

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018**

**Course Code: CE352**

**Course Name: COMPREHENSIVE EXAM (CE)**

Max. Marks: 50

Duration: 1 Hour

**Instructions**

- (1) Each question carries one mark. No negative marks for wrong answers*
- (2) Total number of questions: 50*
- (3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.*
- (4) If more than one option is chosen, it will not be considered for valuation.*
- (5) Calculators are not permitted*

- 1 Find the distance travelled if  $r(t) = (1 - 3\sin t)i + 3\cos t j, 0 \leq t \leq \pi$ .  
(A) 0 (B)  $3\pi$  (C)  $2\pi$  (D)  $4\pi$
- 2 If  $y=x$  is a solution of  $x^2y'' + xy' - y = 0$ , then the second linearly independent solution is :  
(A)  $x^2$  (B)  $x^{-2}$  (C)  $x^{-1}$  (D)  $x^n$
- 3 Moment of inertia of a triangular section of base ( $b$ ) and height ( $h$ ) about an axis passing through its C.G. and parallel to the base, is :  
(A)  $bh^3/4$  (B)  $bh^3/8$  (C)  $bh^3/12$  (D)  $bh^3/36$
- 4 The angle between two forces when the resultant is maximum and minimum respectively are :  
(A)  $0^\circ$  and  $180^\circ$  (B)  $180^\circ$  and  $0^\circ$  (C)  $90^\circ$  and  $180^\circ$  (D)  $90^\circ$  and  $0^\circ$
- 5 If front and top view of a point lie above the reference line, in which quadrant the point lies ?  
(A) First quadrant (B) Second First quadrant  
(C) Third First quadrant (D) Fourth First quadrant
- 6 In an isometric projection all horizontal lines of the object are represented by lines inclined at an angle of ..... to horizontal  
(A)  $20^\circ$  (B)  $30^\circ$  (C)  $40^\circ$  (D)  $45^\circ$
- 7 Which of the following is not a green house gas ?  
(A)  $\text{CO}_2$  (B)  $\text{H}_2\text{S}$  (C)  $\text{O}_3$  (D)  $\text{CH}_4$
- 8 As per LEED certification, the platinum scale for building design and construction phase is  
(A) 40-49 points (B) 50-59 pointS  
(C) 60-79 points (D) greater than or equal to 80 points

- 9 Which manufacturing technique is based on the principle of “Seeing what is out there”?.  
(A) Concurrent Engineering (B) Value Engineering  
(C) Reverse Engineering (D) Prototype Engineering
- 10 The concept of the high speed trains, Shinkansen Bullet Trains, was inspired by :  
(A) The kingfisher (B) Shark skin  
(C) The burr seed (D) The Gecko feet
- 11 Yield point of brittle material can be ascertained by drawing a line parallel to the stress-strain curve at  
(A) 0.2 % of max strain (B) 2 % of max strain  
(C) 5 % of max strain (D) 10 % of max strain
- 12 If the modulus of elasticity for a material is  $250 \text{ GN/m}^2$  and Poisson’s ratio is 0.25, the modulus of rigidity of the material is  
(A)  $250 \text{ GN/m}^2$  (B)  $125 \text{ GN/m}^2$  (C)  $100 \text{ GN/m}^2$  (D)  $65 \text{ GN/m}^2$
- 13 For a given shear force, across a symmetrical I section, the intensity of shear stress is maximum at the  
(A) extreme fibres  
(B) centroid of the section  
(C) at the junction of the flange and the web, but on the web  
(D) at the junction of the flange and the web, but on the flange
- 14 If  $w$  is the load intensity,  $F$  the shear force and  $M$  the bending moment, which of the following relationship is correct?  
(A)  $dF/dx=M$  (B)  $dw/dx=F$  (C)  $dM/dx=w$  (D)  $dF/dx=w$
- 15 In a thin cylinder of diameter  $d$  and thickness  $t$ , subjected to internal pressure  $p$ , the hoop stress developed is given by  
(A)  $pd/4t$  (B)  $pd/2t$  (C)  $pd/8t$  (D)  $pd/6t$
- 16 In a shaft subjected to pure twist, the maximum shear stress occurs at  
(A) Centre of section (B) mid radius  
(C)  $3/4$  radius from centre (D) surface
- 17 The ratio of Euler buckling load for two columns with same material and geometric parameters having (i) both ends fixed and (ii) both ends pinned is  
(A) 2 (B) 4 (C)  $1/8$  (D) 8
- 18 Pressure of 10m head of water is .....  
(A)  $9.81 \text{ kN/m}^2$  (B)  $98.1 \text{ kN/m}^2$  (C)  $981 \text{ kN/m}^2$  (D)  $9810 \text{ kN/m}^2$

- 19 The flow of a liquid at constant rate in a conically tapered pipe is classified as :  
(A) Steady, non-uniform flow (B) steady, uniform flow  
(C) unsteady, uniform flow (D) unsteady, non-uniform flow
- 20 A Pitot tube is used to measure :  
(A) discharge (B) pressure head  
(A) velocity (D) energy
- 21 Coconut oil has .....viscosity when compared with water  
(a) Lower (b) equal (c) higher (d) None of these
- 22 For stable equilibrium of a floating body, its metacentre  
(A) coincides with centre of gravity (B) is below the centre of gravity  
(C) is above the centre of gravity (D) None of above
- 23 When a mouth piece is fitted, the discharge through an orifice :  
(A) Increases (B) Decreases (C) No change (D) No discharge
- 24 A Cipolletti weir has a side slope of  
(A) 1 Vertical : 4 Horizontal (B) 1 Vertical : 2 Horizontal  
(C) 1 Horizontal : 4 Vertical (D) 1 Horizontal : 2 Vertical
- 25 Degree of indeterminacy of a pin supported portal frame :  
(A) 1 (B) 2 (C) 3 (D) 4
- 26 A pin jointed plane truss with m number of members and j number of joints, is unstable if :  
(A)  $(m+3) < 2j$  (B)  $(m+3) = 2j$  (C)  $(m+3) > 2j$  (D) None of the above
- 27 Identify which among the following is not a method for finding deflections  
(A) Macaulay's method (B) Mohr's area moment theorems  
(C) Virtual work principles (D) Three moment theorem
- 28 In a two span continuous beam ABC ( $AB = BC$ ,  $EI$  – constant) simply supported at the ends with a uniformly distributed load over the entire length, the maximum bending moment occurs at  
(A) Mid span of AB (B) Mid span of BC  
(C) a point between centre of AB and centre of BC (D) support B
- 29 A concentrated load  $W$  is acting at a distance of 'a' from the left hand support of a three hinged arch of span  $2l$  and rise  $h$  hinged at the crown, the horizontal reaction at the support is  
(A)  $Wa/h$  (B)  $Wa/(2h)$  (C)  $2W/(ah)$  (D)  $2h/(Wa)$
- 30 A single concentrated load of 8kN rolls along a girder of 15 m span. The absolute maximum bending moment will be  
(A) 8 kN.m (B) 15 kN.m (C) 30 kNm (D) 60 kN.m

- 31 Types of steel reinforcement used in concrete structures:  
(A) Hot Rolled Deformed Bars (B) Mild Steel Plain bars  
(C) Prestressing Steel (D) All the above
- 32 Curing of pavements, floors, roofs and slabs, is done by  
(A) Membrane method (B) Ponding method  
(C) Covering surface with bags (D) Sprinkling water method
- 33 Out of the following which one is not a type of stone masonry  
(A) Veneer masonry (C) Fixer Masonry  
(B) Rubble Masonry (D) Ashlar Masonry
- 34 A volatile substance added to paint to make its application easy and smooth is known as:  
(A) Base (B) Solvent (C) Vehicle (D) None of these
- 35 Steps that are narrower on one side than the other and are used to change the direction of the stairs without landings  
(A) Trim (B) Volute (C) Winders (D) Stringer
- 36 Causes of Foundation failure is  
(A) Poor soil preparation (B) Water problems  
(C) Dry heat (D) All of the above
- 37 As per IS 456 nominal cover depends upon:  
(A) Grade of concrete (B) Grade of steel  
(C) Exposure conditions (D) Diameter of bar
- 38 Which type of failure is expected in over reinforced flexural members  
(A) Compression failure (B) Balanced failure  
(C) Tension failure (D) None of these.
- 39 Permissible tensile stress in M25 concrete is :  
(A)  $25 \text{ N/mm}^2$  (B)  $2.5 \text{ N/mm}^2$  (C)  $3.5 \text{ N/mm}^2$  (D)  $5 \text{ N/mm}^2$
- 40 Total area of side face reinforcement in a beam shall be:  
(A) 0.2% of web area (B) 0.1% of web area  
(C) 0.12% of web area (D) 0.15% of web area
- 41 For a column effectively held in position and restrained against rotation at both ends, the effective length as per IS 456 is :  
(A)  $1.0L$  (B)  $0.70L$  (C)  $0.65L$  (D)  $0.5L$
- 42 The span to depth ratio of a slab simply supported and spanning in two directions shall not exceed:  
(A) 25 (B) 30 (C) 35 (D) 40

- 43 For a two way slab the ratio of larger span to smaller span shall be :  
(A) equal to 3 (B) less than 3  
(C) greater than 3 (D) less than 2
- 44 Porosity of a soil is  $1/3$ . Void ratio of the soil is .....  
(A) 0.25 (B) 0.5 (C) 0.75 (D) 1
- 45 Effective stress concept was enunciated by:  
(A) Cassagrande (B) Atterberg (C) Terzaghi (D) Proctor
- 46 Liquid limit and plastic limit of a fine grained soil are 120% and 30% respectively. As per IS the soil is classified as :  
(A) CL (B) CH (C) MI (D) MH
- 47 Read the following statements related to IS light compaction test.  
I. Soil is always compacted in 3 layers in the compaction mould.  
II. Each layer is always given 25 blows.  
Select the correct answer from among the following:  
(A) Statement I is TRUE and Statement II is FALSE  
(B) Statement II is TRUE and Statement I is FALSE  
(C) Both Statements are TRUE  
(D) Both Statements are FALSE
- 48 The water level in a lake rises by 2m. The increase in effective stress at a depth of 1m below the bed level of the lake, due to above increase in water level would be (saturated unit weight of soil bed =  $18\text{kN/m}^3$ , unit weight of water =  $10\text{kN/m}^3$ )  
(A) 18kPa (B) 8kPa (C) 20kPa (D) zero
- 49 Choose the soil property useful for estimation of rate of consolidation settlement of a clay soil:  
(A) Compression index (B) Uniformity coefficient  
(C) Coefficient of consolidation (D) Time factor
- 50 Angle of internal friction of a purely cohesive soil is :  
(A)  $45^\circ$  (B)  $30^\circ$  (C) 0 (D)  $60^\circ$

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