Question Booklet
प्रश्न पुस्तिका

Do not open this booklet until you are asked to do so.
इस पुस्तिका को तब तक न खोलें जब तक कहा ना जाए।

Subject: Mechanical Degree
विषयः–यांत्रिकी डिग्री

Code: D
कोडः डी

Duration: 2 hours
समय : 2 घण्टे

Max. Marks: 100
अधिकतम अंकः 100

1. Candidate's Roll no. परीक्षार्थी क्रमांक	2. Question booklet Serial number : **प्रश्न पुस्तिका क्रमांकः**

Important Instructions
महत्वपूर्ण निर्देश

1. Number of pages in the booklet : 13
2. This Booklet is divided into Two Parts namely Part A and Part B. Part A contains 20 questions and Part B contains 80 questions.
3. Questions in Part A are in both English and Hindi language and in Part B in English language only.
4. All questions carry equal marks.
5. Please use **Black ink Ball Point Pen** to fill OMR answer sheet.
6. Answer all the questions in OMR sheet.
7. Each question has four alternative responses marked serially as A,B,C, and D. You have to darken only one circle in the supplied OMR sheet for each question.
8. **Negative marking** will be done in case of each wrong/multiple reply. 1/3rd part of the mark(s) allotted to the question will be deducted.
9. If more than one options for an answer are marked correct then it will be treated as wrong answer.
10. Rough work should be done only in the space provided at the end of the Question Booklet.
11. Use of mobile phone or any type of electronic device (except non programmable calculator) is strictly prohibited in the examination hall. Any candidate found with such objectionable material/device will be strictly dealt as per state government rules.
12. Please hand over both Answer Sheet and the Question Booklet to the Invigilator before leaving the Examination Hall.
13. In case of any variation in English or Hindi version, English version should be treated as correct.

Warning: If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R will be lodged against his/her in the police station and he/she will be prosecuted under section 3 of the R.P.F. (Prevention of unfair means) Act, 1992.

1. पुस्तिका में पृष्ठों की संख्याः 13
2. पुस्तिका में प्रश्नों को दो पार्ट में विभाजित किया गया है, क्रमशः ए एवं बी. पार्ट ए में 20 प्रश्न तथा पार्ट बी में 80 प्रश्न दिये हुए हैं।
3. पार्ट ए हिन्दी एवं अंग्रेजी (द्विभाषीय) में एवं पार्ट बी में प्रश्न केवल अंग्रेजी (एकभाषीय) में दिये हुए हैं।
4. सभी प्रश्नों के अंक समान है।
5. ओ एम आर पत्रक (OMR) भरने के लिए केवल **काली स्याही वाले बॉल पोईन्ट पेन** का ही प्रयोग करें।
6. सभी प्रश्नों के उत्तर पत्रक (OMR) पर दें।
7. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः A, B, C, D अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर–पत्रक पर काले बॉल प्वाइंट पेन से गहरा करना है।
8. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जोयगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक अधिक उत्तर से है।
9. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
10. रफ कार्य केवल परीक्षा पुस्तिका के अंतिम पृष्ठ पर दिये गये खाली जगह पर ही करें।
11. मोबाईल फोन अथवा इलेक्ट्रोनिक यंत्र (नॉन प्रोग्रामेबल केलकूलेटर को छोडकर) का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उकसे विरूद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
12. परीक्षा कक्ष छोड़ने से पहले प्रश्न पत्र एवं उत्तर पत्र की पुस्तिका कक्ष निरीक्षक को लौटा दें।
13. अंग्रेजी या हिंदी संस्करणों में किसी भी असमानता के मामले में अंग्रेजी संस्करण को सही माना जायेगा।

चेतावनीः–अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरूद्ध पुलिस में प्राथमिकी दर्ज कराई जायेगी और आ.पी.ई. (अनुसूचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

PART – A

1. Thar Desert extends from ..... and surrounded by the Aravalli Ranges on the east.
   A. Indus River
   B. Ghaggar River
   C. Sutlej River
   D. None of the above

2. The Ajmer district is divided into ..... subdivisions,
   A. 2
   B. 3
   C. 4
   D. 5

3. Mount Abu, famous for Dilwara Temples, a sacred pilgrimage for.... .
   A. Buddhists
   B. Sikhs
   C. Hindus
   D. Jains

4. 'Chhappan' basin is in the district of ?
   A. Alwar
   B. Banswara
   C. Pali
   D. Tonk

5. Dhaman, Karad and Anjan are the?
   A. Varieties of Sheep in Rajasthan
   B. Varieties of Caster seed of Gujarat
   C. Varieties of Grass in Rajsthan
   D. Three heroes of Gawari dance

6. Allah Jilai Bai of Rajasthan is ?
   A. Rajasthan Author
   B. Rajasthani Folk Singer
   C. Musician
   D. Social worker

7. Rani Sati temple is situated at ?
   A. Sikar
   B. Jhunjhunu
   C. Karoli
   D. Udaipur

8. Banganga river flows in following three districts
   A. Jaipur, Dausa, Bharatpur
   B. Alwar, Sikar, Jhunjhunu
   C. Jodhpur, Bikaner, barmer
   D. Kota, Baran, Jhalawar

9. Which is not true for "Block Development Officer"
   A. Appointed by the Government
   B. Working at Taluka or Block level
   C. He functions as the leader of the Block
   D. Elected person by people

10. The highest number of state level animal fairs in Rajasthan are held in the district?
    A. Jhalawar
    B. Nagour
    C. Barmer
    D. Hanumangarh

11. Identify the incorrect pair relation:
    A. Gindar dance : Shekhawati
    B. Dhol dance : Jalor
    C. Bamarasia dance : Bikaner
    D. Dandia dance : Marwar

12. Which article of the constitution directs the government to organise Village Panchayats-
    A. Art-32
    B. Art-40
    C. Art-48
    D. Art-51

13. Who among the following is known as 'the father of local self government' in India ?
    A. Mahatma Gandhi
    B. Lord Canning
    C. Lord Ripon
    D. Lord Wellesley

continued...

14. The State Election Commission conducts, controls and supervises municipal elections under—
    A. Article 240(1)
    B. Article 241(2)
    C. Article 243(K)
    D. Article 245(D)

15. Village Panchayat is accountable to the—
    A. Panchayat Samiti
    B. Zila Parishad
    C. Chairman of the Village Panchayat
    D. None of the above

16. Which is at the apex of the three-tier system of Panchayati Raj ?
    A. Gram Sabha
    B. Gram Panchayat
    C. Zila Parishad
    D. Panchayat Samiti

17. Total number of members of Rajasthan state legislative assembly is:
    A. 200
    B. 175
    C. 210
    D. 190

18. On which eve is the Banganga Fair celebrated?
    A. Vaishakh Purnima
    B. Magha Purnima
    C. Chaitra Purnima
    D. Kartik Purnima

19. When is Kapil Muni Fair held?
    A. Vaishakh poornima
    B. Magha poornima
    C. Chaitra poornima
    D. Kartik Purnima

20. Main bench of Rajasthan high Court is situated at:
    A. Jaipur
    B. Udaipur
    C. Jodhpur
    D. Kota

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continued...

पार्ट – ए

1. थार रेगिस्थान ——————— से पूर्व की ओर अरावली पहाड़ियों से घिरा हुआ है-
   A. सिंधु नदी
   B. घग्गर नदी
   C. सतलज नदी
   D. इनमें से कोई नहीं

2. अजमेर जिला कितने उपखण्डों में विभाजित है?
   A. 2
   B. 3
   C. 4
   D. 5

3. माउंट आबू स्थित दिलवाड़ा मंदिर किस धर्म का धर्मस्थल है?
   A. बौद्ध धर्म
   B. सिख धर्म
   C. हिंदू धर्म
   D. जैन धर्म

4. छप्पन बेसिन किस जिले में स्थित है?
   A. अलवर
   B. बाँसवाड़ा
   C. पाली
   D. टोंक

5. धामन, करड और अंजन निम्नलिखित है-
   A. राजस्थान में भेड़ की प्रजाति
   B. राजस्थान में अरंडी के बीज की प्रजाति
   C. राजस्थान में घास की प्रजाति
   D. गवरी नृत्य के तीन कलाकार

6. अल्लाह जिल्ला बाई ——————— है-
   A. राजस्थानी लेखक
   B. राजस्थानी लोक गायक
   C. संगीतकार
   D. समाज सेविका

7. रानी सती मंदिर कहाँ स्थित है?
   A. सीकर
   B. झुन्झुनू
   C. करौली
   D. उदयपुर

8. बाणगंगा नदी निम्न में से किन तीन जिलों में बहती है?
   A. जयपुर, दौसा, भरतपुर
   B. अलवर, सीकर, झुन्झुनू
   C. जोधपुर, बीकानेर, बाड़मेर
   D. कोटा, बारां, झालावाड़

9. इनमें से ब्लॉक डेवलपमेन्ट ऑफिसर के लिए क्या सत्य नहीं है?
   A. सरकार द्वारा नियुक्ति
   B. तालुका/ब्लॉक स्तर पर कार्य
   C. ब्लॉक प्रमुख के रूप में कार्यरत
   D. जनता द्वारा निर्वाचित

10. राजस्थान में सर्वाधिक राज्य–स्तरीय पशु मेले किस जिले में आयोजित होते हैं?
   A. झालावाड़
   B. नागौर
   C. बाड़मेर
   D. हनुमानगढ़

11. निम्न में से कौनसा सम्बन्ध असत्य है?
   A. गींदड़ नृत्यः शेखावाटी
   B. ढोल नृत्यः जालौर
   C. बमरसिया नृत्यः बीकानेर
   D. डांडिया नृत्यः मारवाड़

continued...

12. संविधान का कौनसा अनुच्छेद राज्य सरकार को ग्राम पंचायत बनाने के निर्देश देता है?
A. अनुच्छेद 32
B. अनुच्छेद 40
C. अनुच्छेद 48
D. अनुच्छेद 51

13. इनमें से कौन स्थानीय स्वायत्त शासन के जनक माने जाते है?
A. महात्मा गाँधी
B. लॉर्ड केनिंग
C. लॉर्ड रिपन
D. लॉर्ड वेलेस्ले

14. राज्य निर्वाचन आयोग संविधान के किस अनुच्छेद के अंतर्गत नगर पालिका चुनावों का आयोजन, पर्यवेक्षण एवं नियंत्रण करता है?
A. अनुच्छेद 240(1)
B. अनुच्छेद 241 (2)
C. अनुच्छेद 243 (K)
D. अनुच्छेद 245 (D)

15. ग्राम पंचायत निम्न में से किसके प्रति उत्तरदायी है?
A. पंचायत समिति
B. जिला परिषद
C. ग्राम पंचायत के अध्यक्ष
D. इनमें से कोई नहीं

16. निम्न में से कौन सी संस्था पंचायती राज की त्रिस्तरीय प्रणाली के शीर्ष पर है?
A. ग्राम सभा
B. ग्राम पंचायत
C. जिला परिषद
D. पंचायत समिति

17. राजस्थान विधान सभा के कुल सदस्य है-
A. 200
B. 175
C. 210
D. 190

18. निम्न में से किसकी पूर्व संध्या पर बाणगंगा मेला आयोजित किया जाता है?
A. वैशाख पूर्णिमा
B. माघ पूर्णिमा
C. चैत्र पूर्णिमा
D. कार्तिक पूर्णिमा

19. कपिल मुनि का मेला कब आयोजित किया जाता है?
A. वैशाख पूर्णिमा
B. माघ पूर्णिमा
C. चैत्र पूर्णिमा
D. कार्तिक पूर्णिमा

20. राजस्थान उच्च न्यायालय की मुख्य पीठ कहाँ पर स्थित है?
A. जयपुर
B. उदयपुर
C. जोधपुर
D. कोटा

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continued...

PART – B

21. According to Dalton's law, the total pressure of the mixture of gases is equal to
    A. Greater of the partial pressures of all
    B. Average of the partial pressure of all.
    C. Sum of the partial pressure of all
    D. Atmospheric pressure

22. A closed system is one in which
    A. Mass does not cross boundaries of the system, though energy may do so.
    B. Mass crosses the boundary but not the energy
    C. Neither mass nor energy crosses the boundaries of the system.
    D. Both energy and mass cross the boundaries of the system.

23. Kinetic energy of molecule in terms of absolute temperature(T) is proportional to
    A. T
    B. 1/T
    C. T^2
    D. $T^{1/2}$

24. The adiabatic equation of a perfect gas is
    A. pV=Constant
    B. pV^n = Constant
    C. pV^γ = Constant
    D. $pV^{1/\gamma}$ = Constant

25. Minimum work in compressor is possible when the value of adiabatic index n is equal to
    A. 0.75
    B. 1
    C. 1.27
    D. 1.35

26. The efficiency of carnot engine is 0.75. If cycle direction is reversed, COP of reversed carnot cycle will be
    A. 0.5
    B. 1.25
    C. 1.33
    D. 0.33

27. The following cycle is used for air craft refrigeration
    A. Brayton cycle
    B. Joule cycle
    C. Reversed Brayton Cycle
    D. Bell-Coleman cycle

28. The thermodynamic difference between a Rankine cycle working with saturated steam and Carnot cycle is that
    A. Carnot cycle can't work with saturated steam
    B. Heat is supplied to water at temperature below maximum temperature of the cycle
    C. A rankine cycle receives heat at two places
    D. None of the above

29. Scavenging air in diesel engine means
    A. Air used for combustion sent under pressure
    B. Forced air for cooling cylinder
    C. Burnt air containing products of combustion
    D. Air used for forcing burnt gases out of engine's cylinder during the exhaust period

30. If compression ratio of an engine working on otto cycle is increased from 5 to 6, its air standard efficiency will increase by
    A. 1%
    B. 8%
    C. 20%
    D. 25%

31. The pressure and temperature at the end of compression stroke in a petrol engine are of the order
    A. 4-6 kg/cm^2 and $200\text{-}250^0$ c
    B. 6-12 kg/cm^2 and $250\text{-}300^0$ c
    C. 12-20 kg/cm^2 and $350\text{-}450^0$ c
    D. 20-30 kg/cm^2 and $450\text{-}500^0$ c

continued...

32. The most popular firing order in a four cylinder in-line IC engine is
    A. 1-2-3-4
    B. 1-3-2-4
    C. 1-4-2-3
    D. 1-3-4-2

33. In petrol engine using fuel having fixed octane rating, increases in compression ratio will
    A. Increase the knocking tendency
    B. Decrease the knocking tendency
    C. Not affect the knocking tendency
    D. unpredictable

34. Piston speed is equal to
    A. stroke × rpm
    B. (stroke × rpm)/2
    C. 2 × Stroke × rpm
    D. (stroke × rpm)/4

35. Detonation in petrol engine can be suppressed or reduced by the addition of small quantity of
    A. Lead ethide
    B. Iso-octane
    C. N-heptane
    D. Methyl naphthalene

36. A gas engine has a swept volume of 300cc and clearance volume of 25 cc. Its volumetric efficiency is 0.88 and mechanical efficiency is 0.90. What is the volume of the mixture taken in per stroke?
    A. 248cc
    B. 252 cc
    C. 264cc
    D. 286cc

37. Fuel injection pressure in diesel engine is usually
    A. Slightly above atmospheric pressure
    B. 5 to 100 kg/cm^2
    C. 50 to 100 kg/cm^2
    D. 100 to 200 kg/cm^2

38. The correct sequence of decreasing order of brake thermal efficiency of the three given basic types of IC engine is
    A. 4 stroke CI engine, 4 stroke SI engine, 2 stroke CI engine
    B. 4 stroke SI engine, 4 stroke CI engine, 2 stroke SI engine
    C. 4 stroke CI engine, 2 stroke SI engine, 4 stroke SI engine
    D. 2 stroke SI engine, 4 stroke SI engine, 4 stroke CI engine

39. Keeping the parameters constant, break power of a diesel engine can be increased by
    A. Decreasing the density of intake air
    B. Increasing the temperature of intake air
    C. Increasing the pressure of intake air
    D. Decreasing the pressure of intake air

40. The differential in an automobile performs the function of
    A. Permitting two rear wheel to run independently
    B. To enable the automobile turn by 90 degree
    C. Allowing rear wheel movement
    D. Permitting two rear wheels to have flexibility of relative speed, whenever it is required.

41. Morse test is used to determine mechanical efficiency of
    A. Single cylinder CI engine
    B. Single cylinder SI engine
    C. Multi cylinder engine
    D. Four stroke engine

42. An ideal flow of any fluid must fulfill the following
    A. Newton's law of motion
    B. Boundary layer theory
    C. Pascal's law
    D. Continuity equation

43. Mass density of liquid(ρ) is given by
    A. P = Mass/Volume
    B. P =Metric $slug/m^2$
    C. P = ($kg.\ sec^2$)/m^4
    D. All of the above

continued...

44. When the flow parameters at any given instant remains same at every point, then flow is said to be
    A. Quasi static
    B. Steady state
    C. Laminar
    D. uniform

45. The bulk modulus of elasticity with increase in pressure
    A. increases
    B. decreases
    C. remains constant
    D. increases first upto certain limit and then decreases

46. If mercury in a barometer is replaced by water, the height of 3.75 cm of mercury will be following cm of water
    A. 51 cm
    B. 50 cm
    C. 52 cm
    D. 51.7 cm

47. Dimension of surface tension are
    A. $M^1 L^0 T^{-2}$
    B. $M^1 L^0 T^{-1}$
    C. $M^1 L^1 T^{-2}$
    D. $M^1 L^2 T^{-2}$

48. A one dimensional flow is one which
    A. Is uniform flow
    B. Is steady uniform flow
    C. Takes place in straight lines
    D. Involves zero transverse component of flow

49. Newton's law of viscosity is a relationship between
    A. Shear stress and the rate of angular distortion
    B. Shear stress and viscosity
    C. Shear stress , velocity and viscosity
    D. Pressure , velocity and viscosity

50. Euler's dimensionless number relates the following
    A. Internal force and gravity
    B. Viscous force and internal force
    C. Pressure force and internal force
    D. Viscous force and buoyancy force

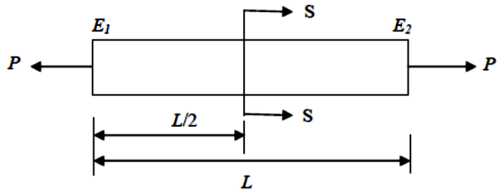
51. A vertical wall is subjected to liquid (of specific gravity 'w') pressure on one side. If h be the height of liquid surface, then total pressure on wall per unit length is
    A. wh
    B. (wh)/2
    C. $(wh^2)/2$
    D. 2/3 wh

52. The total pressure on a horizontally immersed surface(of surface area 'A') with its center of gravity at a depth 'x' from liquid surface in a liquid of specific weight 'w' is
    A. w.A
    B. w.x
    C. w.A/x
    D. w.A.x

53. Two dimensional flow occurs when
    A. The direction and magnitude of the velocity at all points are identical
    B. The velocity od successive fluid particles, at any point, is the same at successive periods of time
    C. The fluid particles moves in plane or parallel planes and the streamline patterns are identical in each plane.
    D. Velocity, depth, pressure etc. changes from point to point in fluid flow.

continued...

54. A rod of length L having uniform cross-sectional area A is subjected to a tensile force P as shown in the figure below. If the Young's modulus of the material varies linearly from E1 to E2 along the length of the rod, the normal stress developed at the section-SS is



A. P/A
B. $P(E_1 - E_2)/A(E_1 + E_2)$
C. PE_2/AE_1
D. PE_1/AE_2

55. Consider one-dimensional steady state heat conduction along x-axis ($0 \leq x \leq L$), through a plane wall with the boundary surfaces (x=0 and x=L) maintained at temperatures of 0°C and 100°C. Heat is generated uniformly throughout the wall. Choose the CORRECT statement.
A. The direction of heat transfer will be from the surface at 100°C to the surface at 0°C.
B. The maximum temperature inside the wall must be greater than 100°C.
C. The temperature distribution is linear within the wall.
D. The temperature distribution is symmetric about the mid-plane of the wall.

56. A cylinder contains 5 m^3 of an ideal gas at a pressure of 1 bar. This gas is compressed in a reversible isothermal process till its pressure increases to 5 bar. The work in kJ required for this process is
A. 804.7
B. 953.2
C. 981.7
D. 1012.2

57. In order to have maximum power from a Pelton turbine, the bucket speed must be
A. equal to the jet speed.
B. equal to half of the jet speed.
C. equal to twice the jet speed.
D. independent of the jet speed.

58. At a point in a strained material, if two mutually perpendicular tensile stresses of 2000 Kg/cm^2 and 1000 Kg/cm^2 are acting, then the intensity of tangential stress on a plane inclined at 15^0 to the axis of the minor stress will be
A. 125 Kg/cm^2
B. 250 Kg/cm^2
C. 500 Kg/cm^2
D. 1000 Kg/cm^2

59. A long thin walled cylindrical shell, closed at both the ends, is subjected to an internal pressure. The ratio of the hoop stress (circumferential stress) to longitudinal stress developed in the shell is
A. 0.5
B. 1.0
C. 2.0
D. 4.0

60. Water is coming out from a tap and falls vertically downwards. At the tap opening, the stream diameter is 20 mm with uniform velocity of 2 m/s. Acceleration due to gravity is 9.81 m/s2. Assuming steady, in viscid flow, constant atmospheric pressure everywhere and neglecting curvature and surface tension effects, the diameter in mm of the stream 0.5 m below the tap is approximately
A. 10
B. 15
C. 20
D. 25

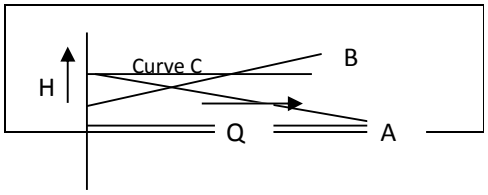
continued...

61. A centrifugal pump has following specifications
    i. Speed=100 rpm
    ii. Flow = 1200 LPM
    iii. Head= 20 m
    iv. Power =5HP

    If speed is increased to 1500 rpm, new flow will be
    A. 1800 LPM
    B. 2700 LPM
    C. 1200 LPM
    D. 4500 LPM

62. Power required to drive a centrifugal pump is proportional to
    A. Speed(N)
    B. N^2
    C. N^3
    D. N^4

63. Figure given below shows the curves between Head(H) and Flow(Q) for a centrifugal pump impeller with different impeller vane exit angles



    For vane exit angle of 90^0, following curve holds
    A. Curve A
    B. Curve B
    C. Curve C
    D. None of the above

64. Based on the above given figure for forward included vanes i.e. vanes having exit angle greater than 90^0, following curve holds good.
    A. Curve A
    B. Curve B
    C. Curve C
    D. None of the above

65. If α is the angle subtended by two adjacent bucket in a pelton wheel, then the no. of buckets i.e. equal to
    A. 40/ α
    B. 180/ α
    C. 270/ α
    D. 360/ α

66. In the tensile test, the phenomenon of slow extension of the material, i.e. stress increasing with the time at a constant load is called
    A. Creeping
    B. Yielding
    C. Breaking
    D. Plasticity

67. A beam of length l, having uniform load of w kg per unit length, is supported freely at the ends. The bending moment at mid span will be
    A. wl/2
    B. $wl^2/2$
    C. $wl^2/4$
    D. $wl^2/8$

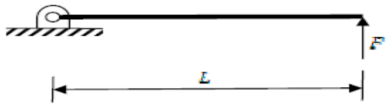
68. The ratio of maximum shear stress to the average shear stress in case of a circular beam transmitting power is equal to
    A. 3/2
    B. 4/3
    C. 7/4
    D. 5/2

69. Two cantilever beams are of equal length. One carries a uniformly distributed load and other carries same load but concentrated at the free end. The ratio of maximum deflection is
    A. 5/6
    B. 2/3
    C. ½
    D. 5/12

continued...

70. A simply supported beam of length L is subjected to a varying distributed load sin (3πx/L) Nm-1, where the distance x is measured from the left support. The magnitude of the vertical reaction force in N at the left support is
    A. zero
    B. L/ 3π
    C. L/ π
    D. 2L/ π

71. A pin jointed uniform rigid rod of weight W and length is supported horizontally by an external force F as shown in the figure below. The force F is suddenly removed. At the instant of force removal, the magnitude of vertical reaction developed at the support is



    A. zero
    B. W/ 4
    C. W/ 2
    D. W

72. How many layers can be used in AutoCAD drawing
    A. One
    B. Ten
    C. One for each object
    D. As many as are needed

73. In orthographic projection how many views are needed
    A. 1
    B. 2
    C. 3
    D. As many as are needed

74. In an AutoCAD can a polyline be given a variable width
    A. No
    B. Only in certain drawing
    C. Only in AutoCAD 2004
    D. Yes, whenever you command it

75. Which command in AutoCAD allows you to change the Linetype Scale?
    A. LT
    B. LT
    C. LS
    D. LTSC

76. The angle of metric thread is
    A. 55^0
    B. 45^0
    C. 47.5^0
    D. 60^0

77. An Oldham coupling connects two shafts , when they are
    A. Intersecting
    B. Parallel
    C. Coaxial
    D. None of the above

78. In solid flanged coupling, the flanges are joined by means of
    A. Hexagonal Headed bolts
    B. Headless taper bolts
    C. Cotter pins
    D. None of the above

79. In the first angle projection, the view obtained on the auxiliary vertical plane placed to the right of the object is called
    A. View from the left
    B. View from the right
    C. View form bottom
    D. View from top

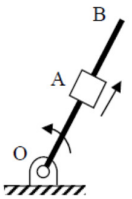
80. In orthographic projection, the projectors are -------- to the plane of projection
    A. Parallel
    B. Perpendicular
    C. Inclined
    D. None of the above

continued...

81. The number of mutually perpendicular planes that may surround an object in space is
    A. Four
    B. Three
    C. Six
    D. Eight

82. In the third angle projection, the object is imagined to be place
    A. Below H.P and behind V. P
    B. Above H.P and infront of V.P
    C. Above H.P and behind V.P
    D. None of the above

83. A link OB is rotating with a constant angular velocity of 2 rad/s in counter clockwise direction and a block is sliding radially outward on it with an uniform velocity of 0.75 m/s with respect to the rod, as shown in the figure below. If OA = 1 m, the magnitude of the absolute acceleration of the block at location A in m/s^2.



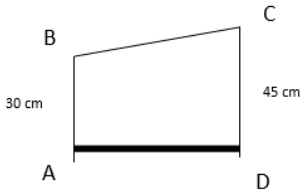
    A. 3
    B. 4
    C. 5
    D. 6

84. Inversion of a mechanism is
    A. Changing the higher pair to lower pair
    B. Obtaining by fixing different links in a kinematic chain
    C. Turning it upside down
    D. Obtaining by reversing the input and output motion

85. Which of the followings are inversions of a double slider crank chain?
    1. Whitworth return motion
    2. Scotch yoke
    3. Oldham's coupling
    4. Rotary engine

    Select the correct answer from the given below
    A. 1 and 2
    B. 1, 3 and 4
    C. 2 and 3
    D. 2, 3 and 4

86. ABCD is a four bar mechanism in which AB = 30 cm and CD = 45 cm. AB and CD are both perpendicular to fixed link AD as show in the figure. If velocity of B at this condition is V, then velocity of C is

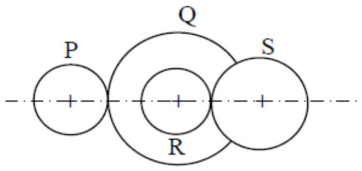


    A. V
    B. 3/2 V
    C. 9/4 V
    D. 2/3 V

87. The instantaneous center of rotation of a rigid thin disc rolling on a plane rigid surface is located at
    A. Center of the disc
    B. An infinite distance on the plane surface
    C. The point of contact
    D. The point on the circumference situated vertically opposite to the contact point.

continued...

88. A compound gear train with gears P, Q, R and S has number of teeth 20, 40, 15 and 20, respectively. Gears Q and R are mounted on the same shaft as shown in the figure below. The diameter of the gear Q is twice that of the gear R. If the module of the gear R is 2 mm, the center distance in mm between gears P and S is



A. 40
B. 80
C. 120
D. 160

89. The analogy of Coriolis component $2V_w$ is the same as that of the relative velocity vector V rotated
A. 45^o in the direction of rotation of the link containing the path
B. 45^o in the direction opposite to the rotation of the link containing the path
C. 90^o in the direction of rotation of the link containing the path
D. 180^o in the direction opposite to the rotation of the link containing the path

90. In a plate cam mechanism with reciprocating roller follower, the follower has a constant acceleration in the case of
A. Cycloidal motion
B. Simple harmonic motion
C. Parabolic motion
D. 3-4-5 polynomial motion

91. In spur gear , the circle on which the involute is generated is called the
A. Pitch circle
B. Clearance circle
C. Base circle
D. Addendum circle

92. In a belt drive , if the pulley diameter is doubled keeping the tension and belt width constant, then it will be necessary to
A. Increase the key length
B. Increase the key width
C. Decrease the key width
D. Decrease the key length

93. Kinamatic pairs are those which have two elements that
A. Have line contact
B. Have surface contact
C. Permit relative motion
D. Are held together

94. Relationship between the number of links(L) and number of pairs(P) is
A. P=2L-4
B. P=2L+4
C. P=2L+2
D. P=L-4

95. According to Kennedy's theorem, if three bodies have plane motions, their instantaneous center lies on
A. A triangle
B. A point
C. A straight line
D. A curve

96. The ratio of number of teeth and pitch circle diameter in a gear is called
A. Circular Pitch
B. Diametral pitch
C. Module
D. Addendum

97. If D1 and T1 be the diameter and number of teeth of gear 1 and D2 and T2 the corresponding values of other gear in mesh, then speed ratio N1/N2 will be equal to
A. D1/D2
B. T1/T2
C. (D1T2)/(D2T1)
D. D2/D1

continued...

98. For steady state forced vibrations, the phase lag at resonance condition is
    A. 0^o
    B. 45^o
    C. 90^o
    D. 180^o

99. If damping factor for a vibrating system is unity, then system is
    A. Critically damped
    B. Not damped
    C. Under damped
    D. Over damped

100. In a CAD package, mirror image of a 2D point P(5,10) is to be obtained about a line which passes through the origin and makes an angle of 45° counterclockwise with the X-axis. The coordinates of the transformed point will be
    A. (7.5, 5)
    B. (10, 5)
    C. (7.5, -5)
    D. (10, -5)
