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PhD ENTRANCE EXAM RESULT , VMSBUTU

Answer Key for Mechanical Engineering Branch

Question	Options
1 : A statement of the quantitative research question should:	1) Extend the statement of purpose by specifying exactly the question (the researcher will address 2) Help the research in selecting appropriate participants, research methods, measures, and materials 3) Specify the variables of interest **4) All the above**
2 : In the process of conducting research ‘Formulation of Hypothesis” is followed by	1) Statement of Objectives 2) Analysis of Data **3) Selection of Research Tools** 4) Collection of Data
3 : In order to pursue the research, which of the following is priorly required?	1) Developing a research design **2) Formulating a research question** 3) Deciding about the data analysis procedure 4) Formulating a research hypothesis

Question	Options
4 : What are the core elements of a Research Process?	1) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations 2) Executive Summary; Literature Review; Data Gathered; Conclusions, Bibliography 3) Research Plan; Research Data; Analysis; References **4) Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions**
5 : What does the term 'longitudinal design' mean?	1) A study completed far away from where the researcher lives 2) A study which is very long to read. 3) A study with two contrasting cases. **4) A study completed over a distinct period of time to map changes in social phenomena**
6 : Which institution approved the ‘6G Vision Framework’	1) NASSCOM 2) NITI Aayog **3) ITU** 4) IMF
7 : Which company has launched ChatGPT rival Bard in European Union, Brazil and other nations?	**1) Google** 2) Microsoft 3) Apple 4) Infosis
8 : What is AIRAWAT ?	1) Submarine **2) AI supercomputer** 3) 5G-enabled drone 4) Recently discovered exoplanet

Question	Options
9 : The Union Government has exempted which institution from the purview of the Right to Information Act, 2005?	1) RBI 2) SEBI **3) CERT-In** 4) Election Commission of India
10 : What is ‘PSiFI system’	1) A primary method of waste disposal **2) A system for recognizing human emotions** 3) A wearable device for monitoring blood pressure 4) A voice recognition AI tool
11 : In a mixture of 60 litres, the ratio of milk to water is 2 : 1. If this ratio is to be 1 : 2, then the quantity of water (in litres) to be further added is ?	1) 20 2) 30 3) 40 **4) 60**
12 : The cost of Type 1 rice is Rs. 15 per kg and Type 2 rice is Rs.20 per kg. If both Type 1 and Type 2 are mixed in the ratio of 2 : 3, then the price per kg of the mixed variety of rice is ?	1) 19.5 2) 19 **3) 18** 4) 18.5
13 : A cistern is normally filled in 8 hours but takes two hours longer to fill because of a leak in its bottom. If the cistern is full, the leak will empty it in ?	**1) 20** 2) 28 3) 36 4) 40
14 : A starts business with Rs. 3500 and after 5 months, B joins with A as his partner. After a year, the profit is divided in the ratio 2 : 3. What is B's contribution in the capital ?	1) 8000 2) 8500 **3) 9000** 4) 7500
15 : A tank is 25 m long, 12 m wide and 6 m deep. The cost of plastering its walls and bottom at 75 paise per sq. m, is ?	1) 456 2) 458 **3) 558** 4) 568

Question	Options
16 : If MADE is coded as 12236 and BAD is coded as 123, then how will DECK be coded as ?	**1) 36212** 2) 34312 3) 36201 4) 44412
17 : Five balls L1, L2, L3, L4 and L5 are kept one above the other (not necessarily in the same order). L1 is just above L5 and just below L4. L2 is just above L3 and just below L5. How many balls are above L2 ?	1) 2 **2) 3** 3) 4 4) 4
18 : Mayank is the son of Chhaya. Chhaya and Deepa are sisters. Gayatri is the mother of Deepa. If Naman is the son of Gayatri , How is Mayank related to Naman ?	**1) Nephew** 2) Brother 3) Father 4) Son
19 : Which number will replace the question mark(?) in the following series? 98, 95, 86, 82, 66, ?, 36 ?	1) 58 2) 60 **3) 61** 4) 63
20 : If 5 November 2019 was Tuesday, then what was the day of the week on 5 December 2011 ?	1) Tuesday **2) Monday** 3) Sunday 4) Saturday
21 : A 1 kg block is resting on a surface with coefficient of friction ? = 0.1. A force of 0.8 N is applied to the block as shown in the figure. The friction force is	1) 0 **2) 0.8 N** 3) 0.98 N 4) 1.2 N
22 : If point A is in equilibrium under the action of the applied forces, the values of tensions TAB and TAC are respectively.	**1) 520 N and 300 N** 2) 300 N and 520 N 3) 450 N and 150 N 4) 150 N and 450 N
23 : A particle P is projected from the earth surface at latitude 45° with escape velocity v = 11.19 km/s. The velocity direction makes an angle ? with the local vertical. The particle will escape the earth’s gravitational field	1) only when ? = 0 2) only when ? = 45° 3) only when ? = 90° **4) irrespective of the value of ?**

Question	Options
24 : For a beam, as shown in the below figure, when the load W is applied in the center of the beam, the maximum deflection is	**1) option A** 2) Option B 3) OptionC 4) Option D
25 : The polar modulus for a solid shaft of diameter (D) is	1) (?D2)/4 **2) (?D3)/16** 3) (?D3)/32 4) (?D4)/64
26 : The polar moment of inertia of a hollow shaft of outer diameter (D) and inner diameter (d) is	1) (?(D3-d3))/16 2) (?(D4-d4))/16 **3) (?(D4-d4))/32** 4) (?(D4-d4))/64
27 : In an I. C. engine piston executes approximately S. H. M. if	**1) Length of connecting rod is very large in comparison of the length of crank** 2) Length of crank is very large in comparison of the length of connecting rod 3) Length of connecting rod is equal to the length of crank 4) Piston does not execute S. H. M. at all
28 : Absorption of energy into a flywheel is	1) At constant speed **2) Accompanied by increase of speed** 3) Accompanied by decrease of speed 4) Not concerned with increase/decrease of speed
29 : The supply of working fluid to the engine to suit the load conditions is controlled by	1) Flywheel **2) Governor** 3) Throttle valve 4) All of these

Question	Options
30 : A ductile component is subjected to dynamic stress varying between 150 MPa and 250 MPa. The ultimate tensile strength of the material is 450 MPa, yield point in tension is 350 MPa and endurance limit for reversed bending is 250 MPa. Determine the factor of safety (N) for the design of the component.	1) N=2.5 2) N= 2.39 3) N=1.45 **4) N=1.29**
31 : Square key of side “d/4” each and length “L” is used to transmit torque “T” from the shaft of diameter “d” to the hub of a pulley. Assuming the length of the key to be equal to the thickness of the pulley, the average shear stress developed in the key is given by	1) 4T/Ld 2) 16T/Ld2 **3) 8T/Ld2** 4) 16T/?d3
32 : A bracket (shown in figure) is rigidly mounted on wall using four rivets. Each rivet is 6 mm in diameter and has an effective length of 12 mm. Direct shear stress (in MPa) in the most heavily loaded rivet is	1) 4.4 **2) 8.8** 3) 17.6 4) 35.2
33 : The value of gas constant (R) in S. I. units is	1) 0.287 J/kgK 2) 2.87 J/kgK 3) 28.7 J/kgK **4) 287 J/kgK**
34 : Which is the incorrect statement about Carnot cycle?	1) It is used as the alternate standard of comparison of all heat engines. **2) All the heat engines are based on Carnot cycle.** 3) It provides concept of maximizing work output between the two temperature limits. 4) all of these
35 : One kg of carbon produces _____ kg of carbon dioxide.	1) 3/7 2) 7/3 **3) 11/3** 4) 3/11

Question	Options
36 : A designer chooses the values of fluid flow rates and specific heats in such a manner that the heat capacities of the two fluids are equal. A hot fluid enters the counter flow heat exchanger at 100°C and leaves at 60°C. A cold fluid enters the heat exchanger at 40°C. The mean temperature difference between the two fluids is	**1) 20°C** 2) 40°C 3) 60°C 4) 66.7°C
37 : Which of the following would lead to a reduction in thermal resistance?	1) In conduction, reduction in the thickness of the material and an increase in thermal conductivity. 2) In convection, stirring of the fluid and cleaning the heating surface. 3) In radiation, increasing the temperature and reducing the emissivity. **4) All of these**
38 : The logarithmic mean temperature difference (tm) is given by (where ?t1 and ?t2 are temperature differences between the hot and cold fluids at entrance and exit)	**1) tm = (?t1 - ?t2)/loge (?t1/?t2)** 2) tm =loge (?t1/?t2)/(?t1 - ?t2) 3) tm = (?t1 - ?t2) loge (?t1/?t2) 4) tm =loge (?t1-?t2)/(?t1 / ?t2)
39 : The diameter of the nozzle (d) for maximum transmission of power is given by (where D = Diameter of pipe, f = Darcy 's coefficient of friction for pipe, and l = Length of pipe)	1) d= (D5/8fl)1/2 2) d= (D5/8fl)1/3 **3) d= (D5/8fl)1/4** 4) d= (D5/8fl)1/5
40 : The length AB of a pipe ABC in which the liquid is flowing has diameter (d1) and is suddenly enlarged to diameter (d2) at B which is constant for the length BC. The loss of head due to sudden enlargement is	1) (v1-v2)2/g 2) (v12-v22)/g **3) (v1-v2)2/2g** 4) (v12-v22)/2g
41 : A tank of uniform cross-sectional area (A) containing liquid up to height (H1) has an orifice of cross-sectional area (a) at its bottom. The time required to empty the tank completely will be	**1) Option A** 2) Option B 3) Option C 4) Option D

Question	Options
42 : Thermoplastic materials are those materials which	1) are formed into shape under heat and pressure and results in a permanently hard product. **2) do not become hard with the application of heat and pressure and no chemical change occurs.** 3) are flexible and can withstand considerable wear under suitable conditions. 4) are used as a friction lining for clutches and brakes.
43 : A eutectoid steel consists of	**1) wholly pearlite** 2) wholly austenite 3) pearlite and ferrite 4) pearlite and cementite
44 : Free carbon in iron makes the metal	**1) soft and gives a coarse-grained crystalline structure** 2) soft and gives a fine-grained crystalline structure 3) hard and gives a coarse-grained crystalline structure 4) hard and gives a fine-grained crystalline structure
45 : When the cutting edge of the tool is dull, then during machining	1) continuous chips are formed 2) discontinuous chips are formed **3) continuous chips with built-up edge are formed** 4) no chips are formed
46 : Twist drills are made of	1) high speed steel 2) carbon steel 3) stainless steel **4) Either high speed steel or carbon steel**

Question	Options
47 : In the relation VTn=C, the value of n for carbide tools is	1) 0.1 to 0.2 **2) 0.20 to 0.25** 3) 0.25 to 0.40 4) 0.40 to 0.55
48 : The probabilistic time is given by (where to = Optimistic time, tp = Pessimistic time, and tn = Most likely time)	1) (to+tp+tn)/3 2) (to+2tp+tn)/4 3) (to+4tp+tn)/5 **4) (to+tp+4tn)/6**
49 : If (R) is the base rate guaranteed per hour, (S) is the standard time for the job and (T) is the actual time, then according to Rowan plan, wages for the job will be	1) TR 2) TR+((S-T)/2)R 3) TR+(S-T)R **4) TR+((S-T)/S)R**
50 : In breakeven analysis, total cost consists of	1) fixed cost + sales revenue 2) variable cost + sales revenue **3) fixed cost + variable cost** 4) fixed cost + variable cost + profit

Best of luck for the future!