

## KPCL Civil Question Paper for Assistant and Junior Engineer

1. A 1.6 m<sup>3</sup> capacity tractor loaded works at a site with an effective per-round-trip time of 64 seconds. Effective delivery of excavated material is 90%. If utilization is 50 minutes per hour working, what will be the productivity in a 4-hour shift?

- (a) 253 m<sup>3</sup>
- (b) 262 m<sup>3</sup>
- (c) 270 m<sup>3</sup>
- (d) 282 m<sup>3</sup>

Ans. (c)

2. Match List-I with List-II and select the correct answer using the code given below the lists:

List-I List-II

(Equipment) (Category)

A. Derrick crane 1. Excavating equipment

B. Hoe 2. Hauling equipment

C. Clamshell 3. Hoisting equipment

D. Dumper Truck 4. Vertical lifting equipment

Code:

A B C D

(a) 2 1 4 3

(b) 3 1 4 2

(c) 2 4 1 3

(d) 3 4 1 2

Ans. (b)

3. A 1.75 m<sup>3</sup> capacity tractor loader has forward loaded speed of 240 m/min, returning unloaded speed of 300 m/min and operates at 80% of the specified speed. It hauls earth over a distance of 60 m with fixed time per trip being 25 seconds. What is its effective cycle time?

- (a) 54.25 seconds
- (b) 55.50 seconds
- (c) 56.75 seconds
- (d) 58.75 seconds

Ans. (d)

4. Which one of the following relates to determination of critical path in PERT?

- (a) Event oriented slack
- (b) Activity oriented float
- (c) Event oriented float
- (d) Activity oriented slack

Ans. (a)

5. In order to achieve a safe compressive strength of 20 kg/cm<sup>2</sup> in a brick masonry, what should be the suitable range of crushing strength of bricks?

- (a) 35 kg/cm<sup>2</sup> to 70 kg/cm<sup>2</sup>
- (b) 70 kg/cm<sup>2</sup> to 105 kg/cm<sup>2</sup>
- (c) 105 kg/cm<sup>2</sup> to 125 kg/cm<sup>2</sup>
- (d) More than 125 kg/cm<sup>2</sup>

Ans. (b)

6. What is the requirement of water (expressed as % of cement w/w) for the completion of chemical reactions in the process of hydration of OPC?

- (a) 10 to 15%

- (b) 15 to 20%
  - (c) 20 to 25%
  - (d) 25 to 30%
- Ans. (c)

7. Which factors comprise maturity of concrete?

- (a) Compressive strength and flexural strength of concrete /
- (b) Cement content per cubic metre and compressive strength of concrete
- (c) Curing age and curing temperature of concrete
- (d) Age and aggregate content per cubic metre of concrete

Ans. (c)

8. What is the minimum value of individual tests results (in N/mm<sup>2</sup>) for compressive strength compliance requirement for concrete M20 as per codal provision?

- (a) fck 1
- (b) fck 3
- (c) fck 4
- (d) fck 5

Ans. (c)

9. For what reason is it taken that the nominal maximum size of aggregate may be as large as possible?

- (a) Larger the maximum size of aggregate, more the cement required and so higher the strength.
- (b) Larger the maximum size of aggregate, smaller is the cement requirement for particular water cement ratio and so more economical the mix.
- (c) Larger the maximum size of aggregate, lesser are the voids in the mix and hence also lesser the cement required.
- (d) Larger the maximum size of aggregate, more the surface area and better the bond between aggregates and cement, and so higher the strength.

Ans. (d)

10. What is the modulus of elasticity of standard timber (Group B) in (MN/cm<sup>2</sup>)?

- (a) 0.5 to 1.0
- (b) 1.0 to 1.25
- (c) 1.25 to 1.5
- (d) 1.5 to 1.75

Ans. (b)

11. What is the treatment for making timber fire-resistant?

- (a) ASCU treatment
- (b) Abel's process
- (c) Creosoting
- (d) Tarring

Ans. (b)

12. How is the process of treatment of wood using a preservative solution and forcing air in at pressure designated?

- (a) Ruping process
- (b) Lawri process
- (c) Full cell process
- (d) Empty cell process

Ans. (d)

13. Modular bricks are of nominal size 20 × 10 × 10cm and 20% of the volume is lost in mortar between joints. Then what is the number of modular bricks required per cubic meter of brick work?

- (a) 520
- (b) 500

(c) 485  
(d) 470  
Ans. (d)

14. A solid metal of uniform sectional area throughout its length hangs vertically from its upper end. Devails of the bar are:  
length = 6m, material density =  $8 \times 10^{-5}$  N/mm<sup>3</sup> and  $B = 2 \times 10^5$  N/mm<sup>2</sup>. What will be the total elongation of the bar in mm?

(a) 288/104  
(b) 48/104  
(c) 144/104  
(d) 72/104  
Ans. (d)

15. What is the representative geometric mean size of an aggregate sample if its fineness modulus is 3.0?

(a) 150  $\mu$ m  
(b) 300  $\mu$ m  
(c) 600  $\mu$ m  
(d) 12  $\mu$ m  
Ans. (c)

16. A square steel bar of 50 mm side and 5m long is subjected to a load where upon it absorbs a strain energy of 100 J. What is its modulus of resilience?

(a) 1/125 Nmm/ mm<sup>3</sup>  
(b) 125 mm<sup>3</sup>/Nmm  
(c) 1/125 Nmm/ mm<sup>3</sup>  
(d) 100 mm<sup>3</sup>/Nmm  
Ans. (a)

17. What is the ratio of flexural strength ( $f_{cr}$ ) to the characteristic compressive strength of concrete ( $f_{ck}$ ) for M25 grade concrete?

(a) 0.08  
(b) 0.11  
(c) 0.14  
(d) 0.17  
Ans. (c)

18. Which of the following tests compares the dynamic modulus of elasticity of samples of concrete?

(a) Compression test  
(b) Ultrasonic pulse velocity test  
(c) Split test  
(d) Tension test  
Ans. (b)

19. Which one of the following is correct regarding the most effective requirements of durability in concrete?

(a) Providing reinforcement near the exposed concrete surface  
(b) Applying a protective coating to the exposed concrete surface  
(c) Restricting the minimum cement content and the maximum water cement ratio and the type of cement  
(d) Compacting the concrete to a greater degree.  
Ans. (c)

20. What is the radius of Mohr's circle in case of bi-axial state of stress?

(a) Half the sum of the two principal stresses  
(b) Half the difference of the two principal stresses  
(c) Difference of the two principal stresses

(d) Sum of the two principal stresses  
Ans. (b)

21. A square beam laid flat is then rotated in such a way that one of its diagonal becomes horizontal. How is its moment capacity affected?

- (a) Increases by 41.4%
- (b) Increases by 29.27%
- (c) Decreases by 29.27%
- (d) Decreases by 41.4%

Ans. (d)

22. A timber beam is 100 mm wide and 150 mm deep. The beam is simply supported and carries a central concentrated load W. If the maximum stress in shear is 2 N/mm<sup>2</sup>, what would be the corresponding load W on the beam?

- (a) 20 kN
- (b) 30 kN
- (c) 40 kN
- (d) 25 kN

Ans. (c)

23. A 40 mm diameter shaft is subjected to a twisting moment M<sub>2</sub>. If shear stress developed in shaft is 5 N/mm<sup>2</sup>, What is the value of the twisting moment?

- (a) 628.8 Nm
- (b) 328.4 Nm
- (c) 62.8 Nm
- (d) 30.4 Nm

Ans. (c)

24. A fixed end beam of uniform cross-section is loaded uniformly throughout the span. What is the proportion of the bending moment at the centre to the end moment considering only elastic conditions?

- (a) 1 : 1
- (b) 1 : 2
- (c) 1 : 4
- (d) 2 : 3

Ans. (b)

25. Steel of yield strength 400 MPa has been used in a structure. What is the value of the maximum allowable tensile strength?

- (a) 240 MPa
- (b) 200 MPa
- (c) 120 MPa
- (d) 96 MPa

Ans. (a)