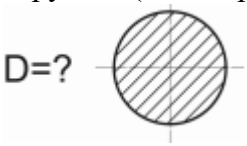
Задание на КР

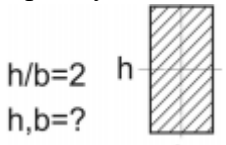
Расчет балки на прочность

Для заданной расчетной схемы балки (табл. 1, номер схемы соответствует номеру варианта задания) подобрать сечения и провести полную проверку прочности, для чего требуется:

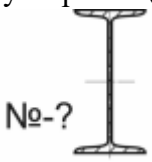
1. Начертить схему нагружения в масштабе, с указанием числовых значений приложенных нагрузок.
2. Построить эпюры перерезывающей силы Qy и изгибающего момента Mz .
3. По условию прочности подобрать сечения стальной балки (приняв предел текучести $\sigma_т$=245МПа, коэффициент запаса n=1,5):
   - круглое (диаметр D);



   -прямоугольное (высота h/ширина b, с соотношением h/b=2);



   - двутавровое (№ двутавра);



4. Сравнить экономичность всех сечений.
5. Для ***<u>балки двутаврового</u>*** профиля провести полную проверку на прочность:
   - построить эпюры нормальных и касательных напряжений для одного из опасных сечений.
   - провести проверку на прочности по четвертой теории прочности

$$\sigma_{пр}^{IV} = \sqrt{\sigma^2 + 3\tau^2}$$

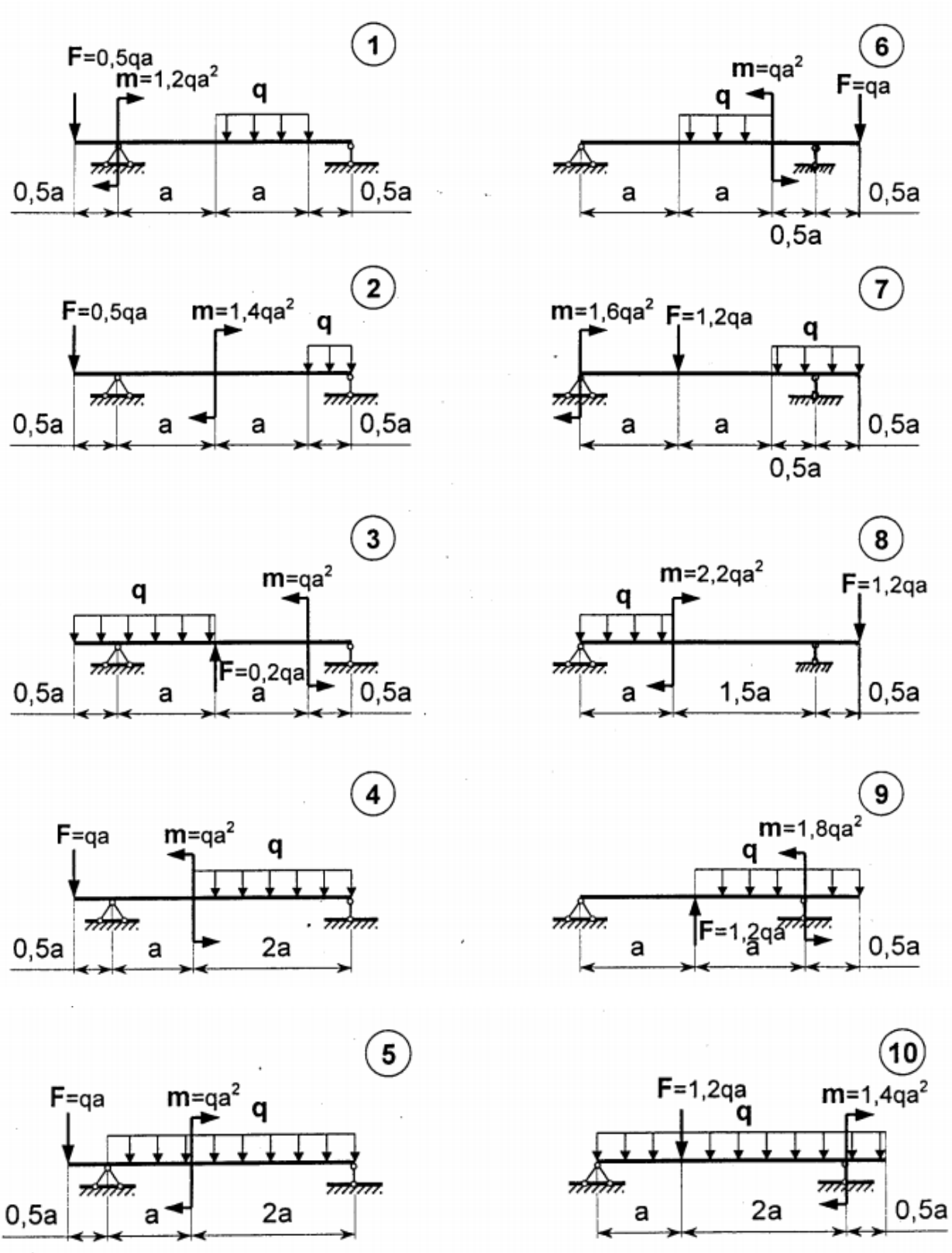
Литература для подготовки работы:

1. Сопротивление материалов, Н. М. Беляев, Главная редакция физико-математической литературы изд-ва «Наука», 1976 г., стр. 608.
2. Сопротивление материалов, Павлов П.А., Паршин Л.К., Мельников Б.Е., Шерстнев В.А., 2007

Таблица 1. Варианты заданий.

Вариант	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
a, м	0,8	3,0	2,5	1	4	6,3	2,3	1,7	5,6	2,3	2	4,1	0,3	1,6
q, кН/м	30	12	18	30	20	14	11	13	15	8	13	16	23	15
Вариант	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
a, м	1	3	4,2	6,8	1,7	0,9	2,5	3,1	4	4	2,3	4	3,3	2,6
q, кН/м	20	14	11	13	20	14	30	12	18	18	20	14	30	12

Вариант	29	30	31	32	33	34	35	36	37	38	39	40	41	42
а, м	0,8	3,0	2,5	1	4	6,3	2,3	1,7	5,6	2,3	2	4,1	0,3	1,6
q, кН/м	14	15	18	23	16	18	12	15	8	10	12	11	23	14
Вариант	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**
а, м	1	3	3,2	4,8	2,7	1,2	1,5	1,1	4	3	1,3	1	3,3	4,6
q, кН/м	23	16	18	12	15	14	14	15	18	14	20	14	23	12



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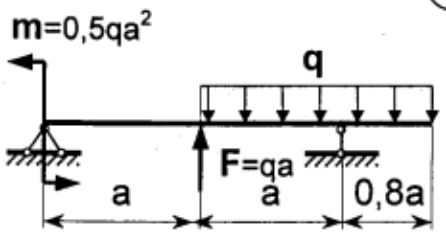

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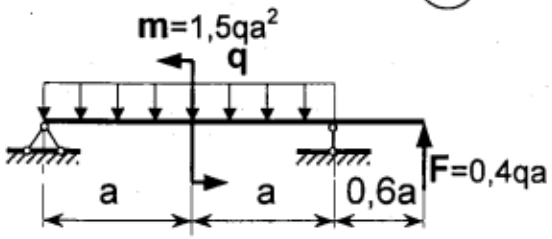

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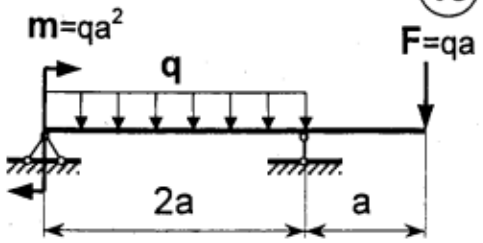

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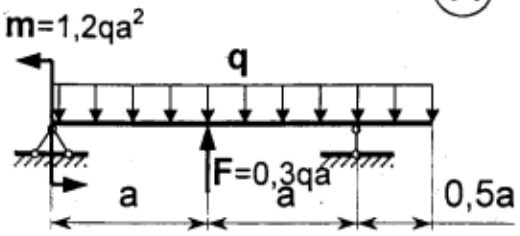

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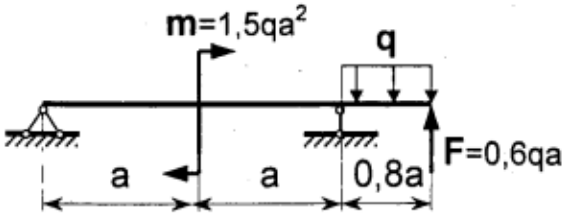

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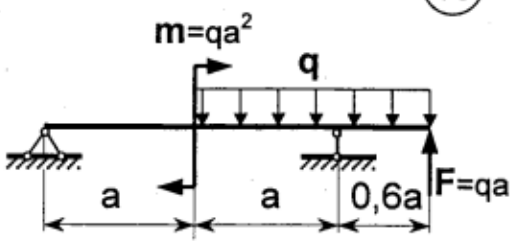

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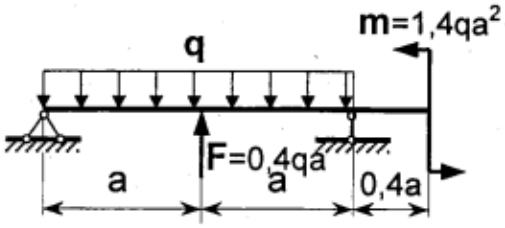

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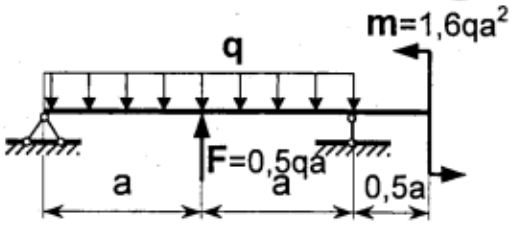

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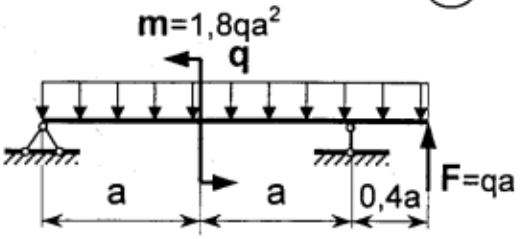

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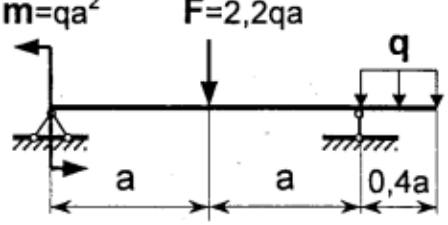

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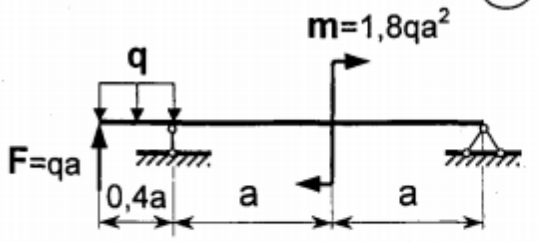

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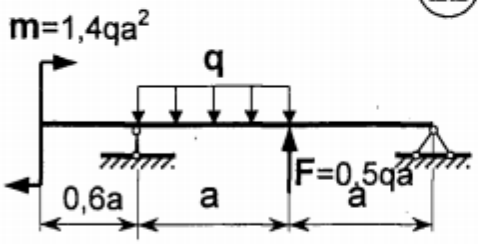

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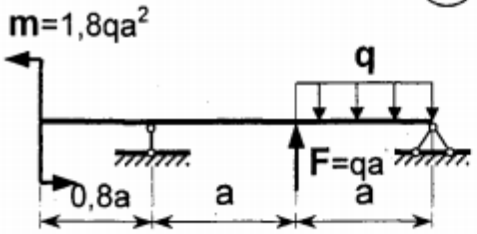

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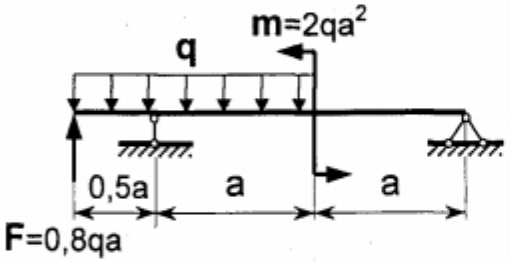

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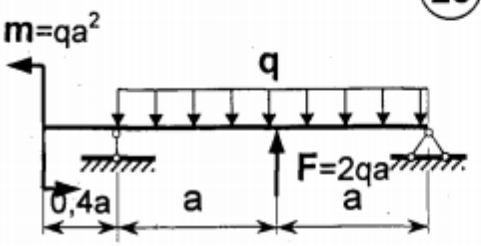

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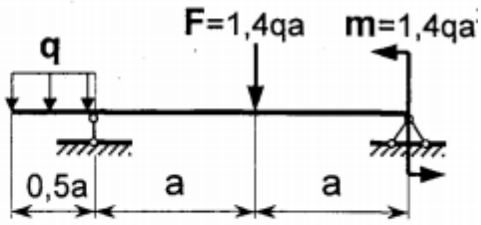

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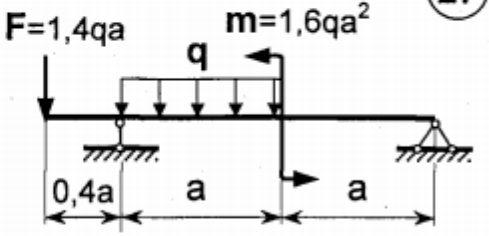

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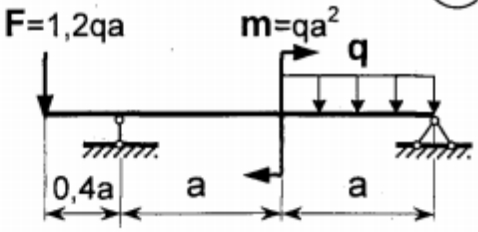

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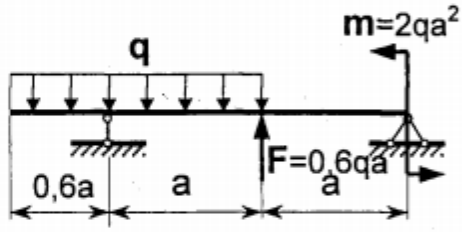

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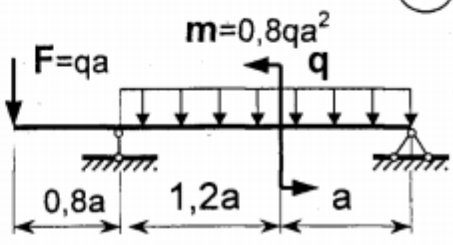

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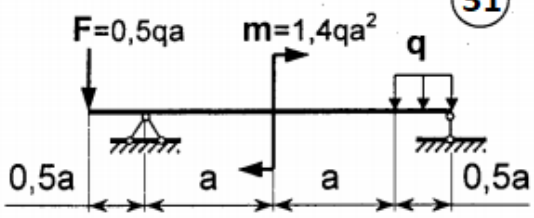

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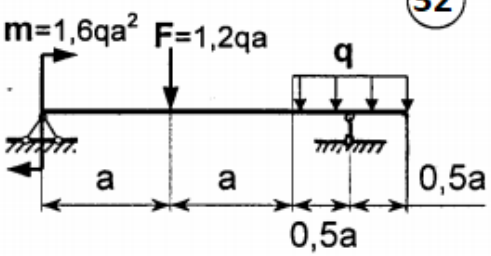

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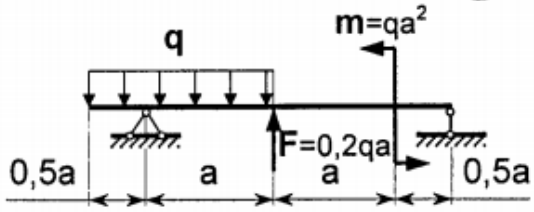

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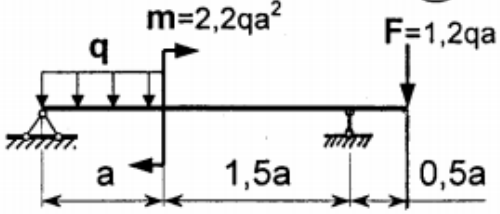

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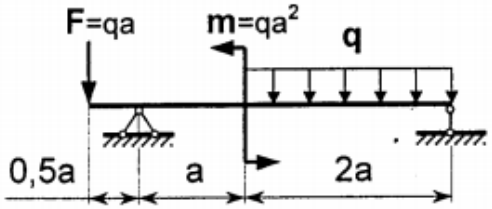

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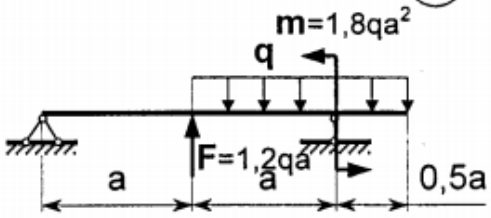

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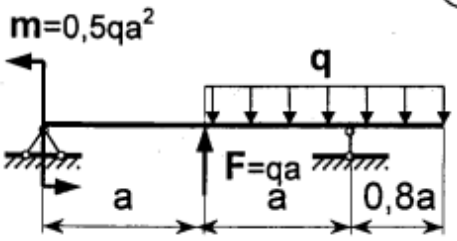

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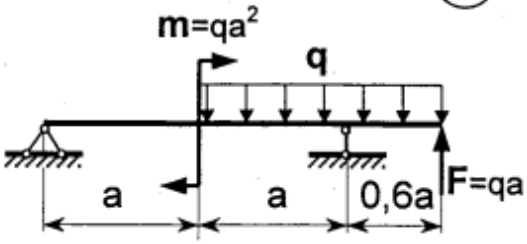

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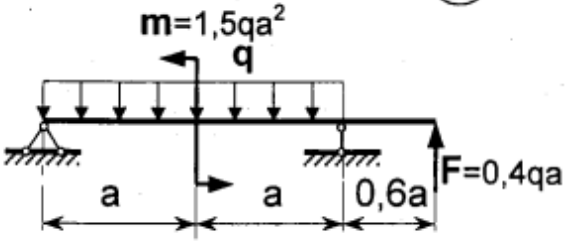

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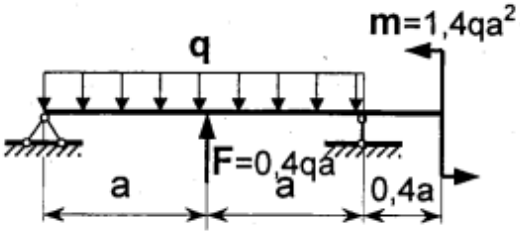

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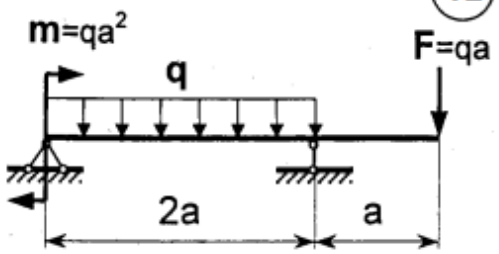

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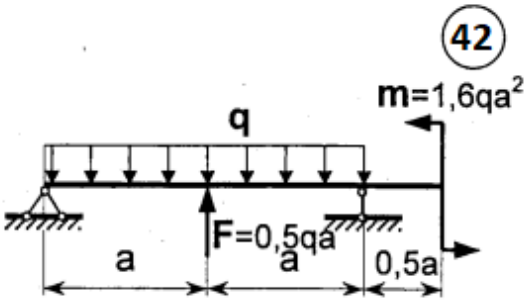

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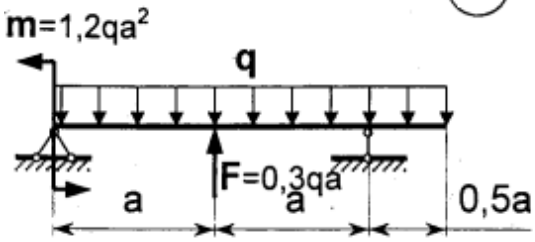

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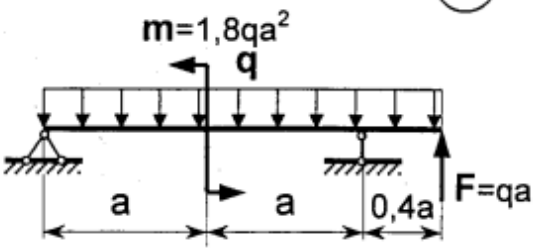

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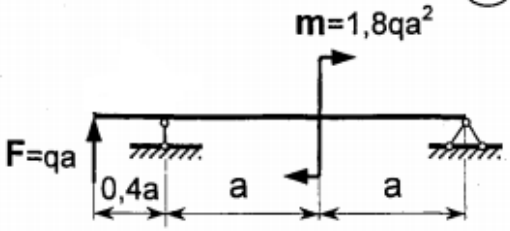

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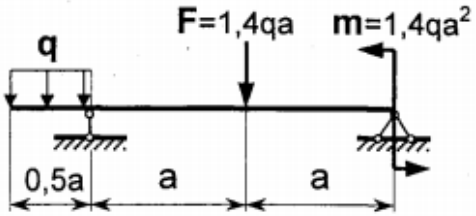

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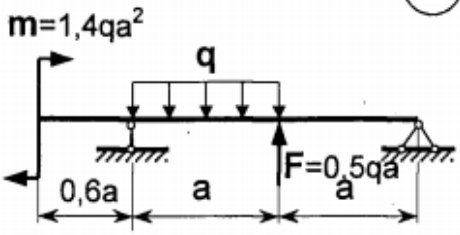

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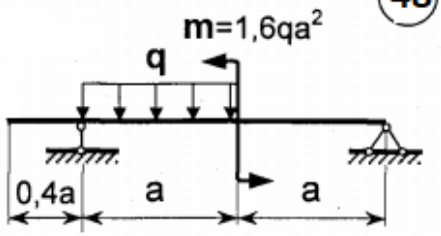

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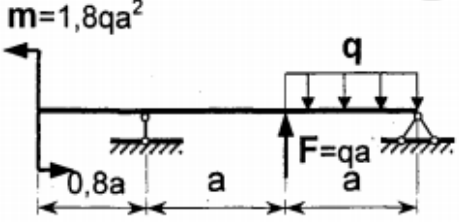
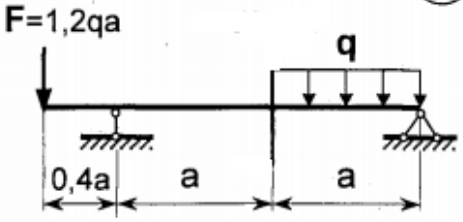
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