20 MN/m²

B : 40 MN/m²

C : 60 MN/m²

D : 80 MN/m²

Q : 50) A circular rod of diameter 30 mm and length 200 mm is subjected to a tensile force. The extension is rod is 0.09 mm and change in diameter is 0.0045 mm. What is the Poisson's ratio of the material of the rod?

A : 0.30

B : 0.32

C : 0.33

D : 0.35



Q : 51) For a material having modulus of elasticity equal to 208 GPa and Poisson's ratio equal to 0.3, what is the modulus of rigidity?

A : 74.0 GPa

B : 80.0 GPa

C : 100.0 GPa

D : 128.5 GPa



Q : 52) Given E as the Young's modulus of elasticity of a material, what can be the minimum value of its bulk modulus of elasticity?

A : $E/2$

B : $E/3$

C : $E/4$

D : $E/5$



Q : 53) Consider the following salient points in a stress-strain curve of a mild steel bar:

- 1. Yield point**
- 2. Braking point**
- 3. Yield plateau**
- 4. Proportionality limit**
- 5. Ultimate point**

The correct sequence in which they occur while testing the mild steel bar in tension from initial zero strain to failure is

A : 4, 1, 2, 3 and 5

B : 1, 4, 3, 5 and 2

C : 4, 1, 3, 5 and 2

D : 1, 4, 2, 3 and 5

Q : 54) Two circular mild steel bars A and B of equal length l have diameters $d_A = 2$ cm and $d_B = 3$ cm. Each is subjected to a tensile load of magnitude P . The ratio of the elongations of the bars l_A/l_B is

A : $2/3$

B : $3/4$

C : $4/9$

D : $9/4$

Q : 55) A metal bar of 10 mm diameter when subjected to a pull of 23.5 kN gave an elongation of 0.3 mm on a gauge length of 200 mm. The young's modulus of elasticity of the metal will nearly be

A : 200 kN/mm²

B : 300 kN/mm²

C : 360 kN/mm²

D : 400 kN/mm²

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