Solved SAIL(MT) Exam Paper for Mechanical Engineer

There were two part technical and non-tech. Again non-tech 4 parts GK, English, Aptitude and Reasoning.
Technical part was having 100 questions and 100 non tech having 25 questions each parts.

Time 2 hour 30 mins. 1.30 mins for each part. First you have to do tech after that non-tech part.

WRITTEN TEST

1. Technical :

Basic fundamentals question from Thermodynamics, Fluid mechanics, hydraulic machines, RAC, material science, production engineering and industrial engineering, Strength of materials. IC engine, Heat and mass transfer and power plant.

NOTE- Direct questions from khurmi objective Mechanical Engineering.

2. Non-Technical:

(1) General Knowledge: G.K. was easy comparatively.

1. 2010 Rajiv Gandhi Khel Ratn Award is given to- Sania nehwal

2. BIHU is local dance of which state- Asam

3. 2012 Olympic will organize in- London.

4. Sign of Indian Rupees is made by. D. uday kumar.

5. Brahm Society was established by- Raja Rammohan Ray

6. State of max. population in density in India- W.B.

7. Who is the ex-officio of planning commition of india is- P.M..

8. Which temple is made up by cutting Kailasa Mount- Ajanta, Alora,elephentas etc

9. 20-20 cricket world cup winner of 2010- England

10. Which river drains in Arabian Sea- Tapi.

11. Which country is recently become the member of SAARC- Myanmar, Sri lanka, Bhutan etc.

12. Durand line is in between of which two countries - pak/afganistan.

13. Currency of Bhutan …..And few more

(2) English: Synonyms, preposition, 5 best meaning and 2 para graph having 5 question each.

(3) Aptitude: Profit loss, Ratio and proportion, time and work, simple interest, compound interest

(4) Reasoning: There was 5 question each from Analogy, Venn diagram, Statement and conclusion, Direction sense test, cube.

Aptitude and reasoning was difficult and time taking. R.S Aggarwal is the best for aptitude and reasoning

NOTE- make sure you attempt all the sections to qualify, well I was one of, to qualify written test.
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1.Aptitude in that they have asked most of the questions from percentage , profit and loss , problems on train , Simple Interest, Compound Interest, Calender, Age problems, Time and Work ,H.C.F & L.C.F, average, square roots, Decimal Fractions, Discount problems, Odd man out and series. Hey freinds just go through the R.S AGGARWAL.

2.Verbal in that they have asked for meanings, opposites, appropriate words, Passages, analogy, relational, Coding and decoding ,cubes and dice, statement and conclusions, Mirror images, Alphabet test, Mathematical Operations, Data sufficiency. follow Verbal and NON-verbal Reasoning by R.S AGGARWAL.

3.General Awareness this all about general knowledge test of the student. So try to refer some G.K general questions like some quotations given by great people like Mahatma Gandhi they will give some quotation n they will ask who said this quotation like that, next O2 is carried out by red blood cells n some on nature n some n history n some on current affairs n some on politics n some on food products like that so try to know some general questions.

4.Technical Test In this they will ask about subject as I am from mechanical they asked questions from Automobile engineering, Design of machine members, Strength of materials, Kinematics, MOF, Thermal subject study all cycles n about working of piston n they have asked some problems from DMM n some problems on turbines n some of determining speeds so frens do concentrate up on core subjects which we have in our 2nd and 3rd and 4-1 sem subjects that too core subjects.
Frens we have negative marking for each wrong answer they will deduct 1/4 mark so first try to do only known questions n they try other questions
we will have time for 2hrs and 20mins so try the best.
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Mechanical-Engineering MT 2009

A definite area or space where some thermodynamic process takes place is known as

A thermodynamic system B thermodynamic cycle

C thermodynamic process D thermodynamic law

2. Which of the following is an intensive property of a thermodynamic system?

A volume B Temperature

C mass D energy

3. Temperature at which the volume of the gas becomes 0 is called

A absolute scale of temperature B absolute 0 temperature

C absolute temperature D none of these

4. The unit of energy in SI units is

A joule B joule metre

C watt D joule/metre

5. 1 joule is equal to

A 1 Nm B kNm

C 10 Nm/s D 10 kNm/s

6. In an irreversible process there is a

A loss of heat B no loss of heat

C gain of heat D no gain of heat

7. The following is an SI engine

A diesel engine B petrol engine

C gas engine D none of the above

8. In a 4 stroke cycle petrol engine during suction stroke

A only air is sucked in B only petrol is sucked in

C mixture of petrol and air is sucked in

D none of the above

9. The thermal efficiency of petrol engine as compared to diesel engine is

A lower B higher

C same for same power output D same for same speed

10. Compression ratio of diesel engines may have a range

A 8 to 10 B 10 to 15

C 16 to 20 D none of the above

11 The thermal efficiency of good I.C engine at the rated load is in the range of

A 80 to 90% B 60 to 70%

C 30 to 35% D 10 to 20%

12 Carburettor is used for

A SI engines B gas engines

C CI engines D none of the above

13 In SI engine to develop high voltage for spark plug

A battery is installed B distributor is installed

C carburetor is installed D ignition coil is installed

14 In a four cylinder petrol engine the standard firing order is

A 1-2-3-4 B 1-4-3-2

C 1-3-2-4 D 1-3-4-2

15 The knocking is SI engines increases with

A increase in inlet air temperature B increase in compression ratio

C increase in cooling water temperature D all of the above

16 Petrol commercially available in India for Indian passenger cars has octane

number in the range

A 40 to 50 B 60 to 70

C 80 to 85 D 95 to 100

17 The knocking tendency in C.I engines increases with

A decrease of compression ratio B increase of compression ratio

C increasing the temperature of inlet air D increasing cooling water

temperature

18 The air standard otto cycle comprises

A two constant pressure processes and two constant volume processes

B two constant pressure and two constant entropy processes

C two constant volume processes and two constant entropy processes

D none of the above

19 The thermal efficiency of theoretical otto cycle

A increases with increase in compression ratio

B increases with increase in isentropic index gamma

1. C does not depend upon the pressure ratio

   D follows of the above

   20 Thermal efficiency of a gas turbine plant has compared to diesel engine plant is

   A higher B lower

   C same D may be higher or lower

21 Mechanical efficiency of a gas turbine as compared to internal combustion

Reciprocating engine is

A higher B lower

C same D unpredictable

22 For a gas turbine the pressure ratio may be in the range

A 2 to 3 B 3 to 5

C 16 to 18 D 18 to 22

23 Thermal efficiency of a closed cycle gas turbine plant increases by

A reheating B intercooling

C regenerator D all of the above

24With the increase in pressure ratio thermal efficiency of a simple gas turbine

Plant with fixed turbine inlet temperature

A decreases B increases

C first increases and then decreases D first decreases and then increases

25In two stage turbine plant, reheating after first stage

A increases work ratio B decreases work ratio

C does not affect work ratio D none of the above

26For a jet propulsion unit , ideally the compressor work and turbine work are

A equal B unequal

C not related to each other D unpredictable

27 Various kinematic pairs are given below.choose the lower pair

A ball bearings B tooth gears in mesh

C camm and follower D crank shaft and bearing

28The relation between the number of pairs forming a kinematic chain and the

Number of links is

A l=2p-2 B l=2p-3

C l=2P-4 D l=2p-5

29In a reciprocating engine

A crankshaft and flywheel form 2 kinematic links

B crankshaft and flywheel form 1 kinematics links

C crankshaft and flywheel do not form kinematic links

D flywheel and crankshaft separately form kinematic links

30A kinematic chain is known as a mechanism when

A none of the link is fixed

B one of the links is fixed

C two of the links are fixed

D all of the links are fixed

31 Which of the following is an inversion of single slider crank chain?

A beam engine

B watt's indicator mechanism

C elliptical trammels

D whitworth quick return motion mechanism

32 control volumes refer to

A a fixed region in space

B a specified mass

C an isolated system

D a closed system

33An isentropic process is always

A irreversible and adiabatic

B reversible and isothermal

C friction less and irreversible

D reversible and adiabatic

34Work done in a free expansion process is

A 0

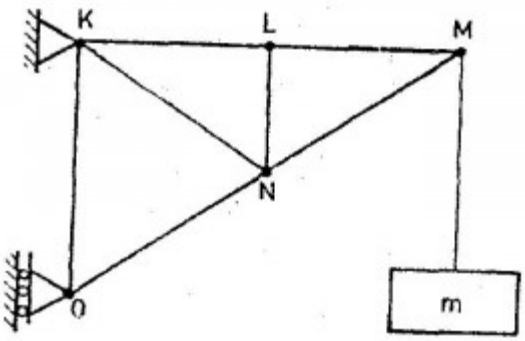
B minimum

C maximum

D positive

35.The figure shows a pin-jointed plane truss loaded at the point M by hanging a mass of 100 kg. The

member LN of the truss is subjected to a load of?



(a) 0 Newton

(b)490 Newtons in compression

(c)981 Newtons in compression

(d) 981 Newtons in tension

36.In terms of.Poisson's ratio (v) the ratio of Young's Modulus (E) to Shear Modulus (G) of elastic materials is ?

(a)2(1 + v)

(b) 2(1 — v)

(c)(1 + v)/2

(d)(1 — v)/2

37. Two mating spur gears have 40 and 120 teeth respectively. The pinion rotates at

1200 rpm and transmits a torque of 2O N. m. The torque transmitted by the gear is

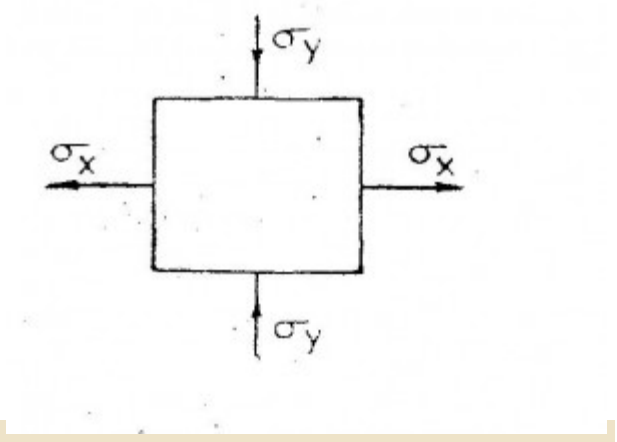
(a) 6.6 Nm

(b) 20 Nm

(c) 40 Nm

(d) 60 Nm

38. The figure shows the state of stress at a certain point in a stressed body. The magnitudes of normal stresses in the x and y direction are 100 MPa and 20 MPa respectively. The radius of Mohr's stress circle representing this state of stress is



(a)120

(b)80

(c)60

(d)40

39.For a mechanism shown below, the mechanical advantage for the given configuration is?

(a)0

(b) 0.5

(c)1.0

(d)Infinity

40.A vibrating machine is isolated from the floor using springs. If the ratio of excitation frequency of vibration of machine to the natural frequency of the isolation system is equal to 0.5, the transmissibility of ratio of isolation is

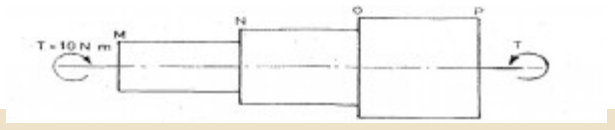
(a)1/2

(b)3/4

(c)4/3

(d)2

41. A torque of 10 Nm is transmitted through a stepped shaft as shown in figure.



The torsional stiffnesses of individual sections of lengths MN, NO and OP are 20 Nm/rad 30 Nm/rad and 60 Nm respectively. The angular deflection between the ends M and P of the shaft is?

(a) 0.5 rad

(b) 1.0 rad

(c) 5.0 rad

(d) 10.0 rad

42.

In terms of theoretical stress concentration factor (K_t) and fatigue stress concentration factor (K_f), the notch sensitivity 'q' is expressed as

(a) $\frac{(K_f - 1)}{(K_t - 1)}$

(b) $\frac{(K_f - 1)}{(K_t + 1)}$

(c) $\frac{(K_t - 1)}{(K_f - 1)}$

(d) $\frac{(K_f + 1)}{(K_t + 1)}$

43. The S-N curve for steel becomes asymptotic nearly at

(a)10 3 cycles

(b) 10 4 cycles

(c)10 6 cycles

(d) 10 9 cycles

44. In the window air conditioner, the expansion device used is

(a)capillary tube

(b) thermostatic expansion valve

(c)automatic expansion valve

(d) float valve

45. During chemical de-humidification process of air

(a) dry bulb temperature and specific humidity decrease

(b) dry bulb temperature increases and specific humidity decreases

(c) dry bulb temperature decreases and specific humidity increases

(d) dry bulb temperature and specific humidity increase

46.An incompressible fluid (kinematic viscosity, 7.4 x 10-7 m2 /s, specific gravity, 0.88) is held between two parallel plates. If the top.plate is moved with a velocity of 0.5 rn/s while the bottom one is held stationary, the fluid attains a linear velocity profile in the gap of 0.5 mm between these plates; the shear stress in Pascals on the surface of top plate is ?

(a)0.651 x 10 -3

(b) 0.651

(c)6.51

(d) 0.651 x 103

47.Environment friendly refrigerant R134a is used in the new generation domestic refrigerators. Its chemical formula is ?

(a)CH ClF2

(b) C2 Cl 3F3

(c)C2 Cl 2F4

(d) C2 H2F4

48.

A fluid flow is represented by the velocity field $\vec{V} = ax\,\vec{i} + ay\vec{j}$, where a is a constant. The equation of stream line passing through a point (1, 2) is

(a)x—2y=0

(b) 2x+y=0

(c)2x—y=0

(d) x+2y=0

49. A gas contained in a cylinder is compressed, the work required for compression being 5000 kJ. During the process, heat interaction of 2000 kJ causes the surroundings to the heated. The change in internal energy of the gas during the process is

(a)—7000kJ

(b) —3000kJ

(c)+ 3000 kJ

(d) + 7000 kJ

50.The compression ratio of a gas power plant cycle corresponding to maximum work output for the given temperature limits of Tmin and Tmax will be

(a) $\left(\frac{T_{max}}{T_{min}}\right)^{\frac{\gamma}{2(\gamma-1)}}$

(b) $\left(\frac{T_{min}}{T_{max}}\right)^{\frac{\gamma}{2(\gamma-1)}}$

(c) $\left(\frac{T_{max}}{T_{min}}\right)^{\frac{\gamma-1}{\gamma}}$

(d) $\left(\frac{T_{min}}{T_{max}}\right)^{\frac{\gamma-1}{\gamma}}$

51.